Summer Training

At

Max Super Speciality Hospital, Mohali.

From: May 10, 2021- July 2, 2021 (8 weeks)

Hazard Identification and Risk Assessment (HIRA) of the entire hospital premises: A Report

by

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M.B.A in Hospital and Healthcare Management

(2020-2022)

IIHMR UNIVERSITY

CERTIFICATE FROM THE ORGANIZATION:

MAX Healthcare

Ref: MOH/TR/CP/J767 **03-July-2021**

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Dr. Aastha Maingi D/O Sh. Sudhir Maingi Student of IIHMR University, Jaipur, has completed her internship in the department of Hospital Operations at Max Super Speciality Hospital, Mohali on 02nd July,2021.

During the training (10th May, 2021 to 02nd July, 2021) she was part of the hospital set up and reporting to Dr. Swati Marwaha.

We wish her all the best in her future endeavors.

For MAX SUPER SPECIALITY HOSPITAL
(A UNIT OF HOMETRAIL BUILDTECH PVT. LTD.)
Shivraj Nakai
AUTHORISED SIGNATORY

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ACKNOWLEDGEMENT:

Needless to say, trainings help gain the practical industry experience where we get to implement our theoretical learning and learn from the field experts and professionals. I am thankful to my institute, IIHMR University, Jaipur, for giving me the opportunity to undergo training that will help me professionally in my career enhancement.

First and foremost, I express my deepest gratitude to the Almighty for blessing me with good health and resources to be able to carry out a training amidst the times of a deadly pandemic.

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LIST OF ABBREVIATIONS:

1. **ALARP:** As Low as Reasonably Possible
2. **CATH LAB :** Catheterization Laboratory
3. **CDC :** Centres for Disease Control and Prevention
4. **CSSD :** Central Sterile Supply Department
5. **CTVS :** Cardiothoracic Vascular Surgery
6. **ETO :** Ethylene Oxide
7. **F & B :** Food and Beverage Department
8. **HVAC :** Heating, Ventilation and Air-Conditioning.
9. **ICU :** Intensive Care Unit
10. **JCI :** Joint Commission International
11. **MAMBS :** Minimal Access and Metabolic Bariatric Surgery.
12. **MSDS :** Material Safety Data Sheet
13. **NABH :** National Accreditation Board for Hospitals & Healthcare Providers
14. **OHSA :** Occupational Health and Safety Act
15. **OHSAS:** Occupational Health and Safety Advisory Services.
16. **OPD :** Outpatient Department
17. **OT :** Operation Theatre
18. **WHO :** World Health Organisation

1) INTRODUCTION OF THE ORGANIZATION:

Figure 1: Max Super Speciality Hospital, Mohali.

Max Healthcare Super Speciality Hospital is one of the premier names in the healthcare domain in the world. Accredited by NABH, it is a 214 bedded hospital facility. The hospital is recognized for its integrated medical care in various disciplines provided by highly qualified doctors and nursing staff and other healthcare professionals. Max Labs and blood banks that are NABL recognised are also available at the hospital. The hospital offers nearly 26 clinical specialities with a team of 80+ doctors and nearly 350+ nursing staff. Max Hospital, Mohali has set itself to be a leading healthcare provider with multiple accreditations to its name and stands out with Infrastructure of the highest quality, cutting-edge technology, and high health and safety requirements.

OUR VISION:

At Max Healthcare, our vision is to be the most well-regarded healthcare provider in India committed to the highest standards of clinical excellence and patient care, supported by latest technology and cutting-edge research.

Every day we come to honour a higher purpose – To serve. To excel.

SECTION 1:

ORGANIZATIONAL LEARNING:

Max Healthcare follows a core of ‘Patient Centred Care’ and is recognised nationally and internationally for the same. Max's clinical team of professional physicians and nurses has effectively implemented the "Medical Excellence Model" by analysing patient needs, ordering testing, arranging treatments, scheduling surgeries, monitoring progress, and planning for early discharge to home in an integrated manner.

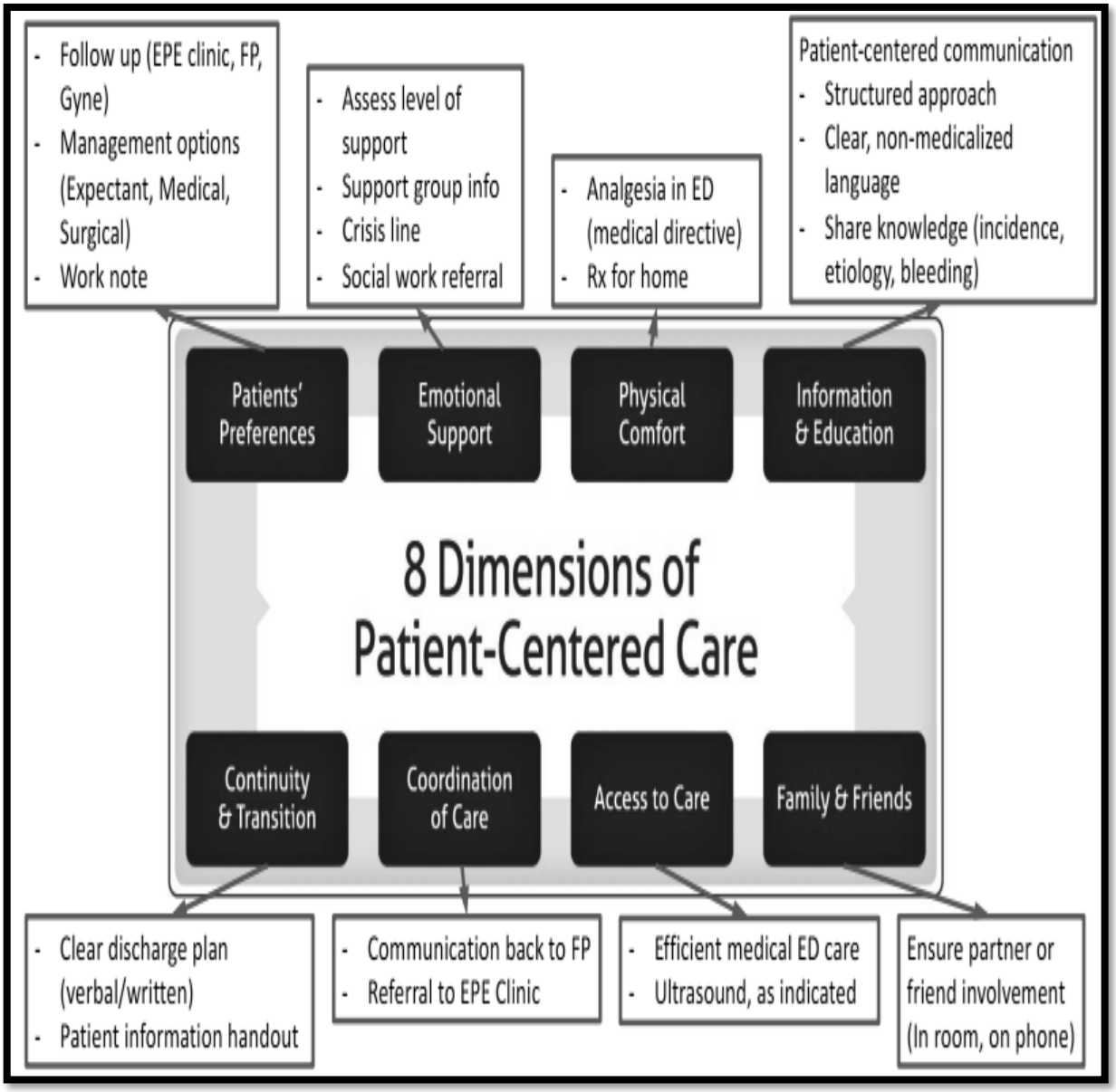

Figure 2: Dimensions of Patient Centred Care

Figure 3: Medical and Service Excellence Model

2) DEPARTMENTS IN THE HOSPITAL:

Table 1: Clinical Departments at Max hospital, Mohali

Cardiology	Critical Care and Pulmonology
Gastroenterology	Dermatology & Cosmetics
Neurology & Neurosurgery	ENT
Vascular Surgery	Rheumatology
Orthopaedics & Joint Replacement	Ophthalmology

Emergency & Critical Care	Spine
Medical, Surgical and Radiation Oncology	Physiotherapy & Rehabilitation
Plastic Surgery	Nuclear Medicine & Radiology
Cath Lab	Preventive Health Medicine
Nephrology, Urology & Renal Transplant	Dietetics
Paediatrics & Neonatology	Dental
Anaesthesiology	Endocrinology
Psychiatry	Gynaecology & Obstetrics
General Surgery	Internal Medicine

Table 2: non-Clinical departments at Max hospital, Mohali

Human resource and training	Operations and Quality
Medical records	Marketing and Communication
IT	Biomedical Engineering
Central sterile services	Finance & Accounts
Security (Ambulance, Parking, Transportation)	Blood Bank
Laundry and Linen	Administration
Food and Beverage	ECHS
Laboratory services	Store
Engineering	Pharmacy

3) DEPARTMENTS AT A GLANCE:

Clinical Departments:

- Outpatient Department (OPD)

The OPD is the first point of contact between the patients and the hospital. OPD includes those patients who do not spend a night in the hospital. It is basically the shop window of the hospital. Every clinical department in the hospital has an OPD.

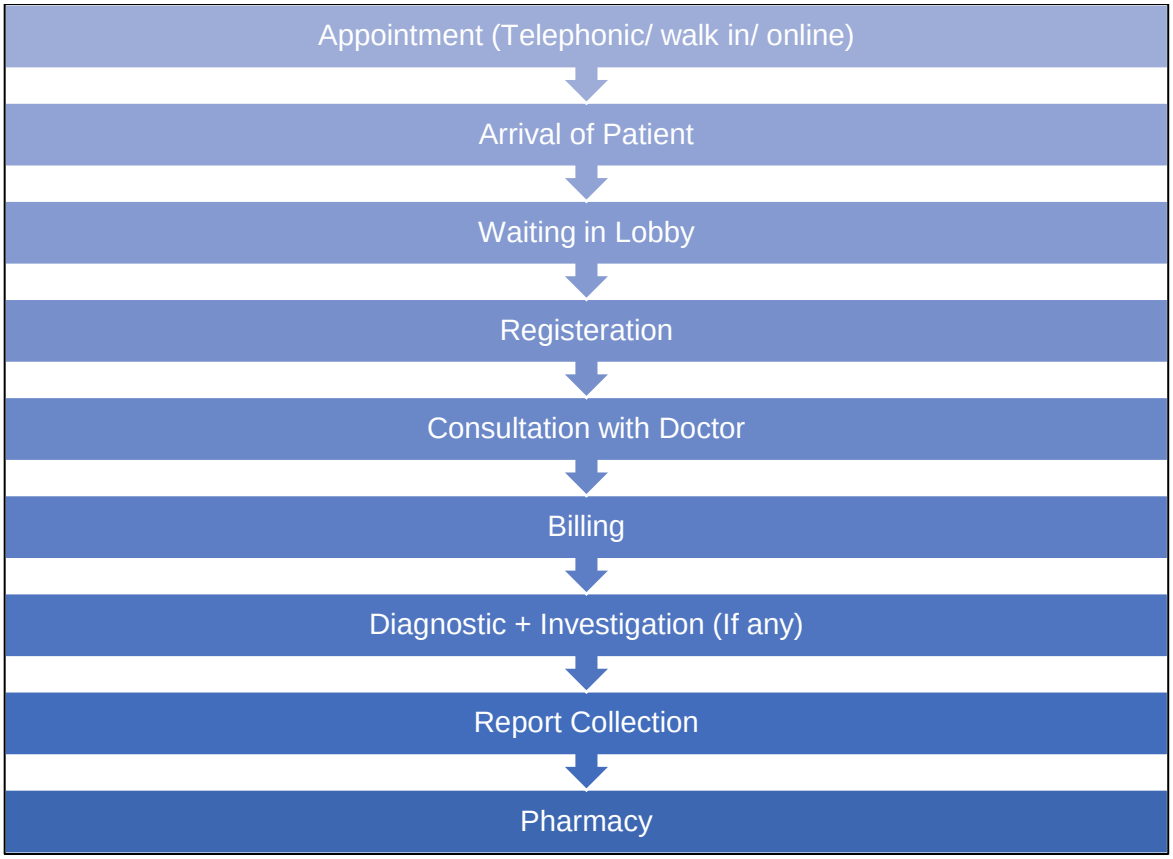

Figure 4: General OPD Process at Max hospital, Mohali

- **Inpatient Department (IPD):**

The IPD is the department where the patients are admitted into the hospital. This implies that the IPD patients are those who spend at least one night in the hospital for their treatment.

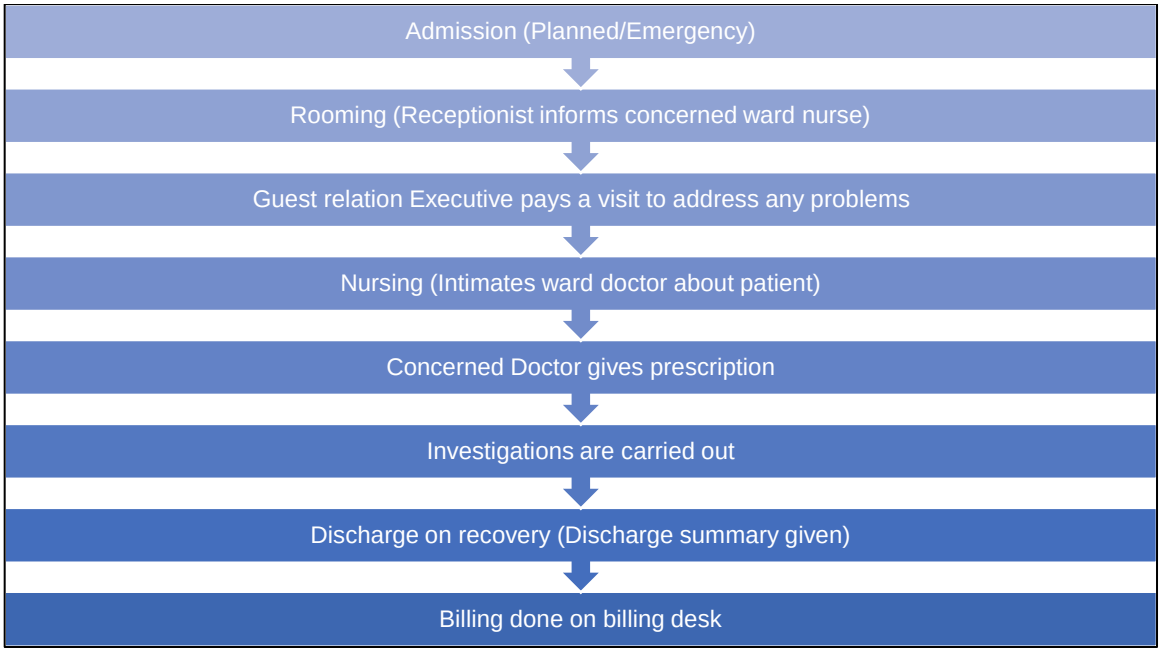

Figure 5: General touch points of IPD patients at Max hospital, Mohali

- **Personalized Health Check Up:**

One of the best ways to prevent any disease is to detect it early. With today's sedentary and hectic lifestyle with no time to exercise and keep healthy, we are all prone to contracting various lifestyle disorders. Max's Personalized health check-ups is basically a preventive health check-up plan for its customers. Here, every individual can tailor his/ her plan according to their needs and wishes.

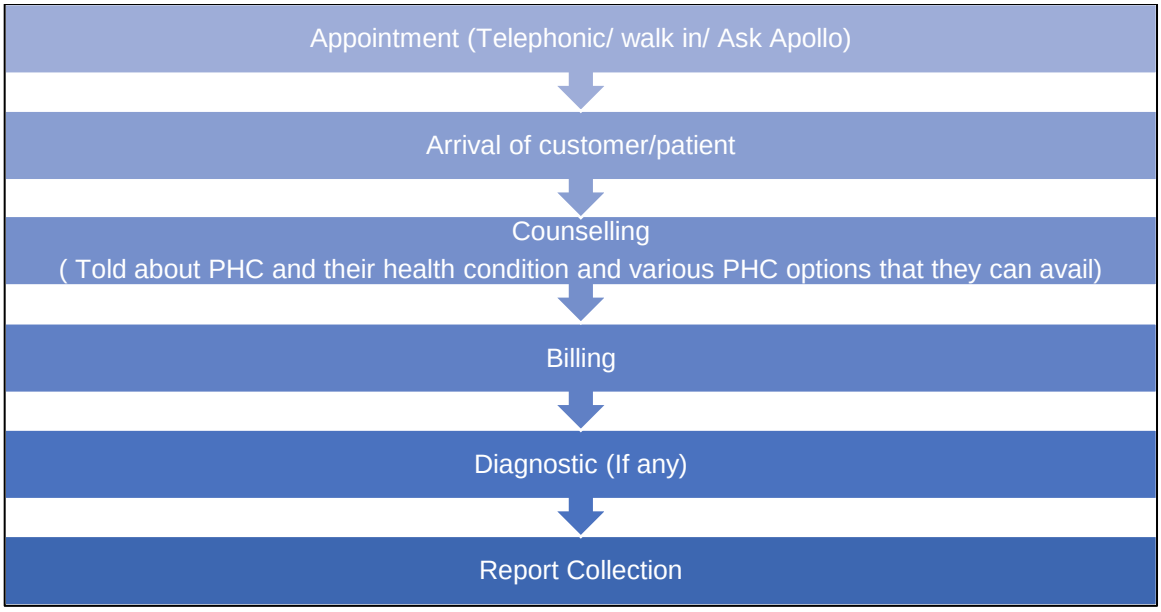

Figure 6: PHC Touch points at Max hospital, Mohali.

- When the patient comes to the hospital, there are various touch points that the patient has to go through starting from his/ her entry to the exit which are listed as follows:
  - Reception (ground floor)
  - Consultation with the concerned doctor
  - Nurse station (First Floor)
  - Pharmacy
  - Treatment room
  - Billing and discharge

- **Emergency Medicine Department**:

- • The Emergency Medicine Department (EMD) is the hospital's frontline of patient care, and it provides timely access, appropriate transportation, and treatment in pre-hospital care, as well as high-quality emergency care to all patients that contact the EMD. In general, the EMD's operations are divided into two categories:
- Medical Services in Case of Emergencies (Pre-hospital care in ambulance by emergency medical technicians & ambulance drivers)
- Intensive Care Unit (In-hospital care by emergency physicians, emergency nurses, housekeeping & other assistants)
- The emergency room, sometimes known as the ER, is one of the hospital's most vital and busy departments. It consists of the in-hospital care by emergency physicians, emergency nurses, housekeeping and other assistants. They run 24x7 and 365 days a year. Due to the unpredictability of emergency room visits, the department is obliged to provide initial treatment for a wide range of illnesses and injuries, some of which are life-threatening and require immediate attention.
- The emergency medicine department is located on the ground floor and has a dedicated access for patient entry to Emergency Room (ER). The ER floor area is divided into following areas broadly:
  a) Triage Room
  b) Doffing and donning room
  c) Registration Desk
  d) Nursing & In-house Billing Desk
  e) Attendants Waiting Area
  f) Resuscitation Area
  g) Treatment Room

h) Clean Utility, Dirty Utility & Toilets
i) Emergency physician Consultation Room
j) Decontamination Area (Should be near ambulance parking or triage area)

There are in total 6 beds in the ER (including the isolation room bed). Access to the emergency room is dedicated and separated from the main entrance. 24hr security personnel controls access to the ER. There is clear & prominent signage is present, indicating the entrance into the ER.

- **Laboratory**

The hospital laboratory services provide essential diagnostic services which help the physician/doctor making important decisions related to the treatment of the patient. The sample collection from the patients on outpatient basis is done through the sample collection department. For the in-house patients it is directly dispatched through the sample dispatch boys.

The departments present at the Hospital Laboratory are:

1) Biochemistry
2) Hematology
3) Microbiology
4) Transfusion Services/Immunology
5) Surgical Pathology
6) Cytology
7) Histopathology
8) Radioimmunoassay

- **Nuclear medicine and Radiology:**

These departments are located at the ground floor of the hospital. While the purpose of the both the departments is similar, they differ in their methodology. Unlike the conventional method of taking X-rays of the patients in radiology, NM works with injecting the radio pharmaceuticals inside the patient's body to produce a detailed image of a specific target area.

- **Operation Theatre :**

The hospital has 8 OTs located on the first and second floor.

On an average 15-20 surgeries are performed every day facilitated by nearly 80 doctors and 350 nurses. More than 100 different types of surgeries are performed under various departments such as:

1. Gastroenterology

2. Orthopedic
3. Urology
4. Plastic
5. Vascular
6. Neurosurgery
7. ENT
8. Ophthalmology
9. Oncology
10. Gynecology & Obstetrics
11. Transplant
12. Cardio-thoracic
13. General
14. Colo-rectal

- **Critical Care Unit (CCU) & Intensive Care Units (ICU'S)**

  Patients with serious illnesses receive high-quality care in critical care units. Patients are advised by the members of the critical care consulting group. They also consult the primary consultants to provide high quality care to the patients. At Max Hospital, Mohali, the intensive care units are segregated into:

- MEDICAL ICU (MICU)
- SURGICAL ICU (SICU)
- NEONATAL ICU (NICU)
- NEURO CCU
- ORTHO CCU
- RENAL CCU
- CT POST OPERATIVE CCU (CTVS)

  There are a total of 83 ICU beds and 8 HDU beds in the hospital.

Non-Clinical / Administrative Departments:

- **Medical records department:**

The medical department is in the basement 1 level. The hospital stores physical records of the patients i.e., hard copies of the files. The files are stored according to the registration number of the patient. The hospital also maintains soft copies by scanning the files and storing them in external storage devices.

The records are kept for a duration as directed by the government. Here, the duration is mentioned according to the guidelines by Punjab State government. It is as follows:

1. OPD records: 3+2 years
2. IPD records: 3+2 years
3. Medico-legal cases: 10 + lifelong
4. Death record: 10 years
5. Birth record: 18+3 years

Post the designated duration, the records are shredded by following the procedure given by the government.

Figure 7: Procedure of Shredding the medical records at Max hospital, Mohali.

- **IT department:**

The IT department is located at the basement 1 of the hospital. The employees are responsible for the smooth functioning of the internal HMIS. Any support required, hardware or software, is provided by IT to the hospital.

- **Accounts department:**

Since Max Healthcare are a chain of corporate hospitals, they give due importance to the finances. The finance department works closely with the corporate relations and other departments.

- **Human Resources (HR) Department:**

  The department located in the administrative building is integral to the functioning of the hospital. Tasks like hiring and recruiting, selecting benefits and compensation, managing personnel and troubleshooting claims are conducted by the department.

- **Central Sterile Service Department (CSSD**):

The CSSD is located at the basement 1 of the hospital. The department is functional 24*7. There are multiple methods of sterilization followed based on the type of material. The methods are –

Method of sterilization	Number of equipment
Steam	2
Ethylene Oxide (ETO)	1

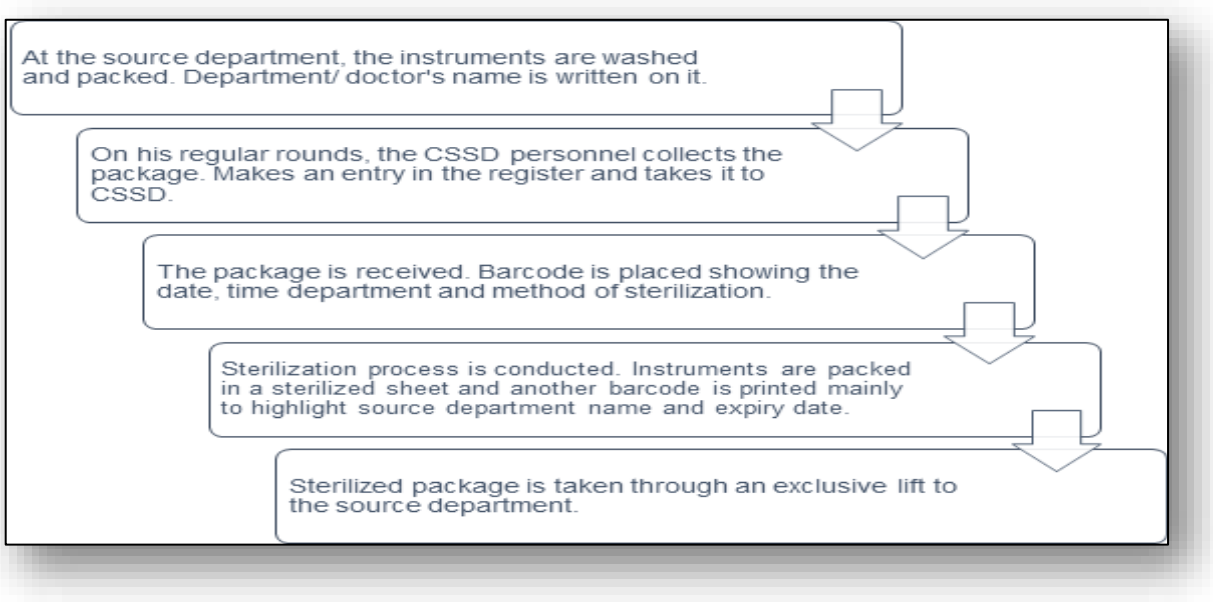

Figure 8: Process of sterilization at CSSD, Max hospital, Mohali.

- **ECHS Department:**

  Located at the basement, the department makes sure of the implementation of the Ex-Servicemen Contributory Health Scheme which aims to provide Medicare to ex-servicemen, pensioner and their dependents through a network of ECHS Polyclinics, Service medical facilities, Government hospitals, empaneled private hospitals/specified govt.

- **Biomedical engineering department:**

The biomedical engineering department is located at the basement 1 of the hospital. This department is responsible for all the medical consumables of the entire facility. Their duties include:

- Repair faulty equipment with least possible downtime and financial burden.
- Follow planned preventive maintenance to prevent breakdown of equipment.
- Train the staff (doctors, nurses, technicians and paramedics) for the proper usage of equipment.
- Coordinate with original equipment manufacturers for technical support.
- Coordinate with purchase and administrative departments for procurement of spares and parts at the earliest.

Presently, the department deals with an average number of 10-15 complaints received per day.

Food and Beverage Services

Dietary services are essential to provide clean, healthy hygienic food to the patients, residents, staff and visitors.

The dietary needs of each patient are assessed by the dieticians in consultation with the doctors and a diet chart is prepared for every patient. Daily routine visits by the dieticians to the patients and their compliance to the food advised is assured.

At Max Hospital, Mohali, the food and beverage services are provided internally in the hospital kitchen. They work in coordination with the dieticians to provide services to the patients according to their specific needs. A choice of Indian and international cuisines is given.

Blood Bank

Max Hospital, Mohali, has licensed blood bank with Max labs. It successfully meets the request for rare blood transfusion. It offers 24 hrs. service and has an excellent diagnostic and support service. It is a reliable Centre for testing of blood for transfusion transmitted diseases. It offers fresh blood transfusions for emergency/trauma cases.

Linen and Laundry Department

The laundry service is in the basement. It receives linen from all departments of the hospital. Linen is segregated and each type of linen is washed in different cycles. The linen is recycled back within 24hrs.

- **Security Department:**

  Located at the upper basement level of the hospital, the department deals with issues like thefts, missing/absconding patients, medico legal cases, fire safety, reports collection, lost and found etc. The department is also responsible for launching various emergency codes according to the incidents. The department undergoes routine visits from the patient welfare department and conducts emergency drills within the facility. The department also supervises the parking and transportation of the hospital.

- **Gas Manifold Department**:

  The department located at the upper basement ensures the continuous central oxygen line functioning and supply of the hospital.

- **Fire Safety and Protection:**

  The department located at the basement assures of detection and protection of the facility from emergencies like fires, sewage and drainage.

SECTION 2:

PROJECT INTRODUCTION: HAZARD IDENTIFICATION AND RISK ANALYSIS (HIRA)

Abstract:

The Hazard Identification and Risk Analysis (HIRA) technique can explain many of the most prevalent and serious hazards that concern healthcare personnel. A number of tasks and processes connected with the use of hazardous materials or substances are highlighted in the Risk Assessment Matrix (RAM).

The study's objective is to identify the hospital's health and safety concerns, then address the medium and high-risk hazards first, inform employees about their working hazards, and recommend the necessary controls to the concerned authorities.

The exploratory design is used in the study. The research was conducted in real time. The primary source of data collection was observation. A quantitative data analysis is done.

The study identified all the health and safety hazards in different departments of the hospital. Out of them those whose risk rating score is above 10 (i.e., Major and Severe), are determined as high-risk hazards which require more attention and some intervention to prevent harms.

INTRODUCTION OF HAZARD IDENTIFICATION AND RISK ANALYSIS

To be successful in any industry, it is now necessary to detect hazards, analyse associated risks, and reduce risks to a tolerable level. It is one of the most important standards under the Occupational Health and Safety Management System–OHSAS(18001) for the organisation to prevent injury and sickness, as well as to provide a safe workplace for their employees and other relevant persons.

WHAT IS HAZARD?

Definition: According to OSHA, when it comes to workplace health and safety, a hazard is defined as any source that may cause possible damage, harm, or bad health consequences on something or someone under certain work conditions."

Hazards can be divided into two broad groups:

• Health hazards (cause occupational illnesses)

• Safety Hazards (cause physical harm - injuries)

Essentially, a hazard can cause injury or have negative consequences (to individuals as health effects or to organisations as property or equipment losses).

A common way to classify hazards is by category:

- Biological-germs, viruses, fungi, needle stick injuries, and so on
- Chemical- depending on the chemical's physical, chemical, and poisonous qualities.
- Ergonomic -repeated movements, incorrect workspace setup, etc.
- Physical - dangers, such as sliding and tripping hazards, insufficient machine guarding, equipment malfunctions or breakdowns, pressure extremes (high pressure or vacuum), noise, and so on.
- Psychosocial - stress, violence, etc.,
- Radiation – Exposure to X-Rays, Alpha, Gamma rays, etc
- Electrical – Fire, Electric shock, short circuit etc

INTRODUCTION OF OHSA

The Occupational Safety and Health Administration (OSHA) of the United States Department of Labour is a regulatory agency. The agency was established by President Richard M. Nixon's signing of the Occupational Safety and Health Act on December 29, 1970.

"Assure safe and healthy working conditions for working men and women by creating and enforcing standards and providing training, outreach, information, and assistance," according to OSHA's purpose.

OBJECTIVE OF THE STUDY

1. To identify and assess potential health and safety dangers in the hospital, as well as the likelihood and severity of injury.
2. To address the high-risk hazards immediately with preventive measures ready to address low and medium risks as well for effective management.
3. To recommend the needed controls and their implementation in respective departments to the concerned authorities

SAMPLE SIZE: The study includes both clinical and non-clinical departments of the hospital. The study was conducted in those areas of the hospital that are at a risk of health and safety hazards and possible severity of injuries. The departments are as follows:

- Laboratory
- Blood Bank
- Fire safety & Security
- Bio Medical
- Gas Manifold
- IT
- Nuclear Medicine
- Radiology
- Food & Beverage
- Human Resources
- Emergency
- CSSD
- Engineering
- Store
- OPD
- ICU

SCOPE OF STUDY:

The study will help the hospital to:

1. To develop a risk assessment matrix with respect to hazards and risks affecting the employees of respective departments.
2. To develop an effective Hazard Management Process.
3. To promote the health and safety awareness among hospital staff.

METHODOLOGY

1. **Type of study:** Exploratory
2. **Duration of study:** 1 month
3. **Population size:** Max Super Speciality Hospital, MOHALI
4. **Sampling technique :** Convenience Sampling
5. **Sources of Data collection:**
   A) Primary data: Through Observation
   B) Secondary data: MSDS, NABH Standards**,** OSHA guidelines
6. **Data Entry :** Manually
7. **Data Analysis :** Quantitative **.**

PROCEDURE OF HIRA

INTRODUCTION: This chapter includes all the procedures that are used in the process of the study which includes the identification process, determining the likelihood and severity of injury and control measure of the identified hazard. The hospital use OHS guidelines for the procedure which are as follows:

IDENTIFICATION OF HAZARDS:

Hazards may be identified by:

- **Observation—to identify hazards, use your senses of sight, hearing, smell, and touch in conjunction with your knowledge and experience.**
- **Material Safety Data Sheets (MSDSs)** - are available from manufacturers and suppliers. Read them carefully to identify potential dangers from harmful chemicals and the steps that must be taken.
- **Hazard and risk assessments**–undertake hazard spotting assessments in key work areas. Discuss your safety concerns with others.
- **Record analysis** - • Keep note of specific dangers, near-misses, injuries, and workers' compensation claims to help identify probable trends.
- **Discussion groups** - are helpful for identifying dangers and proposing solutions.
- **Safety audits** -consider forming a safety committee to look into safety and assist in the development of a management strategy.
- **Information** - • Information–stay up to date on industry hazards by using the most up-to-date information. **Consumer information** - read the consumer instructions on equipment and chemicals carefully and follow them.
- **Regulations and best practices**

Basically, the practise of recognising all dangers in the workplace is known as hazard identification. There is no one-size-fits-all approach to categorising workplace injury and sickness risks.

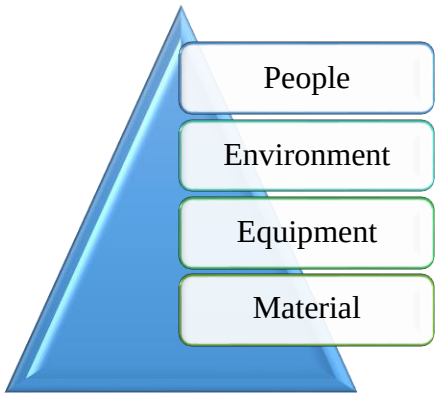

Figure 9: Most common sources of hazards.

ASSESSMENT OF RISK:

- Once a hazard has been discovered, the likelihood and severity of injury or harm must be evaluated before deciding how to best reduce the risk. Hazards that pose a high danger must be addressed more quickly than those that pose a low risk. You may decide that the same hazard can result in a variety of distinct consequences. Consider the likelihood of each conceivable outcome for each hazard and record the one with the highest priority.

MAKE THE CHANGES BASED ON RISK ANALYSIS:

Consider the following control measures, ranked from most important to least important:

- Remove the hazard at its source, for as by removing or replacing it OR
  OR use something less dangerous in its place. OR keep the potentially dangerous method, item, or substance away from humans.
- Include engineering controls like safety barriers and exhaust ventilation.
- Use safe work methods, training, and supervision to reduce risk, and provide personal protection equipment when other measures aren't sufficient or practical.
- Provide personal protection equipment when other options are insufficient or impractical. Implement and track the controls you choose.

MONITOR & REVIEW: This will involve Risk control i.e., actions implementing risk evaluation decisions.

Risk control can involve monitoring, re-evaluation, and compliance with decisions

INTRODUCTION:

This method shows data obtained and analysis from study using selected techniques and recordings of findings. Data consist of the probability, consequences, and control measure for all identified hazards in different departments.

HAZARD IDENTIFICATION AND RISK ANALYSIS CHECKLIST:

The checklist consists of hazards identified in selected departments, their probability, consequences, control measure and risk rating score.

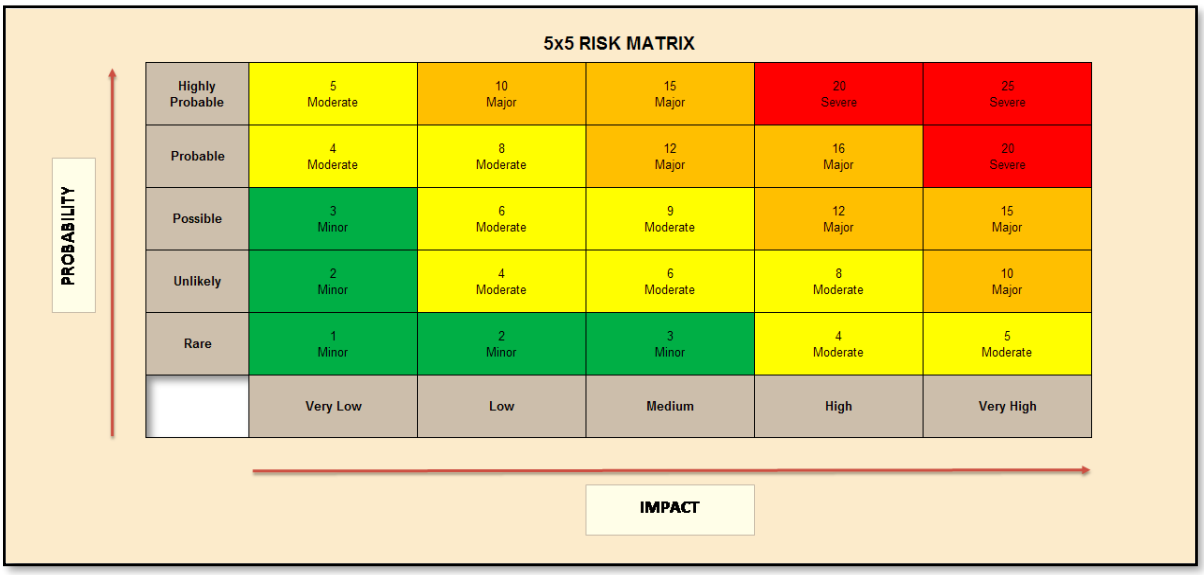

Figure 10: Risk Assessment Matrix (5x5)

SCORING	INTERPRETATION
1-3	Minor Risk
4-9	Moderate Risk
10-16	Major Risk
20-25	Severe Risk

Table 3: Risk assessment scoring

RISK ASSESSMENT OF THE DEPARTMENTS:

LEVEL OF RISK	COLOR CODING
MINOR	
MODERATE	
MAJOR	
SEVERE	

Table 4: Colour coding key for levels of risks

DEPARTMENTS	MINOR	MODERATE	MAJOR	SEVERE
Laboratory	1	7	-	-
Blood Bank	1	6	-	-
Biomedical	-	4	-	-
Fire safety & security	-	6	3	-
IT	-	3	-	-
Gas Manifold	-	8	-	-
Nuclear medicine & Radiology	-	1	2	-
Food & Beverage	-	5	3	1
Human Resources	-	2	-	-
Emergency	-	10	1	-
CSSD	-	4	2	-
Engineering	-	5	5	1
Store	-	8	2	-
OPD	-	6	1	-
ICU	1	5	1	-
OT	-	8	1	-

Table 5: Number of risks identified in the departments (Refer Annexure for details)

Out of these, the high risks (with scoring 10 and above) are:

TYPE OF RISKS	MAJOR	SEVERE
TOTAL NUMBER	21	2

MITIGATION/RECOMMENDATIONS:

Preventive measures: The goal of implementing preventive measures is to lessen the chance of a workplace accident or disease.

Mitigation measures: Mitigation methods: If preventative and protective measures fail, a workplace accident or occupational sickness may occur. The company must be ready (emergency readiness) and mitigating measures must be in place. Mitigation procedures are designed to lessen the degree of any facility damage as well as harm to employees and the general public. The recommended preventive and mitigation measures could be:

- **Electrical Hazards:**
  - Remove-any equipment that does not meet occupational health requirements should be avoided during the workstation design phase.
  - Reduce –dangerous material levels can be decreased by using exhaust fans and sufficient ventilation.
  - Replace – high-risk equipment or chemicals should be swapped out for low-risk alternatives.

  Administrative control:
  - Employee training-Workers must be aware of the hazards they are exposed to, the harm they may cause, and the steps that may be taken to avoid these negative consequences.
  - Work instructions for every activity.
- **Psychological hazards:**
  - enhancing workers' coping abilities by giving them more control over their jobs
  - Improving communication within the organisation
  - allowing workers to be involved in decision-making
  - establishing social support services for employees in the workplace
  - considering the interplay between working and living situations
  - Increasing the importance of safety and health in the workplace.

- **Ergonomic Hazards:**

    - Reduce long reaches and difficult postures by adjusting the height of work surfaces.
    - Make work supplies and equipment easily accessible.
    - Assign the appropriate tool handle to the worker.
    - Give workers a variety of tasks to do (e.g., employ job rotation).
    - Encourage frequent brief relaxation periods.
    - Make mechanical lifting equipment available.
    - Wherever telephone handsets are regularly used, replace them with headsets.
    - Make ergonomic seats and stools available.
    - Make anti-fatigue floor mats available.
    - Vibrations and sharp edges should be reduced or eliminated.

- **Physical Hazards:**

    - Putting on the proper footwear.
    - Cleaning and keeping floors properly
    - Leaks and spills must be reported.
    - Cylinders should be stored upright.
    - Keeping flammables in certified, tightly sealed containers
    - Using appropriate personal safety equipment, such as hearing protection if necessary
    - Performing routine maintenance on electrical equipment in accordance with manufacturer and corporate guidelines
    - Regularly inspecting tools, cords, grounds and accessories
    - When maintaining or repairing mechanical equipment, lock and shut out power sources and switches.
    - Recognizing and treating the indicators of heat stress, as well as drinking lots of water and when maintaining or repairing mechanical equipment, marking power sources and switches.
    - Unless trained and allowed, do not enter restricted radiation regions.
    - Treating and questioning combative patients in open locations
    - Treating and questioning combative patients in open locations

Biological Hazards:

- Providing adequate information, teaching, and training to all persons who may be exposed
- Reducing the number of people who may be exposed (this minimises the extent of the risk)
- Only allowing designated, authorised persons access to places where biological agents are utilised.
- Engineering control measures and designing work processes to prevent or minimise harm.
- Placing the Biohazard emblem and other pertinent warning signs at the entrance to places where biological agents are used.
- Creating plans for dealing with biological-agent-related mishaps
- Specifying acceptable decontamination and disinfection
- Establishing mechanisms for the safe collection, storage, and decontamination of contaminated waste, among other things.
- Using methods for the safe handling, processing, and transportation of biological agents (and samples containing them)
- Providing collective and individual protection measures, as well as suitable protective gear and equipment.
- When necessary, the application of immunisation methods must be done.
- Adoption of appropriate hygiene procedures aimed at preventing the spread or release of a biological agent by accident in the workplace.

- **Chemical Hazards:**

  - Make sure hazardous agents are correctly labelled.
  - Avoid eating near hazardous agents.
  - Use appropriate personal protection equipment, such as respirators if necessary.
  - Request non-latex gloves if allergic to latex
  - Apply or handle dangerous agents with tools.
  - When possible, avoid recapping needles and instead utilise safe and effective alternatives.
  - Locate eyewash stations in case of an emergency.
  - Place hazardous materials in proper containers for disposal.
  - Report any leaks or spills to the appropriate authorities.
  - Recognize the signs and symptoms of sickness caused by hazardous agents and
  - Report any instances of exposure.

MONITOR AND REVIEW

Regardless of the approach chosen to eliminate and/or control the hazard, an assessment of its influence on the use of the equipment, substance, system, or environment is required to ensure that the control does not contribute to the current hazard or introduce a new hazard. It's also critical that everyone involved is told about the changes and, if necessary, given the necessary information, instruction, training, and supervision to ensure that each worker is protected against injury and health risks. It is also advised that the area supervisor assess the system or control after a period of time to determine its continued usefulness.

CONCLUSION:

Defining and analysing dangers is the first step in protecting workers from occupational diseases and ensuring a safe workplace. All healthcare institutions should conduct HIRAC studies on a regular basis. This helps with two objectives: first, identifying important and high-risk risks that must be addressed as soon as possible, and second, putting control mechanisms in place. It minimises the risk to an ALARP level as soon as possible.

Despite all the short comings and the risks and challenges that have been analyzed and discussed above, Max Super Specialty Hospital, Mohali is one of the most sought healthcare institutes in the country. Because of the excellent medical care that the hospital provides along with the eminent consultants in their respective fields, Max has created a remarkable image in the healthcare industry. In order to retain the brand name and to cater successfully to the ever-increasing demand, the hospital needs to look into all the discussed issues and recommendations and take necessary actions.
Implementing the step will be very crucial to the hospital as the increased demand and enhanced technology is predictive of upcoming competitors in the market who can take over.

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ANNEXURE:

List of personnel in the hospital approached regarding the project:

Sr No.	Name of Department	Interacted with
1.	Administration	Dr Jasbir Kaur (MS)
2.	Quality	Dr Swati Marwaha (Head, Quality)
3.	Laboratory	Mr. Yogesh (Supervisor)
4.	Wards	Ms. Gulshan (RMO)
5.	Security	Mr. Naveen (Head)
6.	Fire Safety	Mr. Rahul Vats (Coordinator)
7.	Engineering	Mr. Harpreet (Head)
8.	Gas Manifold	Mr. Aman (Technician)
9.	Biomedical Department	Mr. Gautam (Assistant manager) Ms. Shivani (Senior Biomedical Engineer)
10.	Nuclear Medicine	Mr. Santosh (Senior technician)
11.	Medical Records Department	Mrs. Hema (Head)
12.	Laundry and Linen	Mr. Kamal (Head)
13.	OT	Dr Vivek (Anesthesiologist)
14.	Cardiology	Dr Deepak Puri (Head)
15.	ICU	Dr Harpal (surgeon)
16.	Dietetics	Ms. Aastha (Head)
17.	Human Resources	Ms. Man Kanwar (assistant)
18.	Supply Chain Management	Mr. Rajiv Modgil (Head) Mr. Sahil (Assistant)

19.	Security: Mortuary	Mrs. Preeti (Senior headguard)
20.	Pharmacy	Mr. Balwinder (Supervisor)
21.	Radiology	Mr. Suben (Technician)
22.	Administration	Mr. Ankush Mehta (Deputy General Manager)

Detailed risk assessment based on RAM scoring:

DEPARTMENTS AND LOCATION	HAZARD	TYPE OF HAZARD	PROBABILITY	SEVERITY OR IMPACT	SCORE (P*S)
Laboratory: 3F	Needle Stick Injury	Physical	4	2	8
	Manual mishandling/ breakage of beakers/test tubes/ glassware	Physical	3	2	6
	Skin cuts from blade/glass slides	Physical	4	2	8
	Exposure to chemicals like benzene, formalin, sulphuric acids etc	Chemical	3	3	9
	Posture Issues (Long standing/Sitting)	Ergonomics	2	2	4
	Microbial exposure	Biological	3	2	6
	Stressed workers	Psychological	2	2	4
	Aggression and violence amongst workers	Psychological	1	2	2

Blood Bank: 3F	Micro Blood seepage (While taking the sample or from the storage bag)	Physical	2	2	4
	Needle Stick injury	Physical	3	3	9
	Personnel protection and safety	Physical	2	2	4
	Exposure to chemicals like Sodium Hypochlorite	Chemical	3	3	9
	Posture issues	Ergonomics	1	1	1
	Improper matching leading to Adverse transfusion reactions	Biological	3	3	9
	Infectious transfusion hazards	Biological	3	3	9
Biomedical: B1	Faulty Machinery	Physical	3	2	6
	Liquid leakage (Motor oils, coolant etc)	Chemical	3	2	6
	Excessive lifting of heavy machinery	Ergonomics	3	2	6
	Stressed workers	Psychological	2	2	4
Fire safety and Security: B1	Pipeline Leakage	Physical	3	3	9
	Personnel safety	Physical	3	4	12

	Fires	Electrical	4	4	16
	Noise	Physical	4	2	8
	Improper communication channels amongst teams during emergency	Electrical	2	2	4
	Respiratory distress amongst personnel	Biological	2	2	4
	Flammable liquids, gases and acids	Chemical	3	3	9
	Radiation Exposure	Radiation	3	2	6
	Stressed Workers	Psychological	4	3	12
IT: B1	Slips and falls	Physical	3	2	6
	Short Circuits	Electrical	3	3	9
	Equipment overheating	Electrical	3	2	6
	Stressed Workers	Psychological	4	2	8
Gas Manifold: B1	Nozzle mishandling	Physical	3	3	9
	Temperature extremes	Physical	4	2	8
	Noise	Physical	4	2	8
	Electric Shock	Electrical	3	2	6
	Explosions	Electrical	3	3	9
	Mishandled cylinders(gases)	Chemical	3	2	6

	Lifting heavy machinery	Ergonomics	2	2	4
	Stressed Workers	Psychological	3	2	6
Nuclear Medicine and Radiology: GF	Radiation exposure	Radiation	4	4	16
	Blood/Body fluid exposure	Biological	3	3	9
	Personnel unsafety	Physical	3	4	16
Food and Beverage: Building 2,Kitchen	Temperature Extremes	Physical	5	4	20
	Slips and falls	Physical	4	3	12
	Noise and Vibrations	Physical	3	2	6
	Cuts and injuries from Sharp Objects (Knives)	Physical	3	4	12
	Burns from cooking oils	Physical	3	3	9
	Hazardous substances(cleaning agents etc)	Chemical	2	2	4
	Fires	Electrical	3	4	12
	Posture (Pain in back)	Ergonomics	3	2	6
	Stress amongst workers	Psychological	4	2	8
HR	Uncooperative ambience	Psychological	3	2	6
	Static Posture	Ergonomics	3	3	9
Emergency: GF	Slips and falls	Physical	3	2	6

	Noise and Vibrations	Physical	3	2	6
	Being hit by mobile object	Physical	4	2	8
	Needle stick injury	Physical	4	2	8
	Allergies and dermatitis	Physical	3	2	6
	Fires and Explosion	Electrical	3	3	9
	Posture issues (Long standing and sitting)	Ergonomics	4	2	8
	Airborne infections	Biological	3	2	6
	Improper storage of biomedical waste	Biological	2	2	4
	Stressed workers	Psychological	3	4	12
	Violence and aggression in workers	Psychological	3	2	6
CSSD:B1	Slips and falls	Physical	3	3	9
	Noise	Physical	2	2	4
	ETO	Chemical	3	2	6
	Gases	Chemical	3	3	9
	Excessive Force	Ergonomics	3	4	12
	Blood/Body fluid exposure while decontamination	Biological	4	4	16
	Stressed workers	Psychological	2	1	2

ENGINEERING: B1	Noise and Vibrations	Physical	5	4	20
	Dust and allergies	Physical	4	2	8
	Temperature extremes	Physical	4	4	16
	Hazardous liquids	Chemicals	3	3	9
	Metal injury	Chemical	3	2	6
	Fires	Electrical	4	4	16
	Electric Shock	Electrical	4	4	16
	Short circuiting	Electrical	4	3	12
	Posture issues	Ergonomics	3	2	6
	Lifting/ working with Heavy Machinery	Ergonomics	4	4	16
	Stressed Workers	Psychological	3	3	9
STORE: Building2, above physiotherapy	Dust and Fibres	Physical	3	2	6
	Over exertion injuries	Physical	3	2	6
	Noise and vibrations	Physical	3	2	6
	Head injuries from overhead material fallings	Physical	3	3	9
	Burns and Dermatitis	Physical	2	2	4
	Flammable Hazardous liquids	Chemical	3	2	6
	Fires	Electrical	2	2	4

	Excessive lifting and carrying	Ergonomics	3	2	6
	Posture issues	Ergonomics	3	1	3
	Occupational violence and distress	Psychological	1	1	1
OPD: GF	Slips and falls	Physical	3	3	9
	Noise	Physical	3	2	6
	Being hit by mobile objects	Physical	3	2	6
	Fires	Electrical	2	2	4
	Posture issues	Ergonomics	3	2	6
	Air borne infections	Biological	3	4	12
	Violence and Aggression	Psychological	3	3	9
ICU: 1F, 2F	Slips and falls	Physical	3	2	6
	Latex gloves	Chemical	3	2	6
	Posture issues(Long standing hours)	Ergonomics	3	3	9
	Blood/ body fluid exposure	Biological	3	3	9
	Exposure to nosocomial infections	Biological	3	2	6
	Stressed workers	Psychological	4	4	16
	Co-workers Conflict	Psychological	3	1	3
OT: 1F, 2F	Slips and Trips	Physical	3	2	6
	Stabs and cuts from sharp	Physical	3	3	9

	objects, scalpel etc				
	Head injuries from head lights	Physical	2	2	4
	Anaesthetic chemicals	Chemical	2	3	6
	Disinfectants and cleaning agents	Chemical	3	2	6
	Fires	Electrical	2	3	6
	Posture issues	Ergonomics	3	3	9
	Exposure to blood/body fluid	Biological	3	2	6
	Stressed workers	Psychological	3	4	12