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Assignment : protection

BS Radiology 4th Semester

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Q(4) Describe the role of radiation protection officer in radiology department?

★ Role of radiation protection officer:-

⇒ A radiation protection officer (RPO) is a specialist in radiation safty and compliance matters and as an appointed position within health and safty services.

⇒ The role of the RPO is to support the university's work with ionising radiations by ensuring arrangements are in place to manage radiation risks, so that work is carried out safely and in compliance with regulations and so that university employes and the public are protected from harmful effects.

⇒ Advising on training in radiation prot. Safty.

⇒ Investigating incidents are report incidents when appropriate to the

relevant regulatory authority.

⇒ A medical facility may have a number of radiation protection officers, each with a specific responsibility include the explanation of local rules, such as for diagnostic radiology, radiotherapy and nuclear medicine.

⇒ They may also be responsible for operations involving radioactive waste management in the facility.

⇒ RPO have common core on protection and safety or related to their field of practice and need to have specific personal attributes, such as communication skill, human machine interface skills and multitasks management skills.

⇒ A radiation protection officer should be responsible for the supervision of the safe handling of sealed and unsealed radiation sources and radiation generating equipment.

⇒ Educational level of a radiation protection officer will be dependent on the skills and technical requirements of the jobs as well as on radiation protection needs.

⇒ The radiology department is responsible for the following radiation safty policies and procedures.

⇒ protective healthcare professionals who work with medical imaging and equipment.

⇒ Radiology department officer an number of resources to the help you learn and your self.

Q(2) What are radiation hazards that one should be beaware off?

Radiation Hazards:-

⇒ Exposure to very high levels of radiation, such as being close to an atomic blast, can cause acute health effects such is skin burns and acute radiation syndrome (radiation sickness").

⇒ It can also result in long-term health effects such as cancer and cardiovascular disease.

Hazards.

⇒ alpha, Beta, Gamma.

Alpha particles:-

⇒ Once it gets in it is highly damaging to the body tissues.

⇒ Can not pass through the skin but could be inhaled or ingested.

⇒ Considered the less demaging than gamma rays or alpha particles.

⇒ Alpha particles can be very dangerous.

⇒ Even then they don't typically cause radiation sickness instead, they lead to lung cancer

⇒ They do not penetrate very deeply into the skin, if at all in fact, clothing can stop alpha particles.

★ Beta - particles:-

⇒ Penetrating the skin and causing radiation damage
⇒ β - Lower interaction rate means it is much less damaging to the body tissues than Alpha
⇒ Used as medical tracers.
⇒ Radiation damage Such as Skin burns.
⇒ As with alpha emitters, beta emitters are most hazardous when they are inhaled or swallowed or absorbed into the blood stream through wounds.
⇒ Beta particles is typically a high speed electron - in β - decay or position.

★ Gamma rays:-

⇒ The extremely high energy of gamma rays allows them to penetrate just about anything.
⇒ They can pass through bones and teeth.
⇒ Gamma rays is very dangerous.
⇒ Needs intense or prolonged radiation to cause damage cells.
⇒ They can destroy living cells produce gene mutations, and cause cancer.

Q(3) How a radiation technologist can protect himself/herself from radiation, what is annual occupational dose?

⇒ During these imaging procedures, radiologic technicians leave the room, or stand behind a protective shield, such as a curtain, that is designed to keep out radiation.

⇒ Technicians also wear shielding devices, such as lead aprons, gloves, goggles and masks for radiation protection when ever necessary.

⇒ Radiation is a part of our life. Background radiation, coming primarily from natural minerals, is around us all the time.

⇒ Few situation where an average person is exposed to uncontrolled sources of radiation above background.

⇒ The Best ways to be prepared is to understand the radiation protection principles of time, distance and shielding.

* Time:-

The exposed to radiation in addition to natural background radiation, Limiting or minimizing the exposure time reduced the dose from the radiation sources.

* **Distance :-**

The longer distance, they can safe the technologist to
⇒ The dose of radiations decreases dramatically as your increase your distance from the source.

* **Shielding :-**

Barriers of lead, concrete of water provide protection from penetrating gamma rays and x-rays.
⇒ Certain radioactive materials are stored under water or in concrete or lead-lined rooms, and dentists place or lead blanket on patients receiving x-rays of their teeth.

* **Radiation Emergencies :-**

If a radiation emergency occurs you can take actions to protect yourself, your loved ones and your pets: Get inside stay inside and stay tuned.

* **Get inside :-**

Radiation emergency you may be asked to get inside a building and take shelter for a period time.
⇒ Bring pets inside.

* **Stay inside :-**

Staying inside will

reduce your exposure to radiation.

⇒ Close windows and doors.

⇒ Drink bottled water and eat food in sealed containers.

* Stay turned :-

Emergency officials are trained to respond to disaster situations and will provid specific actions to help keep People safe.

* Annual occupational dose :-

⇒ A dose-limit to non-occupational workers and members of the public are set at two percent of the annual occupational Dose Limit -- Organ, tissue occupational dose Limit Non-occupational Dose limits mrem/year msv/year whole body 5,000 50 100 1 Lens of the eye 15,000 150 NA Shallow dose (skin and extremities) the annual total for the whole body is 5,000 mrem.

⇒ The annual occupational dose limits, or to declearedd pregnant workers Section Declaration of pregnancy for more information.

⇒ To ensure that no employee exceeds regulatorily determined dose limits, Stanford Health physics monitors occupational exposures through the Dosimetry Program.

Q4) Elaborate the radiation protection measures in the safe radiology department?

* Safety Measures in Radiology Department:-

⇒ The radiology department has a implemented safty plane.
⇒ The safty plane that indicates the periodic inspection, maintences, and calibrations of all equipments.
⇒ The Safty plane involves the radio-active materials used for therapeutic and diagnostic purposes, regard to handling, storing and transportation.
⇒ Involves posting of safty warnings on the doors.
⇒ A radiation safty program is in place, documented, and compliance with the facility managment and infection control programs is maintained.
⇒ The safty plan indicates monitoring of the staff for radiation exposure at least quarterly.
⇒ The Safety plan is implemented as evidenced by the daily practice.
⇒ The Safety plane involves the provision and regular testing of radiation protection aprons and thyroid and gonads shields for staff and patients.
⇒ The radiology department ensure the safty of diagnostic imaging

equipments.

⇒ The radiology department ensures the following.

- Automatic Exposure control test
- Kvp reproducibility and repeatability.

* Radiation Exposure:-

⇒ The risk of exposure should balance the medical benefits.

⇒ optimize radiation doses by exposing the patient to enough radiation to get a clear image.

⇒ Growing concern about risk of giving the patient large doses of radiation.

* Biological Effects of Radiation:-

⇒ Radiation may

- Deposit Energy in Body.
- Cause DNA Damage.

⇒ which may Lead to biological damage.

* Radiation protection:-

1) Minimize Exposure

⇒ Remember to minimize your exposure at all possible times.

2) Measure your radiation Dose dosimeters.

⇒ Measure the occupational dose equivalent from x-rays, gamma, and high energy beta emitters.

⇒ Always practice Alara (low reasonably).

3) Three Effective Strategies :Time.
⇒ Minimize the time.
⇒ Minimize the dose.
⇒ Pre-plan the procedure.
⇒ Minimize exposure time.

4) Three Effective Strategies Distance
⇒ Doubling the distance from the source can reduce your exposure intensity by 25% (Inverse Square law).
⇒ Radiation Intensity.
⇒ Move to lower dose areas during work delays

5) Three Effective Strategies Shielding:-
⇒ Position Shielding between yourself and source of radiation.
⇒ Take advantage of permanent Shielding
⇒ Appropriate Shielding material.
⇒ planning Stages of the procedure.

6) Room Shielding
⇒ Lead Lined plaster board.
⇒ Lead glass viewing window.

7) Radiation protection in x-rays,
⇒ Lead aprons attenuate scattered radiation by 95%.

⇒ Shield thyroid and gonads, always wear Lead aprons and use dosimeter to monitor the exposure.
⇒ Patient education is important.