Public Health Laboratory Issues after a Nuclear Incident

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Radiation Diagnostics Terms

- Radiation **Exposure**: A person is "exposed" to radioactive materials through
  - gamma irritation (e.g. Improvised Nuclear Device [IND] blast)

- Radiation **Contamination**: A person is "contaminated" **internally** via inhalation, ingestion or penetrating injury or **externally** with **radioactive materials**.

Both "exposure" and "contamination" result in an exposure to a dose of radiation.

Biodosimetry versus Bioassay

Radiation "Exposure" NO contamination on clothes or body (e.g. X-ray, gamma rays)	External Radionuclide Contamination ON clothes or body (e.g. radioactive particles)	Internal Radionuclide Contamination INSIDE the body (e.g. radioactive particles)
Biodosimetry Lymphocyte depletion kinetics Chromosome analysis	Radiation handheld meter Radiation portal	**Bioassay** Laboratory Urine analysis

Biodosimetry versus Bioassay

Type of Incident	Exposure (Biodosimetry)	Contamination (Bioassay)
Improvised Nuclear Device (IND)	**Effective** (shine)	**Effective** (fallout)
Nuclear Power Plant (NPP)	Limited	**Effective** (fallout)
Radiation Dispersal Device (RDD)	Limited	**Effective**
Radiation Exposure Device (RED)	**Effective**	Not useful

Biodosimetry determines a "past" radiation dose from an "exposure" incident.

Bioassay determines "past, current and ongoing" radiation doses from an internal "contamination" incident.

Bioassay Testing

- **Capability**: Rapid **screening**, **identification** and **quantitative** assessment of **internal** deposition or incorporation of radionuclides that quantifies contamination so one can calculate radiation dose.
- **Capacity**: ID and Quantify a few hundred samples per day
- Limited surge testing capacity for testing after a nuclear incident (e.g. IND)
- Bioassays are not readily available or a priority in the immediate resource-limited environment
- Determine priority in conjunction with local, state, and federal epidemiology subject matter experts

Bioassay Summary

- Radiation Laboratory Methods (bioassay): rapidly identify and directly quantify specific radionuclides in people potentially contaminated in a radiological or nuclear incident.
- Provides information for population monitoring by determining the level of internal contamination.
- Coordinate with local, state, and federal epidemiology subject matter experts.
- In many cases it provides test results for people who think that they may be contaminated but are not truly contaminated thereby relieving the stress on the public health system and overall healthcare system.

Thank you

For more information please contact

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