



FMEA - Mitigating hazard risk in MRD

Proactive Risk Assessment and effective Implementation of Mitigating measures

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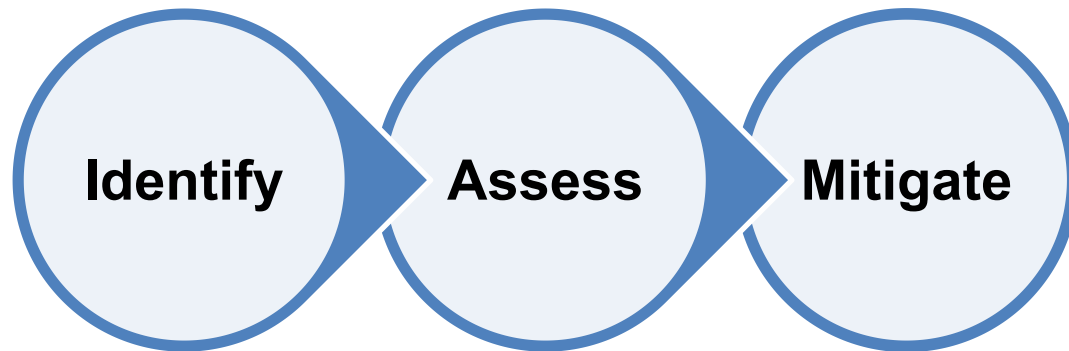
Introduction



- Medical Records Department is an **essential** part of a hospital.
- It stores all the patient medical record which has **legal/statutory component, confidentiality, privacy and security elements**.
- **FMEA** is a structured approach to **discover potential failures** that may exist within the design of a process in order to **reduce or eliminate harm** to the staff through the incorporation of preventive measures.

- Aging Buildingmore than Two decades
- Records Quantum
- CQI
- Risk Management

Aim & Objective



The potential hazards to life & property wrt **fire, electrical & environment** in the Medical Record Department using a quantitative tool for risk management.

Project period :July 2021-Sept 2021

Methodology-DMAIC & FMEA

A multi-disciplinary team was set up consisting Quality team, MRD Staff and Engineers.

Brainstorming was done and each step in the current process was mapped and possible failure modes and effects were identified.

Each **failure mode was attributed** a Risk Priority Number

Failure modes **were prioritized**

Actions were planned to eliminate or minimise failures

FMEA MRD-Predicted

Process Step	Potential Failure Mode	Potential Effect	Severity (S)	Potential Causes	Occurrence (O)	Current Process Controls	Detection (D)	RPN	Actions Recommended	Resp.& Target Date	Actions Taken	S	O	D	Future RPN	
FIRE SAFETY																
Fire safety sinages	Missing Signages	Evacuation will be effected Direction will not be known	9	Design Gap	8	-	2	144	Glow in dark floor (arrow) signages are required	Engineering Deptt. 30/07/2021	Glow in dark signages applied	6	1	8	48	
	Inappropriately placed															
Fire exit route	Crowded route	Chances of stampede during any incident. Hampered safe exit Adverese/Sentinel Event	10	Layout deficiency & Process gap	9	-	2	180	1. Sitting layout to be changed 2. Extra furniture to be removed 3. Code Red mockdrill to be done	1. Head Admin 2. Fire Safety Officer 30/07/2021	1. Appropriate furniture kept 2. Code Red Mockdrill done	4	1	8	32	
Detection system (Detectors)	Not working properly	Untimely/Delayed alarm can aggravate the fire Medical Record Damage	9	Dectectors not being checked by fire safety officer	3	1. Timely check of Detectors 2. Automated powder based sprinklers have been installed	2	54	1. Fire safety officers to regularly check/audits of the detectors 2. Fire safety cabinets to be ensured for medical records	Head Admin 30-07/2021	1. Fire safety cabinets installed	4	1	8	32	
Fire extinguisher	Non-availability of fire extinguisher	Fire management inconcievable Burns & electrocuted Adverese/Sentinel Event	10	Cause of fire not identified Untrained staff Lack of training	9	3 types of fire extinguishers are placed in MRD 1. ABC Type 2. BC Type 3. Water Based	2	180	1. Proper training the staff to be done 2. Regular audits to be done by fire safety officer 3. Code Red mockdrill to be done to train the staff	Fire Safety Officer 30/07/2021	Mockdrill conducted by Fire safety officer & Quality Deptt.	5	1	9	45	
	Inappropriate type of extinguisher															
	Empty extinguisher															
	Non-working/broken extinguisher															
Process Step	Potential Failure Mode	Potential Effect	Severity (S)	Potential Causes	Occurrence (O)	Current Process Controls	Detection (D)	RPN	Actions Recommended	Resp.& Target Date	Actions Taken	S	O	D	Future RPN	
ELECTRICAL SAFETY																
Electrical shock	Overloaded electricity point	Adverese/Sentinel Event	9	Interrupted supply Improperly fit sockets					Sockets/wires damaged leading to power supply	Head Engineering		4	1	9	36	
	Improper power supply load															
	Open sockets/wires															
Leekage	Improper drainage	1. Damage to medical records 2. Damage to property 3. Electric shock	9	Drainage/AC Duct Blocked/defective	6	-	4	216	1. Proper drainage system to be ensured by engineering 2. Medical Records to be stored in safe racks such as compactors	Head Admin 30/07/2021	Compactors installed	5	1	8	40	
	AC Duct leekage															
ENVIRONMENTAL SAFETY																
Seepage	Water blocked/standing water	1. Damage to medical record 2. Fungus	9	1. Rain water accumulation 2. Pipe drainage	6	-	1	54	1. Leveling of floor in the exhaust room 2. Medical Records to be stored in safe racks such as compactors	Head Engineering 30/07/2021	1. Leveling of the floor done 2. Compactors installed	4	1	8	32	
Pest control	Rodents	Spoilage of medical record	9	1. Standing water leads to insects 2. Pesticide spray not being effective	4	Daily pest spray is done and record is maintained	3	108	1. Safe racks for medical records 2. One a week pesticide spray to be ensured	Head Admin 30/07/2021	Compactors/pest safe racks installed	3	1	8	24	
TOTAL								1080	TOTAL							289

73% Hazard reduction predicted

Activate Windows
Go to Settings to activate Windows.



A meeting was held with the concerned stakeholders on 20/07/2021 and following were point of concerns

S No.	Discussion	Responsibility/ Action By	Timeline
1.	Fire safety signage:- Glow sign /luminescent signage - directional /floor & fire exit signage to be pasted.	Mr. Neeraj Tandon	
2.	Fire exit route:- MRD Department to be decongested. Extra furniture to be removed. Broken racks to be checked and removed.	Mr. Jatinder Katoch	
3.	Fire safety cabinets to have wheels in case of any fire incident. -optional	Mr. Neeraj Tandon	
4.	Sprinklers:- No. of powder based sprinklers to be increased.	Mr. Neeraj Tandon	
5.	Electrical Shock:- • ELCB (Electric leakage circuit breaker) has been put on every electrical socket. • Emergency lights to be put near the racks at the backside. - 3 lights	Mr. Neeraj Tandon	
6.	Seepage:- Last occurred one year ago, reoccurrence will be checked in the next 15 days.	Mr. Jatinder Katoch/Mr Neeraj	
7.	Pest Control:- Rodents are seen and even get trapped sometimes ...eliminate the potential cause	Mr. Rajesh/ Mr. Jatinder Katoch	

In reference to the fmea, a mock drill was conducted in MRD preceded by a pre-test on fire safety



Staff informing Code Red at EPBAX



Team Security Post Code Red Mock Drill



Debriefing done by Dr. Shweta Prabhakar, Head Quality & Patient Safety
Post Code Red Mock drill

Code Red- Mock fire Evacuation Drill

20th July 2021

Date and Time: 20th July 2021, 3:48PM

Location: MRD (Basement)

Situation:

A fan in Medical Record Department (Back Office) caught fire due to an electrical short circuit at 3:48PM. At that time, all the MRD Staff was working at their respective stations.

Response

- A staff named Deepak raised the alarm in the department and called EPBAX (41).
- Call Centre immediately informed the Chief Security Officer (CSO) following which CSO instructed them to announce code red through PA system. CSO also informed his security supervisor.
- Code Red Announced at 3:48pm.
- As per the protocol, Call Centre also informed all the members of command nucleus.
- The firefighting team reached the site at 3:50pm and evacuated the staff from the area.
- Meanwhile one of the staff used the fire extinguisher (CO₂) and tried to control the fire.
- The firefighting team intervened and was successful in extinguishing & containing the fire.
- All clear was announced at 3:52pm after extinguishing fire from the room and after evacuating all the personnel.

→ *Debriefing was done by Dr. Shweta Prabhakar, Head Quality.*

→ *A pre-test and post test was conducted before and after the mock drill to measure the training effectiveness*

→ *31 employees from different departments attended the mock drill which included Security,*

Biomedical, CSSD & Engineering.

Observations:

- No announcement heard from PA System installed in the MRD I/C office located within the department .Hence staff and visitor (patient attendant)were not evacuated timely.
- Firefighters/security personnel's reaching the site didn't take proper handover of the situation from the MRD staff /I/C to execute their function.(eg details of fire if known ;No. of personnel /staff still inside the department ; head count etc)
- Power supply to the fire affected area was not switched/cut off timely.
- Few members of command nucleus didn't reach the site.
- Crowded /closely placed racks in the department posed challenge to the firefighting team carrying heavy equipment's in navigating & executing Evacuation drill effectively
- One of the Fire exit was partially blocked by a three seater placed adjacently.

Corrective Action Taken:

- Immediately Rescue demo & brief Handover was conducted by Firefighting team
- MRD Staff were apprised about the protocol in the debrief.

Preventive Action :-

- Continue FMEA(Failure mode effect analysis) as planned by Team Quality ,Security(Fire safety team) & MRD

Recommendations :-

Fire safety officer along with MRD team to ensure effective closure of observations by 10th August 2021

FMEA MRD-Actual

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Fire extinguisher	Non-availability of fire extinguisher	Fire management inconcievable Burns & electrocuted Adverse/Sentinel Event	10	Cause of fire not identified Untrained staff Lack of training	9	3 types of fire extinguishers are placed in MRD 1. ABC Type 2. BC Type 3. Water Based	2	180	1. Proper training the staff to be done 2. Regular audits to be done by fire safety officer 3. Code Red mockdrill to be done to train the staff	Fire Safety Officer 30/07/2021	Mockdrill conducted by Fire safety officer & Quality Deptt.	5	1	2	10	
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ELECTRICAL SAFETY																
Electrical shock	Overloaded electricity point	Adverse/Sentinel Event	9	Interrupted supply Improperly fitted sockets	8	-	2	144	1. Loose sockets/wires to be checked 2. Engineering to maintain proper supply	Head Engineering		4	1	1	4	
	Improper power supply load															
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Leakage	Improper drainage	1. Damage to medical records 2. Damage to property 3. Electric shock	9	Drainage/AC Duct Blocked/defective	6	-	4	216	1. Proper drainage system to be ensured by engineering 2. Medical Records to be stored in safe racks such as compactors	Head Admin 30/07/2021	Compactors installed	5	1	1	5	
	AC Duct leakage															
ENVIRONMENTAL SAFETY																
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TOTAL								1080	TOTAL							46

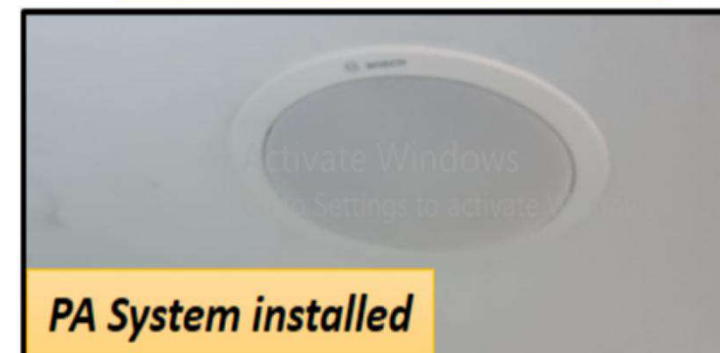
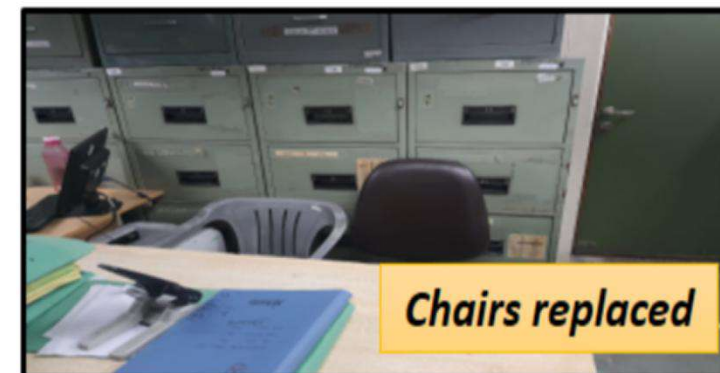
Overall 95% Risk reduction

S No	OBSERVATIONS	CORRECTIONS DONE
1	No announcement heard from PA System installed in the MRD I/C office located within the department. Hence staff and visitor (patient attendant) were not evacuated timely.	PA System installed in the first room.
2	Firefighters/security personnel's reaching the site didn't take proper handover of the situation from the MRD staff /I/C to execute their function. (e.g. details of fire if known; No. of personnel /staff still inside the department; head count etc.)	On the spot, Rescue demo & brief Handover was conducted by Firefighting team
3	Power supply to the fire affected area was not switched/cut off timely.	Emergency lights have been installed in the rack area
4	Crowded /closely placed racks in the department posed challenge to the firefighting team carrying heavy equipment's in navigating & executing Evacuation drill effectively	
5	One of the Fire exit was partially blocked by a three seater placed adjacently.	Three seater was replaced by two separate chairs.

A pre & post test was conducted and results was as following:-

Pre- Test:- 47%

Post Test:- 100%



Intangible benefits-

- Ensuring staff Safety wrt fire, electrical and environmental safety in the medical record department.
- Building culture of proactive risk mitigation
- Enhanced Staff satisfaction
- Ensuring safety of records (especially legal documents) and property loss mitigated

Tangible benefits -

- Successful Implementation of FMEA had resulted in overall 95% risk reduction and following risk reduction-
- 95% reduction in risk to fire related hazard
- 97.5% reduction in risk to electrical related hazard
- 96% reduction in risk to environment related hazard

Overall hazard reduction of upto 95%.

