Indian Institute of Science

Office of Laboratory Safety & Environmental Health

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POLICY ON EMERGENCY RESPONSE PLAN (ERP)

This document is the official emergency response plan for IISc. It lays out the step-by-step response for each actor during a laboratory emergency.

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Version information: This is the first version of the document

1. Introduction

The first few moments of an emergency are critical. Any delay or hesitance can cause loss of life and property. Please memorize and save these important numbers.

Know the IISc Emergency Numbers

Ambulance: +91 814 766 5421
Security: +91 80 2293 5555
Health Centre: +91 80 2293 2227

1.1 What is an emergency response plan (ERP)?

ERP is a step-by-step plan to deal with an emergency. The role and responsibility of every participant are clearly defined. The document tries to answer the 5 critical questions: who, what, when, how, and where.

1.2 What is the scope of this document?

The Emergency Plan is applicable for any lab emergency. The document contains:

a) The standard operating procedure for dealing with an emergency.
b) The list of personnel responsible during an emergency.
c) The sequence of actions (response) in case of medical emergency or injury
d) List of infrastructure that is supposed to be maintained by departments, security, and Health Centre.

1.3 How should I prepare?

The response changes with the role.

a) Lab users: Lab users can be both victims and witnesses, so understand those roles. At the very least memorize emergency numbers. In summary:

b) Faculty or PI: The PI of the lab is ultimately responsible for establishing safety processes, especially concerning PPE, storage, housekeeping, and signage. Lab-specific items like spill kits, masks, gloves, and gas detectors must be stocked. Also, there must be a documented lab-specific emergency plan. The plan must be part of the orientation program for new users. Regular refreshers for existing users are strongly recommended.
c) Department Safety Champion (DSC) or Chair: First responders will not know specific dangers in a laboratory or department. First responders may contact the department safety champions for that information during an emergency.
d) OLSEH must ensure that department-level fire infrastructure is in order, e.g., signage, extinguishers, fire alarm system, hydrants, etc.
e) Security: On-site security personnel and their supervisors are the first responders. They are the primary response team of the Institute. Security will conduct regular training to ensure their preparedness.
f) Health Centre: HC is responsible for non-critical injuries and management of ambulance.
g) Ambulance: Responsible for critical injuries. The ambulance has a trained paramedic trained in emergency first aid. The ambulance will not go to Health Center and directly go to a fully equipped hospital.

1.4 Good practices

a) Be familiar with your surroundings.
    i. Which is the nearest exit?
    ii. Where is the nearest fire extinguisher?
    iii. Which are the nearest safety shower and eyewash stations?
b) Display critical information. People tend to forget things and respond poorly in an emergency. Clear signage is important.
    i. Display emergency numbers in the lab.
    ii. Fill hazard sheet and display it outside lab.
c) Know the ERP. Take personal responsibility to educate yourself.
    i. Who do I call first? Who do I call second?
    ii. What to do if I am injured?
    iii. What to do if I see someone else get injured?
d) Be vigilant and report anything which seems dangerous or suspicious.

2. Emergency Response Plan

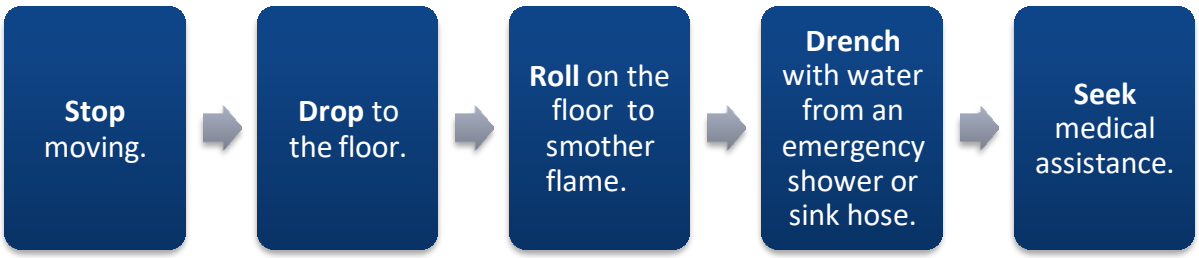
	Who	Informed By?	When informed?	Immediately	Follow-up action(s)
1.	Victim	--	--	Call for help or control room at 5555	1. Try to remove yourself from the hazard 2. Call control room at 5555 or ambulance 3. Use safety shower if needed. 4. Use eyewash station.
2.	Witness	--	--	Call control room at 5555 OR Ambulance	1. If you can do so safely, help the victim/On site security guard. 2. Trigger alarm. 3. Guide first responder. 4. Call PI/ Lab in charge.
3.	On-site Security guard	Witness/ Victim	While waiting for first responders	Call control room at 5555	1. Trigger alarm. 2. Help victim. 3. Use fire extinguisher 4. Escort first responders
4.	Control Room (Security)	Witness or victim or on-site guard	Right after the incident.	[Critical injury] Call ambulance. [Non-critical injury] Call Health Centre [Fire] Call fire brigade	5. Dispatch patrol vehicle to the site. (First Responder) 6. Inform on-site guard. 7. Call OLSEH Officer on call. 8. Call Chair.
5.	Patrol Vehicle (Security) *The de-facto emergency response team (ERT)*	Control room	As per follow-up actions	[Injury] First aid [Fire] Use extinguisher [Chemical] Use spill kit	1. Inform control room if ambulance or fire brigade is needed. 2. Cordon-off the area 3. Debrief the witness 4. Manage the emergency, as per the advice of the PI or DSC. 5. When appropriate, declare "all-clear."
6.	Health Centre	Control room or victim or witness	As per follow-up actions	Dispatch ambulance to the location	1. Inform duty doctor 2. Call control room. 3. Email OLSEH
7.	OLSEH Officer	Control room	As per follow-up actions	Reach location	1. Assist first responders 2. Conduct follow-up investigation
8.	Department Chair	Control room	As per follow-up actions	If needed, reach the location	1. Assist first responders 2. Inform PI/lab in-charge 3. Inform DSC
9.	PI or Lab-in-charge	Chair	As per follow-up actions	If needed, reach the location	1. Assist first responders 2. Help with information on lab-specific hazards

Note:

1. If you have pertinent information, inform the ERT or security guard.
2. Don't wander away during an emergency. Stay in the designated assembly area until "all-clear".
3. Only ERT can declare an "all-clear". No one is allowed back unless "all-clear" is declared.

2.1 Action items for victim

1. Raise the alarm by getting attention from lab buddy, security guards, etc.
2. Try to remove yourself from the hazard.
3. If you can, call the control room or ambulance.
4. If you are on fire:



5. If exposed to chemicals, remove clothing (don't worry about modesty) and flush the area with running water for at least 20 minutes.
6. If your eyes are exposed to chemicals, wash under the eyewash station for 20 mins.

Did you know?

Anyone can call ambulance. There is no need to take permission from PI, Health Centre, Safety Champion, or OLSEH.

2.2 Action items for witness

1. Raise the alarm and inform the control room at 5555. If needed, trigger the department-wide alarm.
2. Decide if you are in danger.
   a) If you are, evacuate immediately. OR
   b) If you have the capacity to do so, attend to the victim.
3. Decide the seriousness of the injury. Err on the side of caution. Better to overreact.
   a) If the injury is serious, call ambulance directly. If you can't, call the control room. Section 3.2 list some examples of serious injuries.
   b) If you can, provide first-aid to the victim.
4. Go out to the main door. Wait for the ambulance. Guide them to the victim.
5. Inform the Control room or security guard while waiting for the ambulance.
6. Once the victim is stable or has left on the ambulance, inform PI and department chair.

2.3 Action items for On-site Security Guard

1. Help the victim and witnesses
2. If needed, use fire extinguishers.
3. If needed, trigger the department-wide alarm.
4. Inform control room.
5. Wait for the ambulance or patrol vehicle. Guide them to the site.
6. If the department-wide alarm is triggered:
   a) Evacuate building along evacuation routes to primary assembly areas outside.
   b) Redirect building occupants to stairs and exits away from the fire.
   c) Prohibit the use of elevators.

How to extinguish a fire?

- Never turn your back to a fire.
- Always keep a clear exit path so you can retreat.
- Use the appropriate extinguisher for the fire (Type A, B, C, D).
- Remember P.A.S.S.

2.4 Action items for Control Room

1.	Note contact information of the witness		
2.	Dispatch Patrol vehicle		
3.	Call on-site security guard		
4.	Get information about the nature of the emergency		
	Fire or Gas leak	***Minor Injury***	***Major Injury***
5.	If the fire is large, call the fire brigade	Call Health Center	Call ambulance via the control room
6.	Call Department Chair and OLSEH		
7.	Coordinate with Patrol vehicle for further actions		

2.5 Action items for Patrol Vehicle

1.	Immediately reach the site			
2.	Talk to the victim (if possible), witness, and the on-site guard to assess the situation			
	Fire	***Gas Leak***	***Minor Injury***	***Major Injury***
3.	Identify the cause of the fire	Trigger alarm to evacuate the building	Remove the victim from the hazard	If possible, remove the victim from the hazard
4.	Control fire with an appropriate extinguisher	If needed, wear SCBA before approaching the site	Provide first aid.	Call ambulance via the control room
5.	Call the fire brigade via the control room if the	Close the cylinder at the source.	If needed, call an ambulance via the control room.	Stabilize the victim

	fire is not under control.			
6.	Deploy fire hydrants	Ventilate the area	Coordinate with HC to transport the victim to HC	Resolve the underlying fault/ issue
7.	Cordon off the area			
8.	Debrief the witnesses. Ensure that all victims are accounted for.			
9.	Evaluate next steps after conferring with the Department Chair and OLSEH			
10.	Once it is safe to do so, declare all-clear so that users can go back into the lab.			

Note:

1. The patrol vehicle is our primary emergency response team.
2. Security & OLSEH to organize regular training and mock drills to train the team
3. If required, the patrol vehicle can cordon off the site indefinitely.

2.6 Action items for Health Center

1.	Call received by Health Centre nursing station/reception	
2.	Ascertain the nature of emergency: Serious (critical) or Minor.	
3.	Dispatch ambulance a) For serious injuries, send ambulance. b) For non-serious injuries, send an IISc ambulance. c) If ambulance is not available, then a regular ambulance will be sent, but the same SOP will be operational. Every day, from 4 pm to 8 pm, ambulance is stationed in Gymkhana. So, ambulance may take longer to reach the main campus, subject to traffic conditions. A regular HC ambulance with nursing staff and the patient will transport the victim to the hospital during this time.	
	Serious injury	***Non-serious injury***
4.	Ambulance will take the patient and attendant to the nearest tertiary care center.	Nursing staff to call the witness for more details after the ambulance leaves.
5.	The ambulance driver and the attendant will stay at the hospital and ensure that the patient receives medical care.	Inform the doctor on duty.
6.	Once the patient is received, the paramedic will call back HC nursing station with details	The duty doctor decides the treatment.
7.	After the urgency is over, the duty doctor will inform [Phone] Security. [Email] Department Chair, Registrar, and OLSEH.	

2.7 Action items for on-call OLSEH Officer

1. If needed, reach on-site.
2. Provide technical support to first responders
3. Conduct follow-up investigation.

2.8 Action items for Department Chair

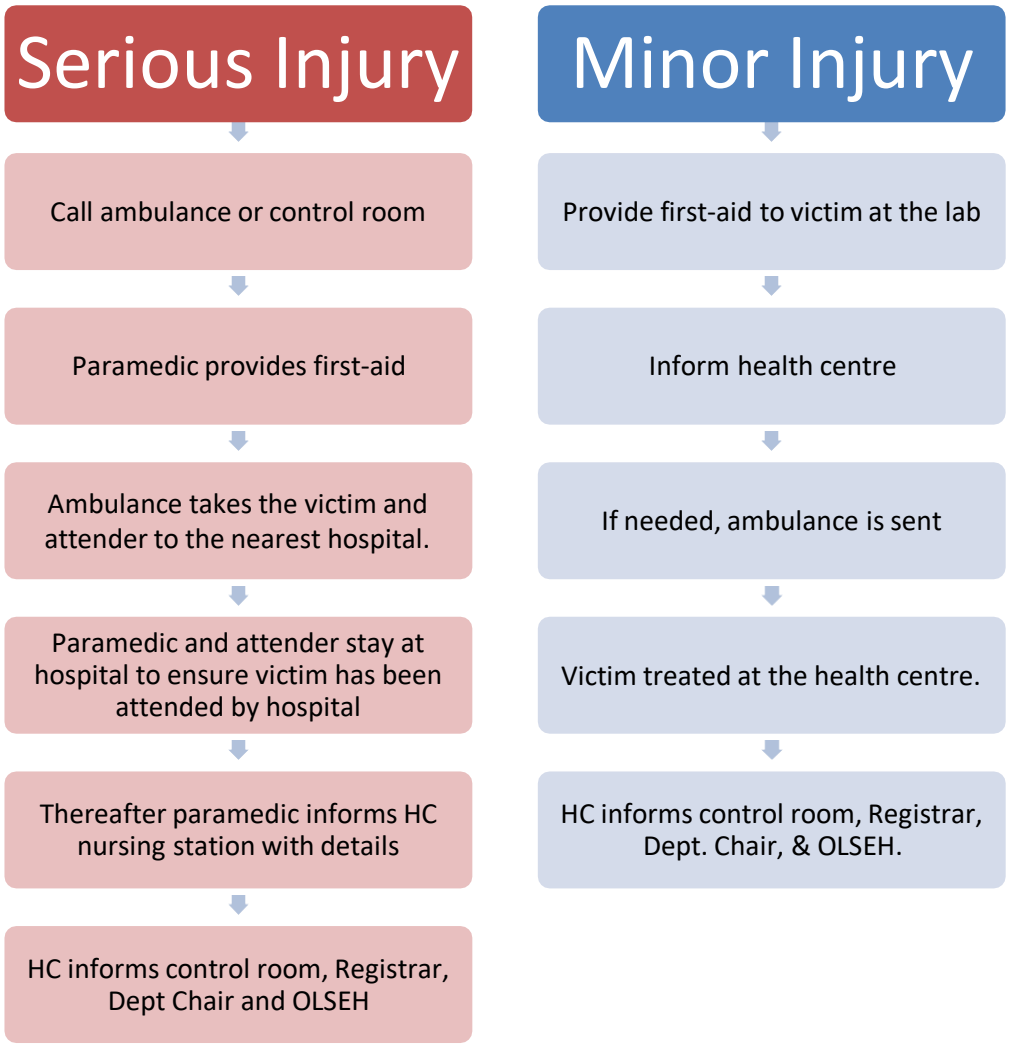
1. If needed, reach on-site.
2. Provide technical support to first responders.
3. Inform PI or Department Safety Champion.

2.9 Action items for PI or Lab In-charge

1. Reach on-site.
2. Provide technical support to first responders.
3. Provide lab-specific inputs.

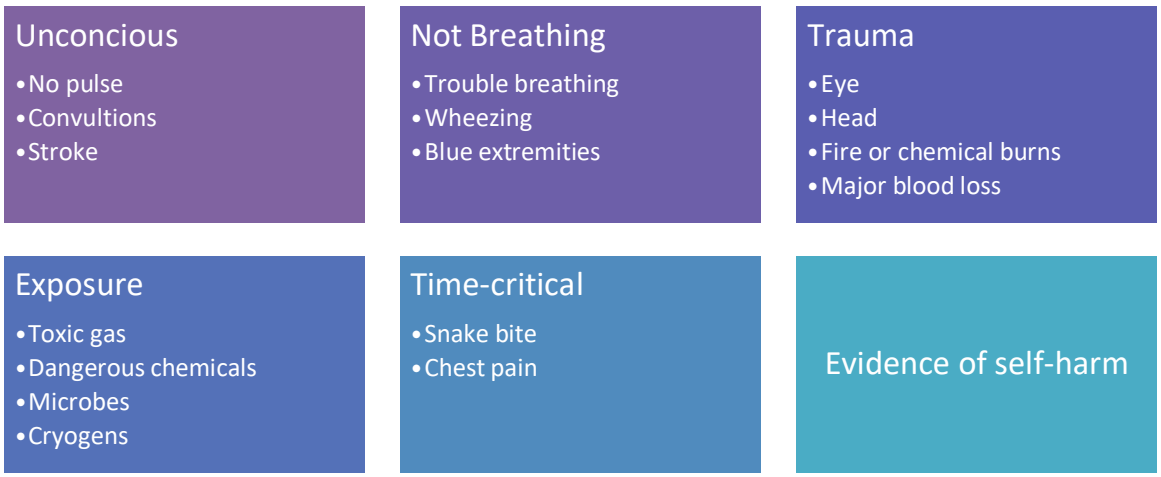
3. Response in Case of Injury

The flowchart below gives the overall sequence of events.



3.1 Examples of Serious Injuries

DIRECTLY CALL AMBULANCE FOR SIMILAR EMERGENCIES



3.2 First-aid

Physical Injury

1. Blunt trauma
   a) Immobilize the affected joint/part.
   b) Apply ice packs.
2. Penetrating/ cut injury
   a) Apply consistent pressure to arrest bleeding.
   b) Elevate the affected part above the heart if direct pressure is not stopping the bleeding.
   c) Dress or support the wound.

Splash in Eyes

1. Immediately rinse the affected eye with running water at low pressure for at least 10 minutes.
2. Position the face so that the injured eye is down and to the side.
3. Keep the eyes open as wide as possible.
4. Flush the eyes to remove contact lenses, if any. If they don't come out, try to gently remove them after flushing.
5. Do not rub the eyes.

Splash Over Skin

1. Flush the area with running water for at least 20 minutes.
2. *Exceptions:*
   a) Dry lime: To be brushed off before irrigation.
   b) Phenols: Wipe off the skin using glycerin.
   c) Elemental metals fragments to be removed by dry forceps and affected area covered with mineral oil (or a comparable solution).
   d) Skin exposure with hydrofluoric acid, after thorough irrigation, should be applied with 2.5% Calcium Gluconate gel. Ice packs can be used to retard the diffusion of ions.
3. Remove jewelry or articles of clothing with chemicals on them.

Exposure to Toxic Gases:

1. Take the victim immediately away from the poisonous gas to clean air.
2. Remove any tight clothes.
3. If the victim is not breathing, perform CPR until the ambulance arrives.
   a) Be careful to avoid chemical poisoning during CPR.

Burns

1. Immediately remove the person away from the heat source to stop the burning.
2. Apply cool/lukewarm running water for 20 minutes.
3. Avoid using ice, iced water, or grease.
4. Avoid using extinguishers directly on the victim. This can cause cold burns.
5. Remove any jewellery or clothing near the burnt area of the skin.

Needle poke or cut with contaminated sharp item:

1. Immediately wash the area with soap and water for at least 15 minutes.
2. Immediately after rinsing, obtain medical attention.

Exposure to HF?

- HF is colorless, odourless gas. In solution, it looks like water
- Exposure is very dangerous, and initially painless
- Very important to get treatment immidiately with calcium gluconate.
- Labs with HF must store calcium gluconate. It is also stocked by Health Centre. Calcium Gluconate should not be in expired condition for both labs and Health Centre.

3.3 Emergency Training

It is essential to train lab users in basic life support, first aid, and extinguishers. Given IISc has a rolling population, any such training needs to be regular. By the very nature of the job, it must also be voluntary. Please contact OLSEH to schedule workshops on:

1. Basic life support: CPR, first aid, etc.
2. Fire safety: Including use of fire-extinguisher and alarm.

4. Infrastructure to be maintained for Emergency Response

4.1 Health Centre

1. The nurse and ambulance station will be manned 24x7.
2. Automatic Defibrillator (AED) in Health Centre and IISc ambulance van.
3. HC should adopt an easy to remember, e.g., 4444.
4. For HF exposure, HC will stock Calcium Gluconate in the pharmacy. Both Ointment and IV. These can be sent to hospitals in case they are needed.
5. Portable stretcher in the ambulance that go-up flight(s) of stairs. This is important because older departments don't have lifts.

6. HC will install a safety shower with enough privacy.
7. HC will install an eyewash station.
8. HC will stock disposable gowns so victims can quickly discard clothes.
9. CPR, Basic Life Support Training to nurses and staff.
10. Nurses are to be trained in helping patients exposed to chemicals and gasses.
11. Fire Extinguishers in Health Centre.

4.2 Security

Control room

1. A control room that can efficiently and effectively work during an emergency.
2. The control room must be manned by at least two people 24x7. One person must be fluent in Kannada because the fire department is not comfortable with any other language.
3. The control room must be in constant contact with all security guards posted on campus. Either through wireless or wired phones. Security should procure hardware to enable the connectivity.
4. The control room should be able to call the Fire brigade ambulances.
5. The control room will maintain contact information for Chairs of all departments and OLSEH officers.

Manpower

6. Security guards should be empowered to quickly respond to an emergency, especially in case of fire and injury, where the first few minutes are crucial.
7. All security guards should be trained on fire extinguishers and basic life support (BLS).
8. A subset of security should be trained on specialized emergency response, including fire-hydrants, chemical spills, SCBA, and gas safety. These form the cadre which will man the patrol vehicle.

Patrol vehicle

9. A patrol vehicle that is available 24x7 to respond to an emergency.
10. The patrol should have enough infrastructure to perform the functionality of the response team. E.g.
    a) Wireless communication devices
    b) Trained manpower
    c) First-aid kit
    d) Chemical spill kit.
    e) Handheld hydride gas sensor.

4.3 OLSEH

OLSEH will maintain minimum fire safety infrastructure in all departments. Departments are requested to escalate any lacune to OLSEH.

1. Fire extinguishers of sufficient quantity and type, placed at an appropriate location.
2. All buildings must comply with the Indian Building Code in terms of fire hydrant loop and sprinkler systems.
3. All hazardous departments must have a centralized fire alarm system with hooters and strobe lamps.
4. All buildings need defined emergency exits, assembly points, etc. These need to be clearly marked.
5. Conduct mock drills at least once a year.

Need Funds for Safety?

- OLSEH can fund safety infrastructure.
- Procedures are on the OLSEH website.

4.4 Department/ Labs

The infrastructure needed in a department or building is a function of the hazards. All buildings are expected to have basic safety infra. In addition, departments with “special” lab hazards need a special infrastructure.

Basic infrastructure

The following infrastructure must be maintained by all departments. It is the responsibility of the Chair to ensure compliance.

1. First-aid boxes in each lab with contents suitable for hazards in the lab.
2. Working service lift:
   a) if departments have 4 or more floors; or
   b) if the department has 2 or more floors but uses compressed gas cylinders or hazardous chemicals.
3. Emergency lights. One in each lab will automatically turn on if power fails.
4. Hazard sheets outside each lab.
5. A designated Lab-in charge for each lab that is knowledgeable about hazards in the lab.
6. A system to access locked labs. The implementation can vary. For example, the department may maintain a collection of keys in the office; or a central biometric system that can be deactivated.
7. Clear and suitable safety signage.
8. All departments must have switches that can disconnect mains power. The disconnect must be at the level of the individual lab or floor.
9. All labs must have circuit breakers of suitable rating to automatically disconnect power during a fault.

Special infrastructure for Hazardous Chemicals

1. Departments with hazardous chemicals must have a safety shower & eyewash station (as per ANSI Z358.1) within 10 seconds of the work area or 55 feet of walking distance.
2. Hazardous chemicals must be segregated and stored in chemical safety cabinets with 30 mins fire rating or in a segregated area outside the main building.
3. Calcium gluconate if lab stores or uses hydrofluoric acid.

Special infrastructure for Gases or cryogens

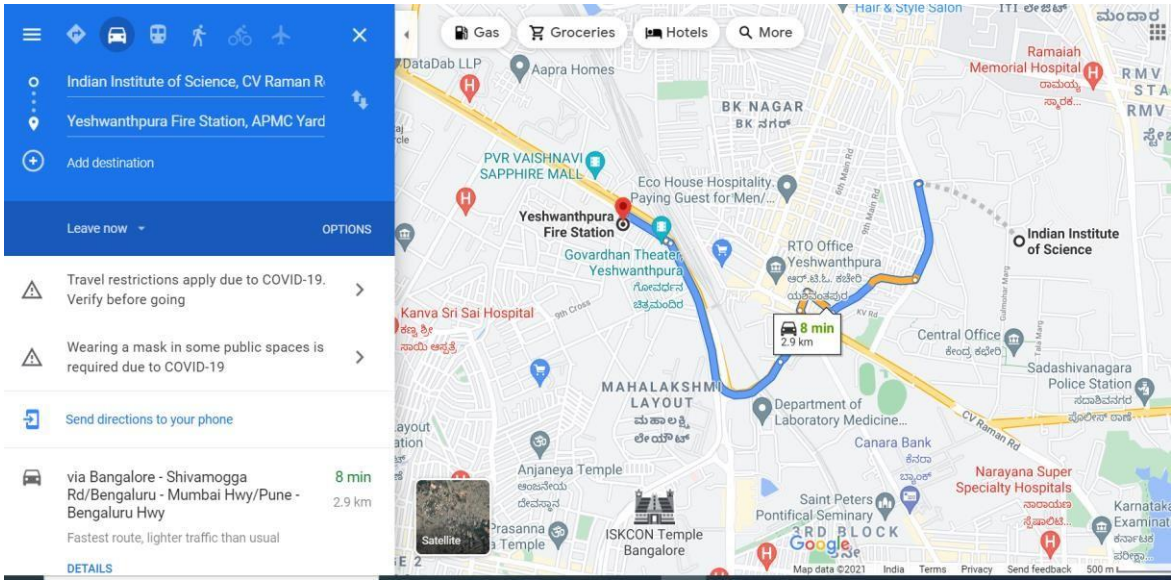
1. All hazardous gasses (NFPA > 2) must be inside gas cabinets.
2. Labs with hazardous gasses (NFPA > 2) must have gas alarms.
3. Departments with hazardous gasses (NFPA > 2) must have one SCBA.

Special infrastructure for Other Hazards

1. Labs with a high electrical load must have a mains switch mounted somewhere outside the lab so the electrical power can be turned off without entering the lab
2. BSL3 labs will store hazard suits outside the labs that can be quickly accessed by first responders in case of emergency.

5. Fire Tender Vehicle

1. Fire station Yeshwantpur is 2.1 km from IISc main gate. In case of a fire emergency, security will directly call the fire station. Users can also call **101** to contact the fire station directly.
2. After confirming the location, the fireteam gets ready within **30 seconds.** The fire tender reaches IISc **in 5-7 minutes**. The team is available 24x7.
3. The fire tender can enter the IISc campus using any of the 3 gates: IISc main gate, D Gate, and Maramma Gate. The **security will escort the fire tender to the location.** The fire tender is stocked with **firefighting equipment** like extinguishers. The fire team may need specific input from OLSEH, the department, or PI.



Note: The security will guide the vehicle to the nearest gate.