Al-Rasheed University
College
Medical Instrumentation
Tech. Eng.

Clinical Chemistry Instrumentation and Technology

Lecture (2)
Lab safety and security

2nd stage – 2022/2023

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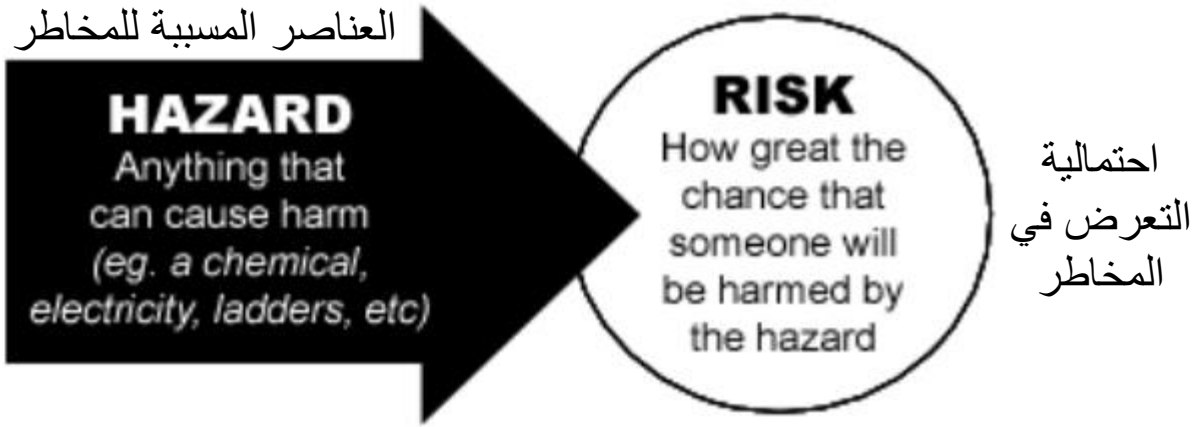
Laboratory safety is a set of rules and procedures that keep people safe from chemicals, while **laboratory security** keeps chemicals safe from people.



- Laboratory workers are exposed to numerous potential hazards.
- Laboratory hazards are as varied and might include **poisons**, **infectious agents**, **flammable**, **explosive**, or **radioactive materials**, **moving machinery**, **extreme temperatures**, **lasers**, **strong magnetic fields (i.e., X-ray)** or **high voltage**.

(1)

Classification of Hazards and Risks in the Chemical Laboratory

- **Large-Scale Emergencies and Sensitive Situations (General)**

Different kinds of risks are involved such as **fire**, **flooding**, and **earthquakes**; power outages; hazardous material spill انسكاب or release تحرر **; loss of laboratory materials** or **equipment** (due to lack of rules in using equipment by individuals).

- **Security Breach**

Possible breaches include (1) **theft** or (2) **diversion** نقل **high-value equipment** or (3) **dual-use chemicals** or materials that may be utilized for illegal activities; as well as (4) **unauthorized laboratory experimentation**.

Classification of Hazards and Risks in the Chemical Laboratory

- **Toxic Chemical Exposure**

In the chemistry laboratory, the rule states that "**no substance is entirely safe and all chemicals result in some toxic effects**" if a large enough amount of the substance comes in contact with a living system. For example, some chemicals can cause a harmful effect after a single exposure, such as corrosive nitric acid.

- **Flammable, Explosive, and Reactive Chemicals**

Flammable chemicals may be liquid, solid, or gaseous; for example Kerosene, Polystyrene, and Gasoline. **Reactive chemicals** are substances that react in combination with another substance.

Classification of Hazards and Risks in the Chemical Laboratory

Explosive chemicals include a variety of substances that can **explode** تنفجر under certain conditions.

Biohazards are a concern in laboratories that **handle microorganisms** or materials contaminated with them, i.e., the tools used to isolate pathogenic bacteria or viruses.

Hazardous Waste

Hazardous waste is material that is discarded or intended to be discarded, or is no longer useful for its intended purpose. Waste materials considered to be hazardous if has one or more of the following properties: ignitable, corrosive مسببة للتآكل, reactive, or toxic.




The objectives of the lab safety in clinical chemistry.

1. The desire of protection from potential hazards,
2. Preparation and planning for laboratory work (to be familiar with chemical and instrument and a ware of hazards before starting your experiment).
3. Using protective equipment – goggles نظارات واقية, gloves, lab coats, etc.
4. Anticipating potential hazards توقع المخاطر المحتملة by asking "what would happen if...?".
5. Minimizing exposure to chemicals.
6. Knowing how to get help in case of an accident.
7. Knowing how to properly dispose the waste material.

Quiz (2)

Answer the given questions