ALARA

- The goal of radiation protection is to keep radiation doses **As Low As Reasonably Achievable**

- **BUMC** is committed to keeping radiation exposures to all personnel ALARA

NCRP Definition of ALARA

As Low As Reasonably Achievable (ALARA): A principle of radiation protection philosophy that requires that exposures to ionizing radiation be kept as low as reasonably achievable, economic and social factors being taken into account. The protection from radiation exposure is ALARA when the expenditure of further resources would be unwarranted by the reduction in exposure that would be achieved.

MINIMIZE EXTERNAL EXPOSURE

Time

(Reduce exposure time)

Distance

(Increase Distance)

Shielding

(Place dense object between you and source of radiation)


TIME
EXPOSURE

How To Minimize External Exposure

TIME : 60 mR/hr = 6 mR in 6 minutes


DISTANCE
EXPOSURE

How To Minimize External Exposure

DISTANCE : Inverse Square Law

Radiation Source: 10 mR/hr at 1 foot

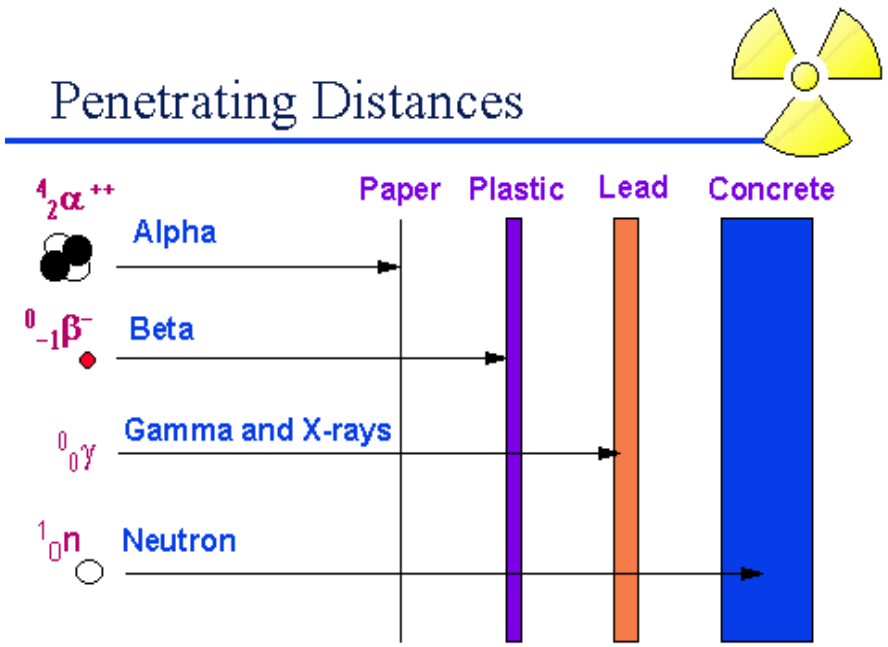
What is your exposure at 2 feet?

$$(10 mR/hr)(ft)\uparrow 2 /(2 ft)\uparrow 2 = 2.5\ mR/hr$$

SHIELDING

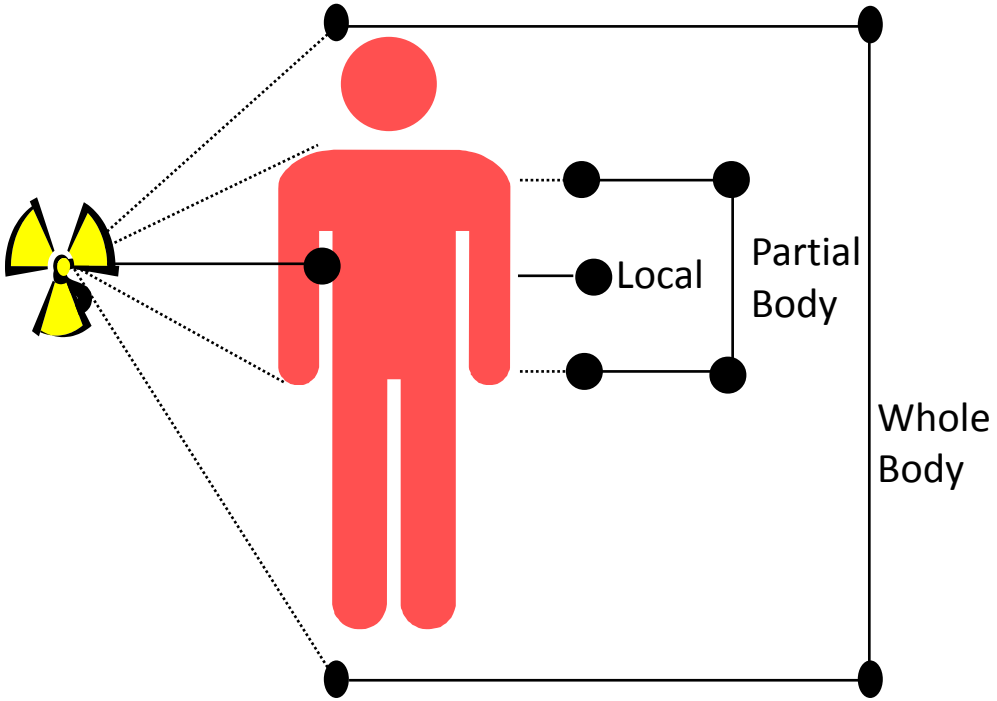
EXPOSURE

Shielding



- Alpha particles can be stopped by a sheet of paper.
- Most Beta particles can be stopped by 1-2 cm of plexiglass.
- Most gamma and x-ray photons can be absorbed by several cm of lead.
- Neutrons may require several feet of concrete.

External Exposure / Irradiation



- External irradiation occurs when all or part of the body is exposed to penetrating radiation from an external source.
- During exposure, some of this radiation is absorbed by the body and some passes completely through.
- Following external exposure, an individual is not radioactive.

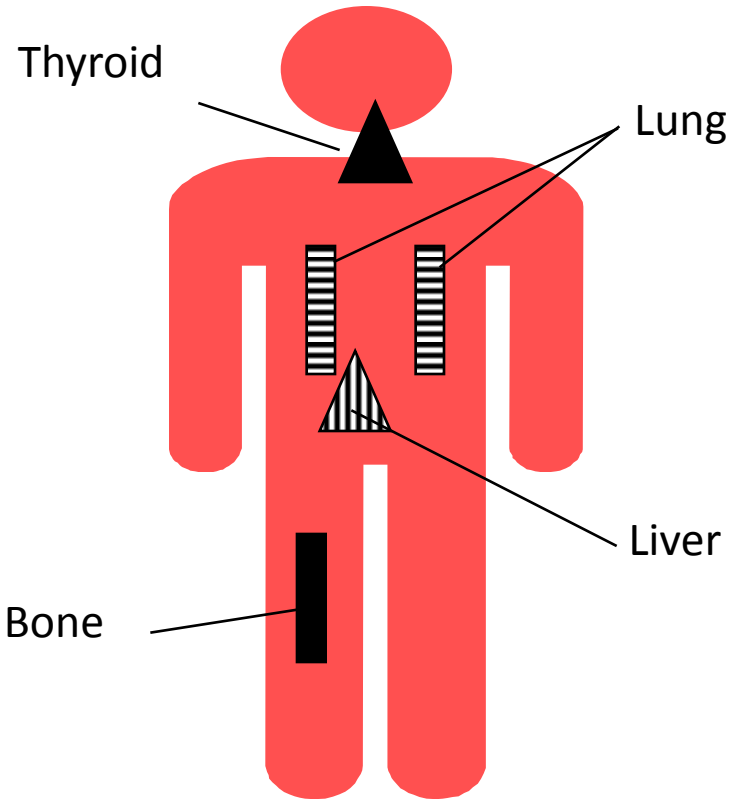
Protection from External Radiation

- Time – less time, less dose.

- Distance – more distance, less dose.

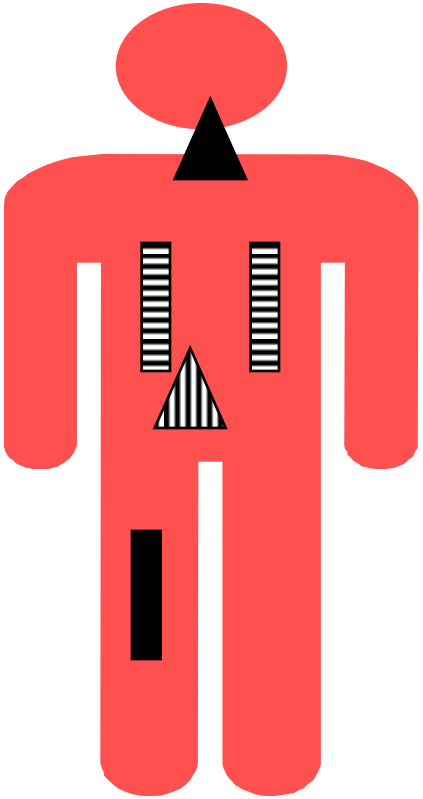
- Shielding – more shielding, dose.

Internal Exposure



- Internal exposure is from radioactive materials that have been taken into the body.
- Radioactive material can enter the body through:
  - Injection
  - Inhalation
  - Ingestion
  - Absorption
- Once radioactive materials are in the body, they irradiate body tissues as long as they remain in the body

Internal Exposure



- There are two ways for radioactive materials to be removed from the body:
  - Biological clearance
  - Radiological decay
- The term “committed dose” refers to the fact that the radioactive dose will continue as long as the radioactive material is in the body
- The amount of radioactivity in the body can be assessed by Bioassay