Radiological Response Guidelines

STADARD OPERATING GUIDELINES

-This plan was developed to establish guidelines for IDPH EMS Region 2 Hospitals to respond to a Radiological Event

Plan Activation: In the event of a radiological release in Region 2,
please contact the Region 2 RHCC at 800-252-5433 and ask for the Disaster Preparedness Office.

Introduction:

Purpose:

The Illinois Department of Public Health requires that Illinois based Healthcare Coalitions (HCC) develop and maintain a plan for the management of patients from a radiological or nuclear incident. This plan will provide guidance and direction, along with procedures for requesting Region 2 Healthcare Coalition resources.

The purpose of this plan is to support and help protect healthcare coalition facilities and staff during a radiological disaster. The goal is to set out a comprehensive coalition wide approach to guide coalition members and partners.

Note: This document will not provide recommendations, protocols or specific guidance on medical treatment of patients during a radiological event. Consult your facilities medical directors for further direction on medical treatment.

Scope:

The Region 2 Radiological Incident Response Plan involves the coordination of healthcare facilities in IDPH EMS Region 2, their medical systems and organizations, along with their supporting resources, to manage potentially exposed and/or contaminated patients following a radiological incident. Any large scale incident involving a release of radiological materials will likely result in a response that will be beyond local capabilities to manage. This will most likely require regional, state and federal resources and coordination.

Situation:

The Region 2 Healthcare Coalition has several nuclear or radiological facilities, entities and or locations with these materials within in the region. There are a number of radiological or nuclear related scenarios that could potentially occur within the region. Along with fixed facilities storing, having or using radiological materials, it is important to remember that radiation sources are transported using interstates, highways and railways and potentially barges through or within the region on an almost daily basis.

Assumptions:

The plan is not intended to supersede, infringe upon or replace any plans, procedures, policies, or protocols in place. This plan is designed to present guidance and allow for local flexibility in response to a radiological incident.

It is assumed that a radiological incident can be accidental in nature and not be from nefarious actions or terrorism. We must allow for flexibility in our response to a radiological incident. Not every incident can be respond to in the same manner. Incidents involving a release of a radiological materials from an industrial facility or power plan may require a different response than a dirty bomb or terrorism related release. Contamination assessments, proper PPE utilization, and decontamination efforts will be essential in protecting coalition partners, staff, and the public. Contamination from a radiological event may be low or non-existent in a large population. Especially the farther away from the release the person is. Since radiological/nuclear contamination cannot be detected by human senses, this may result in a surge of “worried well” patients to medical facilities seeking treatment. This surge of “worried well” patients to the medical facilities, this will result in the implementation of healthcare facility surge plans at the local and regional level.

Background

Radioactivity is the natural process of unstable atoms releasing their excess energy. This emission, or giving up energy, is called radiation. Radiation can be either man-made or occur naturally in the environment. It is divided into two types: non-ionizing and ionizing.

Non-ionizing radiation is the type of radiation associated with the operation of many of the conveniences that we use in our daily lives: for example, the energy that microwave ovens emit to cook our foods and the waves of energy that transmit our radio and television signals.

Ionizing radiation is the type of radiation associated with nuclear power generation. Because of its ability to cause damage to any organism, it is important to understand how to protect yourself from unnecessary exposure. There are many additional uses of ionizing radiation, which include: medical x-ray, radioactive material used in medical diagnosis and treatment, industrial manufacturing, and in the production of many consumer products such as cigarettes, smoke detectors and some gas lantern mantels.

Besides the radioactive materials that are man-made, ionizing radiation occurs naturally in rocks and eventually works its way into the soil, trees, plants, ground water, and even into materials in the human body. Another important source of naturally occurring ionizing radiation is the sun and outer space, which produces a continuous exposure to all living organisms on this planet. We call naturally occurring radiation *background radiation*.

Types of Ionizing Radiation

- **Alpha Particles** have a very low penetrating ability and can be stopped by a very thin sheet of paper or the outer layer of skin. They are not an external hazard, but once they are inhaled or ingested, they become very hazardous.
- **Beta Particles** have a low penetrating ability and can be shielded or stopped by thin sheets of metal or thick plastic. Depending on the energy of beta particles, it can cause burns ranging in severity from minor (similar to a sunburn) to extreme (blistering similar to third-degree burns from fire). Because beta particles are also harmful if inhaled or ingested, they are both an internal and external hazard.
- **Gamma Rays and X-rays** are waves similar to light waves, but have higher energy levels. Lead, steel, concrete or water are commonly used to shield this type of ionizing radiation. Although scientists make a distinction between x-rays and gamma rays, the important difference is that gamma rays are usually more energetic and therefore more penetrating.

Types of Radiological Emergencies:

- **Transportation Related**: radioactive materials can be transported numerous ways. Methods of transportation include, ground transport by truck/semi, rail or even potentially by barge. These transports are highly secretive and highly guarded. Many safety factors have been built into the transportation procedures and methods… But nothing is perfect! It is very unlikely that accidents involving transport of radioactive material will cause any radiation-related injuries or illnesses.

- **Nuclear Power Plant Incidents**: accidents/incidents at or involving nuclear power plants are an extremely rare occurrence. But the impact on or felt by the communities, citizens, residents can be extreme. Nuclear Power Plants are closely monitored by both state and federal agencies. They are regulated by the Nuclear Regulatory Committee (NRC). One of the incidents involving the release of radiation from a nuclear power plant would be radioactive steam or a release of radioactive materials during an emergency. In this type of an event radioactive material would settle and contaminate people, buildings, food and water, along with livestock and crops.

- **Radiological Dispersal Device (RDD)**: any device that causes intentional dissemination of radioactive material without a nuclear detonation or explosion. An RDD can cause internal dose through inhalation or ingestion of released radioactive material and external dose because of surface contamination. An RDD intended to disperse radioactive material by use of an explosive device would likely result in injuries associated with blasts and heat to become contaminated with radioactive material. Additionally, the contaminated environments would likely complicate medical response and/or evacuation.
- **Radiation Exposure Device (RED)**: radioactive material, in a sealed source or within a container, and intended to expose people in the vicinity of the device to a high-level external dose. Some materials used in commercial equipment contain radioactive sources that could function as an RED. Also some medical equipment such as bone density scanners, x-ray machines and CT scanners contain small amounts of radioactive materials.
- **Improvised Nuclear Devices** (IND / Dirty Bomb): A dirty bomb is a mix of explosives, such as dynamite, with radioactive powder or pellets. When the dynamite or other explosives are set off, the blast carries radioactive material into the surrounding area. This is a nuclear detonation. An IND exposes people to trauma, high-level external dose, inhalation and ingestion of radioactive materials, and skin contamination. Should an IND fail to detonate properly, the high explosives may disseminate the nuclear material around the environment, thus effectively becoming an RDD.

Protection from Radiation:

Time, **D**istance, **S**hielding when used effectively will help protect you from ionizing radiation.

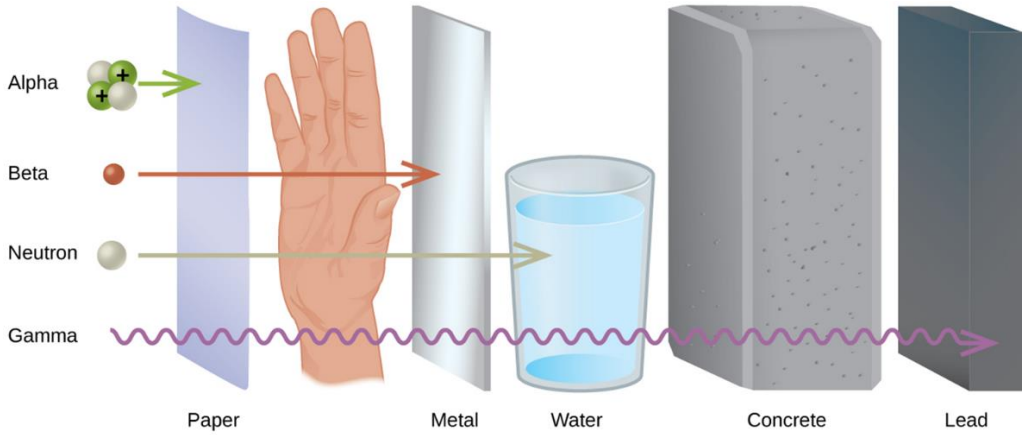
Time: The less time you spend around radiation, the less exposure you will receive. *For example, if you were working in an area where the exposure rate was 100 mR/hr and you stayed there for one hour, you would receive an exposure of 100 mR. If you remained there for only 30 minutes, you would receive an exposure of 50 mR.*

Distance: The farther away you are from a source of ionizing radiation, the less exposure you will receive. The amount of radiation exposure is not inversely proportional to the distance from the radiation source, but is inversely proportional to the square of the distance. This means that when you double your distance from the radiation source you can effectively reduce the radiation exposure to 1/4.

Doubling the distance from a source of radiation **reduces exposure by 75%**

2x the distance = ¼ the exposure

Shielding: The use of shielding between you and a source of ionizing radiation will reduce your exposure. The amount of reduction depends on the type and density of the shielding material.



In the graphic above you can see that different sources of radiation with different particles require different types of shielding to be effective.

Radiological Detection and Metering:

Detection: When notification is received that a potential release of radiation into the environment has occurred, a terrorist incident involving a release of radioactive particles or when a nuclear facility has a failure of systems and radioactive isotopes are released, we should begin radioactive detection and monitoring of the environment and patients.

Ionizing radiation is not detectable by one's senses. It cannot be seen, heard, smelled, tasted, or felt. For these reasons, simple visual inspection is insufficient to identify radioactive materials, and radiation sources can be virtually impossible to recognize without special markings. To address these problems, scientists have developed tools to aid in the detection of radioactive particles. Different facilities have different tools and devices.

The Region 2 RHCC office has several devices that are capable of detecting radiation on patients. These devices include:

- Ludlum 14c General Purpose Meter (click here for more information)
- RDS 30 – Radiation Survey Meter (click here for more information)
- RDS 80 Surface Contamination Meter (click here for more information)

Metering: There are four different but interrelated units for measuring radioactivity, exposure, absorbed dose, and dose equivalent. These can be remembered by the mnemonic R-E-A-D, as follows, with both common (British, e.g., Ci) and international (metric, e.g., Bq) units in use:

- Radioactivity refers to the amount of ionizing radiation released by a material. Whether it emits alpha or beta particles, gamma rays, x-rays, or neutrons, a quantity of radioactive material is expressed in terms of its radioactivity (or simply its activity), which represents how many atoms in the material decay in a given time period. The units of measure for radioactivity are the curie (Ci) and becquerel (Bq).

- Exposure describes the amount of radiation traveling through the air. Many radiation monitors measure exposure. The units for exposure are the roentgen (R) and coulomb/kilogram (C/kg).

- Absorbed dose describes the amount of radiation absorbed by an object or person (that is, the amount of energy that radioactive sources deposit in materials through which they pass). The units for absorbed dose are the radiation absorbed dose (rad) and gray (Gy).

- Dose equivalent (or effective dose) combines the amount of radiation absorbed and the medical effects of that type of radiation. For beta and gamma radiation, the dose equivalent is the same as the absorbed dose. By contrast, the dose equivalent is larger than the absorbed dose for alpha and neutron radiation, because these types of radiation are more damaging to the human body. Units for dose equivalent are the roentgen equivalent man (rem) and sievert (Sv), and biological dose equivalents are commonly measured in 1/1000th of a rem (known as a millirem or mrem).

For practical purposes, 1 R (exposure) = 1 rad (absorbed dose) = 1 rem or 1000 mrem (dose equivalent).

Note that a measure given in Ci tells the radioactivity of a substance, while a measure in rem (or mrem) tells the amount of energy that a radioactive source deposits in living tissue. For example, a person would receive a dose equivalent of 1 mrem from any one of the following activities:

- 3 days of living in Atlanta
- 2 days of living in Denver
- 1 year of watching television (on average)

- 1 year of wearing a watch with a luminous dial
- 1 coast-to-coast airline flight
- 1 year living next door to a normally operating nuclear power plant

Exposure Limits:

ALARA (As Low As Reasonably Achievable): The guiding principle of radiation safety is “ALARA”. ALARA means avoiding exposure to radiation that does not have a direct benefit to you, even if the dose is small.

To do this, you can use three basic protective measures in radiation safety: time, distance, and shielding as discussed above.

Maximum Exposure Limits set by the US EPA and also IPRA (Illinois Plan for Radiological Accidents)[(6)]

U.S. EPA (REM)	IPRA (REM)
10 R Whole Body Exposure (non-lifesaving)	3 R Whole Body (Notification Limit)
25 R Whole Body (lifesaving)	10 R Notification / Turn Around Limit

Note: Cumulative exposure to 3 R or more, confer with Incident Command for further instructions. Once cumulative limits reach 10 R, immediately notify incident command, turn around and exit the radioactive area. 10 R is a lifetime limit not a per-incident limit.

Workers in radioactive environments should be protected by PPE and wearing personal dosimeters or direct read dosimeters.

Direct Read Dosimeters (DRD)[(7)] - he direct-read dosimeter is a small, cylindrical device equipped with a clip to fasten to the wearer’s clothing. It is fairly accurate and rugged, and can be read directly by the user. The dosimeter contains a fixed horizontal scale of exposure measured in roentgens (R), a movable vertical hairline, and a built-in lens that enlarges the scale and hairline for easy viewing.

When the hairline is set on the zero point of the scale, it is said to be fully charged, or zeroed. If the dosimeter is exposed to ionizing radiation, the hairline moves along the scale to indicate the amount of exposure.

Note on measurements of radioactivity:

As radiation moves through the body, it dislodges electrons from atoms, disrupting molecules. Each time this happens, the radiation loses some energy until it escapes from the body or disappears. The energy deposited indicates the number of molecules disrupted. The energy the radiation deposits in tissue is called the ***dose***, or more correctly, the ***absorbed dose***. The units of measure for absorbed dose are the gray (1 joule per kilogram of tissue) or the ***rad*** (1/100 of a gray). The ***cumulative dose*** is the total absorbed dose or energy deposited by the body or a region of the body from repeated or prolonged exposures.

Alpha particles, beta particles, gamma rays, and x-rays affect tissue in different ways. Alpha particles disrupt more molecules in a shorter distance than gamma rays. A measure of the biologic risk of the energy deposited is the ***dose equivalent***. The units of dose equivalent are ***sieverts*** or ***rem***. Dose equivalent is calculated by multiplying the absorbed dose by a ***quality factor***.

PPE Recommendations for survey monitoring and decontamination:

First Receiver: Recommended PPE and practices in a radiation emergency		
First receivers delivering care to victims **more likely** to be externally contaminated: i.e., healthcare providers working in **pre-decontamination (triage) and decontamination areas**	Level C PPE usually provides sufficient level of respiratory and skin protection	Recommended respiratory PPE includes a full-face piece air purifying respirator with a P-100 or High Efficiency Particulate Air (HEPA) filter.

		*Lead aprons are cumbersome and do not protect against exposure from high-energy, highly penetrating ionizing radiation

Health Effects of Radiation Exposure:

It's all about the dose, as with other toxins the dose makes the poison. [8]

We receive low doses of radiation from our natural environment. However, we know that radiation at high doses can be lethal. We know that radiation can cause cancer, and we also know radiation can be harmful to the fetus at various stages of pregnancy. And, although we haven't seen it in humans, radiation can cause hereditary effects in lab animals.

Other Factors that Influence Health Effects

How fast the dose is received

This is known as the dose rate. If a person receives a dose over an extended period of time, the impact on health won't be as severe as if the same dose were received all at once.

Where the dose is received

If the dose is received by only a portion of the body, the impact on health won't be as severe as if the dose were delivered to the entire body.

How sensitive the body is to radiation

Individual sensitivity to radiation is also a factor. A developing fetus is the most vulnerable to the effects of radiation. Infants, children, the elderly, pregnant women, and people with compromised immune systems are more vulnerable to health effects than healthy adults.

Like with many other contaminants or toxins, our genetic material, or DNA, is the primary target.

Radiation can interact with DNA directly and cause damage by breaking bonds in the DNA or indirectly by breaking water molecules surrounding the DNA. When these water molecules are broken, they produce free radicals–unstable oxygen molecules that can damage cells and organs.

Once a cell is damaged, three things can happen.

1. The cell repairs itself. The cell would then go back to normal.
2. The cell damage is not repaired or is incorrectly repaired, so the cell is changed. This change may eventually lead to cancer.
3. There is too much damage to the cell, and the cell dies. Cell death is not always a bad option.
    - If a few radiation-damaged cells die, your body will recover and you do not have the risk of those cells potentially turning into cancer.
    - However, widespread cell death, such as that caused by high radiation doses, can lead to organ failure and, ultimately, death.

Biological Effects of Ionizing Radiation: Levels of exposure [5]

The fact that ionizing radiation can cause biological damage is well documented, but determining its effect is extremely difficult. Many factors such as the type of radiation, the energy of the radiation, the amount of exposure, and the time it took to receive the exposure must be considered in determining what effects may be seen. Scientists have, however, established some general guidelines for relating amounts of exposure to biological effects.

BIOLOGICAL EFFECT	EXPOSURE (REM)	Maximum Exposure Limits	
Minor Red Blood Cells Change	20 R – 50 R	US EPA	IPRA
Clinical symptoms (possible) (nausea, vomiting and malaise)	50 R – 100 R	10R Whole Body (non-lifesaving)	3R – Notification Level
Clinical Symptoms (Probable) (nausea, vomiting and malaise)	100 R – 300 R	25R Whole Body (lifesaving)	10R – Notification/Turn Around Limit

Lethal Dose for 50% exposed group within 30 days	450 R +	*Maximum Exposure Limits set by the US EPA and also IPRA
NUREG-1250, Rev. 1 "Report on the Accident at the Chernobyl Nuclear Power Station."		

Response:

Once it is determined a radiological incident has occurred, notification to the RHCC should be made. Along with the notification of the RHCC, notification to the IEMA Communications Center should also occur. (IEMA Communications Center 1-217-782-7860 **OR** 1-800-782-7860) (RHCC contact OSF PALS at 309-655-7257 or 1-800-231-7257 ask for Disaster Preparedness)

Incident Response Procedures

REAC/TS – Checklist for Hospital-Based Radiation Professionals Dealing with a Radiological Incident

Once the presence of radiation levels beyond that of background levels if identified:

First Response Agencies

- Attempt to determine source of the elevated levels of radiation. Don't not spend much time in doing so. Only if the source is obvious.
- Establish a cordon and work with local ESDA, Law Enforcement and other first response agencies to control traffic into the location
- Once traffic is controlled, control site access and maintain an entry and exit log.
- Maintain safety measures using ALARA and enforce the use of PPE

Pre-Hospital EMS

- Ensure communications with local hospitals, advise of the situation and:
  - Suspect cause or source of the radiation
  - Number of patients who were potentially contaminated
  - Number of patients requiring transport to hospitals
  - Overall condition of patients and general location of contamination
- Remember that if patient/victim transport is needed before decontamination can be completed, ensure that EMS personnel wear appropriate PPE, including personal dosimeters if available.
- Wrap contaminated areas or whole patient/victim in two layers of full-body sheets.
- Preserve ability to observe and monitor patient fully during transport even though patient is wrapped.
- Pay attention to the patient's body temperature
- Avoid patient hyperthermia from 2 blankets on a hot day.
- Avoid hypothermia on a cold day, especially if patient's clothes have been removed.
- Following transport of contaminated patient/victim:
- Ensure complete survey and decontamination of transport vehicle and equipment.
- Ensure proper disposal of all contaminated equipment.
- Arrange for survey and decontamination of responders and equipment, as needed.

*OSHA Best Practices for Protecting EMS Responders during Treatment and Transport of Victims of Hazardous Substances

Local Hospitals (first receiving facilities)

- Activate your Hospital Command Center/EOC and staff your Incident Management Team
- Activate your radiological decontamination plan or hospital decontamination plan

- Use HICS to organize your response – Example HICS Incident Planning Guide
- Make contact with RHCC to determine regional course of action, additional supplies or resources required.
- Make contact with your facilities Radiation Safety Officer. If unavailable, contact REAC/TS for advice on management of the exposed or contaminated patients. (REAC/TS (865) 576-1005)
- Track all casualties who arrive that are involved in the radiological event (use HICS-254 Disaster Victim – Patient Tracking Form if unable to use facilities EMR.
- Provide staff who will have contact with contaminated patients appropriate PPE.
- Prepare for media inquiries
- If possible initiate rapid discharge procedures to decompress the ER and your facility
- In the waiting room separate those uninvolved in the incident from those who are involved or contaminated
- Establish a radiological screening area for those arriving from the incident
- Inform registration, ED triage and security of potential self-transported patients arriving from the incident. Direct these self-transported patients from the incident to the radiological screening area for assessment and potential decontamination.
- Consider a facility lockdown or access control procedures. Ensure patients that are possibly contaminated receive a screening for potential radiological contamination before entering the medical facility.
- Traffic may become an issue as people who are seeking treatment or potentially contaminated begin arriving. Vehicle may need to be screened to rule out possible radioactive contamination.

RHCC

- Initiate Regional Radiation Plan
- Activate Regional Healthcare Emergency Operations Center
- Maintain communication with local impacted medical facilities
- If warranted activate RMERT or provide additional medical logistical support
- Maintain contact with IEMA, IDPH and other local, regional, state or federal partners as necessary

Management of the Radiologically Contaminated Patient:

Notification of patients presenting with radiological contamination should be done as soon as possible. Notifications should include facility administration, local Emergency Management, Region 2 RHCC, IEMA and IDPH.

Contact the IEMA Communication Center (1-217-782-7860 **OR** 1-800-782-7860) to report that any type of radiologic event has occurred and/or report that patients arriving at the hospital have been involved in any type of radiologic incident.

It is recommended that hospitals consult REAC/TS (Radiation Emergency Assistance Center/Training Site) for questions regarding additional care management information (24 hour emergency phone number: 865-576-1005)

* Pediatric Care Guideline: Radiation Exposure Draft 6 Illinois ESF-8 Plan: Pediatric and Neonatal Surge Annex

REAC/TS Fact Sheet for Medical Providers
REAC/TS Checklist for Healthcare Professionals

Radiation Syndromes

Acute Radiation Syndrome (ARS) (sometimes known as radiation toxicity or radiation sickness) is an acute illness caused by irradiation of the entire body (or most of the body) by a high dose of penetrating radiation in a very short period of time (usually a matter of minutes).

The required conditions for Acute Radiation Syndromes (ARS) are:

- **The radiation dose must be large** (i.e., greater than 0.7 Gray (Gy)[1, 2] or 70 rads).
  - Mild symptoms may be observed with doses as low as 0.3 Gy or 30 rads.

- **The dose usually must be external** (i.e., the source of radiation is outside of the patient's body).
    - Radioactive materials deposited inside the body have produced some ARS effects only in extremely rare cases.
- **The radiation must be penetrating** (i.e., able to reach the internal organs).
    - High energy X-rays, gamma rays, and neutrons are penetrating radiations.
- **The entire body** (or a significant portion of it) must have received the dose[3].
    - Most radiation injuries are local, frequently involving the hands, and these local injuries seldom cause classical signs of ARS.
- **The dose must have been delivered in a short time** (usually a matter of minutes).
    - Fractionated doses are often used in radiation therapy. These are large total doses delivered in small daily amounts over a period of time. Fractionated doses are less effective at inducing ARS than a single dose of the same magnitude.

The three classic ARS Syndromes are:

- **Bone marrow syndrome** (sometimes referred to as hematopoietic syndrome) the full syndrome will usually occur with a dose between 0.7 and 10 Gy (70 – 1000 rads) though mild symptoms may occur as low as 0.3 Gy or 30 rads[4].
    - The survival rate of patients with this syndrome decreases with increasing dose. The primary cause of death is the destruction of the bone marrow, resulting in infection and hemorrhage.
- **Gastrointestinal (GI) syndrome:** the full syndrome will usually occur with a dose greater than approximately 10 Gy (1000 rads) although some symptoms may occur as low as 6 Gy or 600 rads.
    - Survival is extremely unlikely with this syndrome. Destructive and irreparable changes in the GI tract and bone marrow usually cause infection, dehydration, and electrolyte imbalance. Death usually occurs within 2 weeks.
- **Cardiovascular (CV)/ Central Nervous System (CNS) syndrome:** the full syndrome will usually occur with a dose greater than approximately 50 Gy (5000 rads) although some symptoms may occur as low as 20 Gy or 2000 rads.
    - Death occurs within 3 days. Death likely is due to collapse of the circulatory system as well as increased pressure in the confining cranial vault as the result of increased fluid content caused by edema, vasculitis, and meningitis.

The four stages of ARS are:

- **Prodromal stage (N-V-D stage):** The classic symptoms for this stage are nausea, vomiting, as well as anorexia and possibly diarrhea (depending on dose), which occur from minutes to days following exposure. The symptoms may last (episodically) for minutes up to several days.
- **Latent stage:** In this stage, the patient looks and feels generally healthy for a few hours or even up to a few weeks.
- **Manifest illness stage:** In this stage the symptoms depend on the specific syndrome (see Table 1) and last from hours up to several months.
- **Recovery or death:** Most patients who do not recover will die within several months of exposure. The recovery process lasts from several weeks up to two years.

Category	Dose/Rate	Time to Symptoms
Acute	Hematological syndrome (>2 Sv)	Few days to 2 months
	Gastrointestinal syndrome (>6 Sv)	Few days to a week
	CNS/Cardiovascular syndrome (>10 Sv)	Immediate
	Cutaneous syndrome (>6 Sv)	Few days to a week
	Combined injury (early intervention required)	Immediate

Latent	Radiation-induced cancer [risk depends on dose]	Years to decades

Radiation Syndrome Onset Chart

Initial Management of All Patients Involved in a Radiological Event

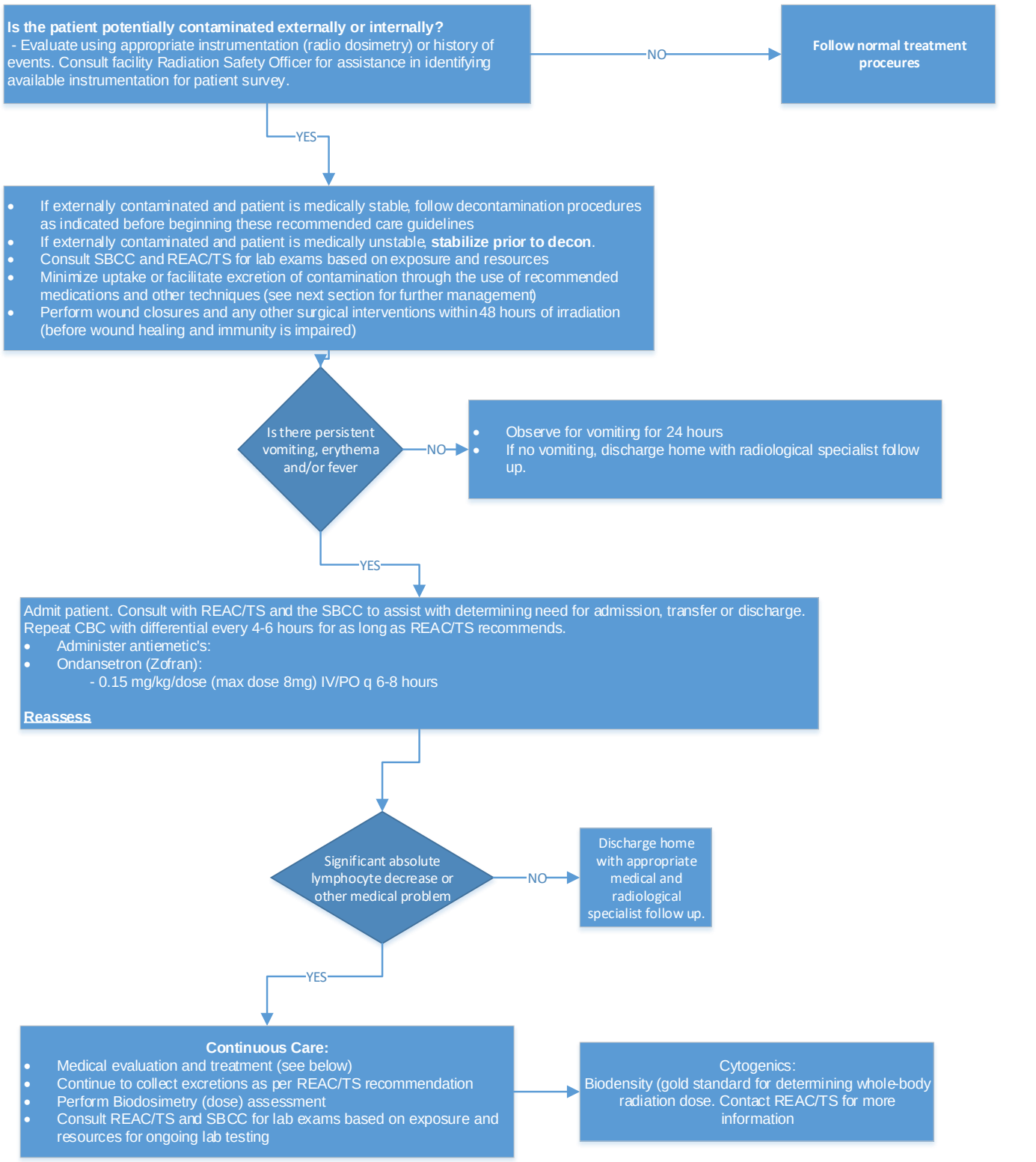
- Determine the appropriate level of PPE to be worn by First Receivers for survey monitoring and decontamination
  - Click here for more information on PPE
- Determine if Decontamination is needed due to external contamination (see Decontamination Guidelines below)
- Stabilize ABC's (Airway, Breathing, Circulation)
- Immobilize spine as indicated if injury from explosion or other traumatic injury
- Look for other injuries (trauma, burns, etc)
- Perform history and physical exam
- Keep patient NPO
- Follow your own facilities radiological response policy, if applicable
- Consult with REAC/TS for assistance with care of the acutely and critically ill patient, to individualize the care of patient, and as needed for further support and consult.
- It is recommended that hospitals consult REAC/TS (Radiation Emergency Assistance Center/Training Site) for questions regarding additional care management information (24 hour emergency phone number: 865-576-1005)

Psychological Considerations

Radiation emergencies, whether it be from a leak at a nuclear power plant or from a terrorist type incident such as a dirty bomb, leads to significant public anxiety. The anxiety associated with such events can appear out of proportion to the radiation induced health effects and can greatly affect the entire community. Many patients may present with symptoms such as nausea. It is important for providers to determine if nausea is from contamination or from the anxiety of the event. Long term psychological effects can manifest years after an event. General examples of long term effects include: feelings of vulnerability, PTSD, chronic anxiety, feelings of loss of control, fear of safety and health of themselves as well as future generations, and multiple idiopathic physical symptoms (MIPS). Provide educational materials and counseling options to all patients and their families after a radiological emergency

Medical Management of All Patients Involved in a Radiological Incident

Management of All Patients Involved in a Radiological Incident



Derived from IDPH Burn Surge Annex

Radiological and Clinical Laboratory Assessments:

Samples needed	**Why?**	**How?**
In all cases of radiation injury:		
CBC and differential STAT (follow with absolute lymphocyte counts every 6 hours for 48 hours when history indicates possibility of total-body irradiation)	To assess the radiation dose; initial counts establish a baseline, subsequent counts reflect the degree of injury	Choose a noncontaminated area for veni-puncture; cover puncture site after collection
Routine urinalysis	To determine if kidneys are functioning normally and establish a baseline of urinary constituents; especially important if internal contamination is a possibility	Avoid contaminating specimen during collection; if necessary, give the patient plastic gloves to wear for collection of specimen
When external contamination is suspected:		
Swabs from body orifices	To assess possibility of internal contamination	Use separate saline- or water-moistened swabs to wipe the inner aspect of each nostril, each ear, mouth, etc.
Wound dressing and/or swabs from wounds	To determine if wounds are contaminated	Save dressings in a plastic bag. Use moist or dry swabs to sample secretions from each wound. For wounds with visible debris, use an applicator or long tweezers or forceps to transfer samples to specimen containers
When internal contamination is suspected:		
Urine 24-hour specimen	Body excreta may contain radionuclides if internal contamination has occurred	Use 24-hour urine collection container. If patient is being discharged, they should be provided a container for feces collection. A standard specimen cup is usually not sufficient.
Feces		

Decontamination of Patients:

Radioactive Contamination versus Exposure

• ***Radioactive contamination:*** radioactive material is on or inside a person
  ○ External contamination-radioactive material is only on outside of a person
  ○ Internal contamination-radioactive material is ingested, inhaled, or absorbed through the skin or open wound
• ***Radiation exposure:*** a person is exposed to radioactive materials
• ***Difference between contamination and exposure:***
  ○ Person exposed to radiation may not be contaminated. A radiation exposure means radioactive material penetrated the person's body. For a person to be contaminated with radioactive materials, the materials must be on or inside of the person's body.

- Gather a background/environmental radiation level of the current environment. This should be done away from contaminated patients and equipment that would provide an elevated reading above background levels.
- If the patient is unstable and requires immediate medical interventions, then medically stabilize the patient first.
  - NOTE: Radioactivity emitted from a patient is considered to be a nuisance dose. This means that in the event a patient is medically unstable, stabilizing treatment should be prioritized over decontamination.
- If the patient is stable, conduct a radiological survey of the patient's body using appropriate detection equipment

Perform whole body radiation survey.

- Mark on patient's/victim's skin, using waterproof felt tip marker, any areas of high level contamination found by radiation survey.
- Ensure that meter-to-skin distance is consistent in all surveys to minimize inter-survey errors. The distance should be ½"-1" away from the skin of the patient. The speed should only be a couple inches per second. Slow and methodical. Ensure the meter does not tough the patients skin.
- Record initial and all follow-up survey results for an individual patient/victim on a Contamination Assessment Form; include name, and time and date of initial and all follow-up radiation surveys.
- Update Contamination Assessment Form after each decontamination cycle or use form for each cycle
- Note: A whole body survey is only needed once, after the first round of decontamination is complete keep the survey to the area marked previously for high concentrations of radiation contamination.

How to use detection equipment and conduct a whole body survey for radioactive contamination:

Screening People for External Contamination - Part 1
Screening People for External Contamination - Part 2
Screening People for External Contamination - Part 3
Screening People for External Contamination - Part 4
Screening People for External Contamination - Part 5

Conduct decontamination in the following order

- Whole body
- Radioactive shrapnel
- Open wounds
- Body entrance cavities: nose, mouth, ears
- Localized contaminated skin starting with area of highest contamination noted on Contamination Assessment Form

Localized Skin Decontamination

1. * Scan hands and feet first. These are the most prominent locations for contamination.
2. Begin decontamination with areas of highest contamination.
3. *In a water deficient environment*, gently brush skin surface to remove a portion of the stratum corneum layer and dislodge contamination held by skin proteins. Items such as baby wipes, swiffer dry wipes and lint rollers may be used to reduce waste water.
4. *In a water sufficient environment*, wash patients/victims (or have patients/victims wash themselves) with tepid water and soap, without damaging or abrading the skin.
    a. Add mild soap (neutral pH such as baby shampoo or Dawn) to water to emulsify and dissolve contamination.
    b. Direct contaminated waste water away from patient/victim rather than over the rest of the body.
5. Use serial washcloths, gauze pads or surgical sponges to avoid recontamination.
6. Place all cloths, pads, or sponges used by a patient/victim into a single, airtight container e.g., property bag.
    a. Label property bag with
        i. Patient/Victim name
        ii. Date and time of collection
        iii. Location of collection
        iv. Radiation warning label
        v. Barcode (if one has been assigned) or unique ID number (consider Triage Tag)
    b. Store property bags in secure location designated by RSO for later forensic evaluation (as necessary) and appropriate disposal.
7. Goal of localized skin decontamination: to decrease external contamination to a level of no more than 2 times background radiation level.
    a. Perform **two decontamination cycles** if feasible, with a radiation survey after each cycle.
    b. Use tepid decontamination water.
    c. Add mild soap (neutral pH) to water to emulsify and dissolve contamination.
    d. Direct contaminated waste water away from patient, rather than over the rest of the body.
    e. Stop localized skin decontamination efforts after 2 decontamination cycles and handle patient with standard precautions if the second radiation survey shows:
        i. External contamination in excess of 2 times background radiation level
        ii. Additional external decontamination efforts do not further reduce contamination levels by more than 10%.
    f. Attempts to remove all contamination from skin may not be feasible or desirable.
        i. Some radioactivity may be trapped in outermost layer of skin (stratum corneum) and will remain until normal sloughing occurs (12-15 days).
        ii. Attempts at vigorous decontamination may result in loss of normal intact skin barrier and an increased risk of internal contamination.
        iii. Cover areas of residual radiation contamination with waterproof dressings/drapes in order to limit spread of contamination to other body sites, immediate environment, and others.
        iv. Treat focal hand contamination not removed after washing by promoting sweating, e.g., put a hand in a surgical glove for a few hours.
    g. Remember that persistently elevated levels of external contamination after adequate decontamination efforts may also be due to any or all of the following
        i. Internal contamination
        ii. Retained radioactive foreign bodies (radioactive shrapnel)
        iii. Contaminated wounds
        iv. Contaminated body orifices

General guidance

- Goal of whole body external decontamination is to decrease external contamination to a level of no more than 2 times background radiation level.
- Perform **two decontamination cycles** if feasible, scan highly contaminated areas after each scan including hands and feet
- Use tepid decontamination water.
    - Avoid cold water which tends to close skin pores, trapping radioactive contamination. Cold water may also cause hypothermia.
    - Avoid hot water which tends to enhance absorption of radioactive material through vasodilation and increased skin blood flow. Hot water may also cause thermal burns.
- Add mild soap (neutral pH) to water to emulsify and dissolve contamination.
- Direct contaminated waste water away from patient, rather than over the rest of the body.
- Stop whole body external decontamination efforts after 2 decontamination cycles and handle patient with standard precautions if the second whole body radiation survey shows:
    - External contamination in excess of 2 times background radiation level
    - Additional whole body external decontamination efforts do not further reduce contamination levels by more than 10%.
- Consider that attempts to remove all contamination from skin may not be feasible or desirable.
    - Some radioactivity may be trapped in outermost layer of skin (stratum corneum) and will remain until normal sloughing occurs (12-15 days).
    - Attempts at vigorous decontamination may result in loss of normal intact skin barrier and an increased risk of internal contamination.
- Cover areas of residual radiation contamination with waterproof dressings/drapes in order to limit spread of contamination to other body sites, immediate environment, and others.
- Persistently elevated levels of external contamination after adequate decontamination efforts may also be due to internal contamination, retained radioactive foreign bodies (shrapnel), contaminated wounds, or contaminated body orifices.

Waste Water Disposal

- In small radiation events, collection and containment of contaminated effluent water in appropriate containers (e.g., large bladders for tent decontamination and plastic bags for individuals with small areas of contamination) may be feasible.
- Sampling and appropriate disposal of contaminated water may be performed later.
- In large mass casualty events, collection of waste effluent may not be feasible.
- EPA guidance on this issue has been provided. [3]

Source: Procedures for Radiation Decontamination - Radiation Emergency Medical Management (hhs.gov)

Steps for Decontaminating Externally Contaminated Patients

Steps for Decontaminating Externally Contaminated Patients

- Remove clothing (cut clothing in a direction away from patinet's airway and roll it
- Place all clothing in a plastic bag for testing

- Assess for and stabilize and emergent medical issues and life threats
- Obtain medical/event history if patient or family are able to provide
- Identify/contain contaminants
- Minimize any additional contaminated uptake to the patient
- Follow IEMA, REAC/TS and/or Department of Nuclear Safety recommendations
- Utilize START / JumpSTART Triage to sort patients

Immediate(RED)

- **Utilize Dry Decon methods**
- **Provide immediate medical care and stabilize the patient**

Delayed (Yellow)

- Conduct full body radiation assessment assessing for contamination
- Decon patient use Dry decon first then Wet Decon (showers) if necessary
- Provide Medical Care

Minor (Green)

- Conduct full body radiation assessment assessing for contamination
- Decon patient use Dry decon first then Wet Decon (showers) if necessary
- Provide Medical Care

Decontamination Order Priority:
1. Wounds
2. Mucosal Surfaces (mouth, ears, etc)
3. Intact Skin

Reassess all areas after decon

Contamination reduced to acceptable levels?

Acceptable Contamination Levels - Less than 2x background

Move from decon corridor into medical treatment

**Radioactivity emitted from a patient is considered to be a nuisance dose. This means that in the event a patient is medically unstable, stabilizing treatment should be prioritized over decontamination.

Recovery:

Hospital Command Center Information: First response agencies will consolidate and forward copies of patient tracking information and Hospital Command Center paperwork (including position specific Job Action Sheets) and notes from the incident.

After Action Report – Improvement Plan (AAR-IP): Hospitals receiving patients from the radiological incident should complete an AAR-IP for their facility. This AAR-IP will outline the facilities response and coordination for this incident along with any plans for improvement in the future. The AAR-IP for each facility should then be forward to the RHCC. Once all AAR-IP's are received, aggregated and compiled from the impacted facilities, the RHCC will develop a regional AAR-IP for the incident.

Mental Health – Prioritize mental health for those who were providing support, patient care, incident management or played any other role in this event. It should be the goal to provide mental health support in form of Critical Incident Stress Management, Critical Incident Stress Debriefing, counseling or other forms of mental health support within 72 hours of the stabilization of the event.

Logistics – Upon conclusion of the event response agencies should inventory supplies and provide a list of supplies used, equipment that will need repaired or replaced, PPE damaged that needs replaced or any other logistical supply costs incurred by the impacted agencies, facilities or entities.

APPENDIX:

Appendix A – Radiation Incident Management Guides

Oak Ridge Institute – Guidelines for Radiation Accident Management - is a resource for emergency responders and receivers who may encounter patients with illnesses or injuries caused by ionizing radiation. It reflects real world experience gained by the physicians, nurse/paramedics, and health physics professionals at the Radiation Emergency Assistance Center/Training Site (REAC/TS) in Oak Ridge, Tenn. The content was created to be used as a reference guide to answer specific questions related to the care and management of patients who have been involved in radiation incidents.

Occupational Safety and Health Administration - his page provides information specifically for emergency response workers and employers. Workers and employers without emergency response or related support functions should consult the General Businesses page for information on protective actions during and following radiation emergencies.

Center for Disease Control and Prevention – CDC provides technical assistance, training, and tools to help preparedness professionals and communities be ready for a radiation emergency.

REMM – Radiation Emergency Medical Management - REMM was produced by the US Department of Health and Human Services, Administration for Strategic Preparedness and Response. REMM is designed to provide just-in-time, evidence-based, usable information with sufficient background and context to make complex issues understandable to those without formal radiation medicine expertise

FEMA – Radiological Emergency Preparedness - FEMA coordinates the national effort to provide state, local and tribal governments with relevant and executable radiological emergency preparedness planning, training, and exercise guidance. We also help set policies necessary to ensure that adequate capabilities exist to prevent, protect against, mitigate the effects of, respond to and recover from incidents involving commercial nuclear power plants.

Preliminary Report on Operational Guidelines Developed for Use in Emergency Preparedness and Response to a Radiological Dispersal Device Incident - This report presents preliminary operational guidelines and supporting work products developed through the interagency Operational Guidelines Task Group (OGT).

Radiation Injury Treatment Network - RITN is a national network of medical centers with expertise in managing bone marrow failure. We work with partners from other medical specialties to assist with managing acute radiation syndrome and its health-related consequences.

Appendix B – Emergency Contacts

Illinois State Emergency Contacts	
Illinois Emergency Management Agency	
IEMA Communications Center	1 (800) 782-7860
Radiological Duty Officer on-call	(217) 785-0600
Illinois Department of Public Health	
Office of Preparedness of Response	(217) 558-0560
Springfield Headquarters	(217) 782-4977
Bioterrorism Preparedness and Emergency Response	(217) 558-0560

RITN Participating Hospital Locations	
Chicago	
Northwestern Memorial Hospital	Adult
Rush-Presbyterian	Adult
University of Chicago	Pediatric / Adult
UW Health Northern Illinois	Pediatric / Adult
Saint Louis	
Barnes Jewish Hospital	Adult
Iowa City	
University of Iowa Hospitals and Clinics	Pediatric / Adult

Incident Response Guide: Radiation Incident

Mission

To provide a safe environment for patients, staff, and visitors within the hospital following a radiation incident that may or may not impact the safety and structural integrity of the hospital or availability of services; and to provide the safe continuation of care for patients, visitors, and those seeking care post-incident.

Directions

Read this entire response guide and review the Hospital Incident Management Team Activation chart.
Use this response guide as a checklist to ensure all tasks are addressed and completed.

Objectives

- ☐ Provide safe and effective decontamination of incoming contaminated patients
- ☐ Protect patients, staff, and the hospital from contamination and safely restore normal operations
- ☐ Communicate effectively with the local Emergency Operations Center and emergency response partners

Immediate Response (0 – 2 hours)				
Section	**Officer**	**Time**	**Action**	**Initials**
Command	**Incident Commander**		Receive notification of the incident. Notify the emergency department of incoming casualties that are possibly contaminated with radiation.	
			Activate the Emergency Operations Plan, Radiation Incident Plan, Decontamination Plan, Hospital Incident Management Team, and Hospital Command Center.	
			In conjunction with Medical-Technical Specialist: Radiological or Radiation Safety Officer, determine threat to the hospital any need for shelter-in-place or hospital evacuation.	
			Notify hospital Chief Executive Officer, Board of Directors, and other appropriate internal and external officials of situation status.	
			Establish operational periods, incident objectives, and regular briefing schedule. Consider use of Incident Action Plan Quick Start form for initial documentation of the incident.	
			Consider limiting or closing nonessential services.	
			Consider activation of ambulance diversion status.	
	Public Information Officer		Develop patient, staff, and community response messages to convey hospital preparations, services, and response.	
			Monitor media outlets for updates on the incident and possible impacts on the hospital.	
			Communicate information via regular briefings to Section Chiefs and Incident Commander.	
	Liaison Officer		Notify community partners in accordance with local policies and procedures (e.g., consider local Emergency Operations Center, other area healthcare facilities, local emergency medical services, and healthcare coalition coordinator), including requesting supplies, equipment, or personnel not available in the facility.	

			Contact appropriate authorities and experts to provide hospital status, and to request support and recommendations for radiological contamination.	
	Safety Officer		Monitor safe activation of the Radiation Incident Plan and the Decontamination Plan.	
			Evaluate for potential secondary hospital contamination and contain any detected contaminated areas within the hospital.	
			Conduct ongoing analysis of existing response practices for health and safety issues related to patients, staff, and hospital and implement corrective actions to address; complete HICS 215A.	
			Monitor safe and consistent use of appropriate personal protective equipment by all staff.	
	Medical-Technical Specialist: Radiological		Assist in obtaining specific information regarding radiological agent such as antidotes, treatment, decontamination procedures, etc.	
			Provide expert input in the Incident Action Planning process.	
			Assist the Incident Commander in determining the radiological threat to the hospital and the need for shelter-in-place or hospital evacuation.	

Immediate Response (0 – 2 hours)

Section	Branch/Unit	Time	Action	Initials
Operations	**Section Chief**		Implement the Radiation Incident Plan.	
			Implement Shelter-in-Place or Evacuation Plan as directed by the Incident Commander.	
	Medical Care Branch Director		Conduct an inpatient and outpatient census and prioritize patients for safe discharge or cancellation of appointments and procedures.	
			Identify evacuation priorities and transfer requirements.	
			Determine patient capacity required to handle patient surge in shelter-in-place conditions.	
			Prepare for fatalities, including contaminated remains, in conjunction with medical examiner and coroner and local emergency management.	

	Infrastructure Branch Director		As directed, implement the hospital's Shelter-In-Place Plan, including heating, ventilation, and air conditioning shutdown, and sealing of the hospital.	
			Conduct a damage, structural integrity, and utilities assessment of the hospital.	
			Monitor hospital air quality for safe occupation.	
	Security Branch Director		Secure the hospital to prevent contaminated individuals from entering or leaving.	
			Establish and maintain a limited number of ingress and egress routes.	
			Establish and secure areas for collection of contaminated belongings and valuables.	
	HazMat Branch Director		Implement the hospital's Decontamination Plan: ☐ Establish triage and decontamination areas with a clear perimeter and directions on ingress and egress ☐ Provide rapid triage and disposition of potentially contaminated patients, non-contaminated patients, media, family members, etc. ☐ Access radiation monitoring equipment for use in decontamination operations ☐ Implement staff monitoring in and rotation through the decontamination area ☐ Consult with Medical-Technical Specialist: Radiological, Radiation Emergency Assistance Center/Training Site (REAC/TS) and Radiation Emergency Medical Management (REMM), and internal and external agencies or consultants to ascertain treatment protocols ☐ Relocate medications and antidotes to clinical care and decontamination areas ☐ Consider the need for evidence collection	
Planning	**Section Chief**		Establish operational periods, incident objectives, and the Incident Action Plan in collaboration with the Incident Commander.	
	Resources Unit Leader		Initiate personnel and materials tracking.	
	Situation Unit Leader		Initiate patient and bed tracking.	
Logistics	**Section Chief**		Activate the Support Branch to provide the logistics needs of hospital staff and operations.	

	Support Branch		Manage labor pool and solicited or unsolicited volunteers.	
			Initiate staff call-in systems, if instructed and if it is safe to do so.	
			Inventory equipment, supplies, and medications on hand and prepare to ration materials as needed.	
			Anticipate an increased need for medical and surgical supplies, medications, and equipment and take actions to obtain when possible.	

Intermediate Response (2 – 12 hours)

Section	Officer	Time	Action	Initials
Command	**Incident Commander**		Reevaluate need to shelter-in-place versus evacuate.	
			Coordinate communications and decision making with external agencies and area hospitals as appropriate.	
			Direct implementation of any and all additional response plans required to address the incident.	
			Consider deploying a hospital representative to the local Emergency Operations Center.	
	Public Information Officer		Conduct briefings to media, patients, staff, visitors, and persons seeking shelter to update them on incident and hospital status.	
			Coordinate risk communication messages with the Joint Information Center, if able.	
			Assist with notification of patients' families about the incident and the likelihood of evacuation, if required.	
	Liaison Officer		Maintain contact with local Emergency Operations Center, local emergency medical services, regional medical resources, and area hospitals to relay status and critical needs, and to receive community updates.	
	Safety Officer		Continue to implement and maintain safety and personal protective measures to protect patients, staff, visitors, and the hospital.	

			Continue to monitor proper use of personal protective equipment and decontamination procedures.	
	Medical-Technical Specialist: Radiological		Support the Operations Section, as needed, by coordinating information regarding specific decontamination and treatment procedures; provide direct oversight to decontamination operations as directed. Continue to provide expert input into the Incident Action Planning process.	

Intermediate Response (2 – 12 hours)

Section	Branch/Unit	Time	Action	Initials
Operations	**Section Chief**		Monitor continuation of medical mission activities.	
	Medical Care Branch Director		Continue patient, staff, and hospital monitoring for radiation exposure, and provide appropriate follow up as required.	
			Evaluate and update staff scheduling to accommodate decontamination team supplementation.	
			Activate the Fatalities Management Plan and management of contaminated remains.	
	HazMat Branch Director		Assess the need for continued decontamination and monitoring activities based on current and projected event status.	
	Patient Family Assistance Branch Director		Establish a patient information center in cooperation with the Liaison Officer.	
			With Public Information Officer, assist with the notification of patients' families about incident and the likelihood of evacuation, if required.	
Planning	**Section Chief**		Revise and update Incident Action Plan, including planning for supplies, staffing, and other needs.	
	Resources Unit Leader		Continue personnel and materials tracking.	
	Situation Unit Leader		Continue patient and bed tracking.	
Logistics	**Section Chief**		Refer to Job Action Sheet for appropriate tasks.	
	Support Branch		Continue to assess surge capacity and need for personnel and supplies (e.g., equipment, blood	

	Director		products, medications, etc.) in cooperation with Operations Section. Obtain supplies as required and available or continue supply rationing.	
			Initiate employee monitoring for radiation exposure and provide appropriate follow up care.	
			Establish Employee Family Care Unit, if required.	
			Continue staff call-in (if safe to do so) and provide additional staff to impacted areas.	
Finance/ Administration	**Section Chief**		Refer to the Job Action Sheet for appropriate tasks.	
	Time Unit Leader		Initiate tracking of hours associated with the emergency response.	
	Procurement Unit Leader		Facilitate procurement of needed supplies, equipment, and contractors.	
	Compensation/Claims Unit Leader		Assess and implement risk management and claims procedures for reported staff and patient exposures or injuries.	

Extended Response (greater than 12 hours)

Section	Officer	Time	Action	Initials
Command	**Incident Commander**		Reassess incident objectives and Incident Action Plan; revise as indicated by the response priorities and overall mission.	
			Continue regular briefing of Command Staff and Section Chiefs.	
			Reevaluate the hospital's ability to continue its medical mission.	
			Plan for return to normal services in coordination with Command Staff and Section Chiefs.	
	Public Information Officer		Continue regularly scheduled briefings to media, patients, staff, families, and persons seeking shelter.	
			Communicate regularly with the Joint Information Center to update hospital status and coordinate public information messages.	
	Liaison Officer		Maintain contact with local Emergency Operations Center, regional medical resources, and area hospitals to relay status and critical needs, and to receive incident and community updates.	

	Safety Officer		Continue to oversee safety measures and use of personal protective equipment for patients, staff, and visitors.	
			Monitor radiation exposures and decontamination operations.	
			Update HICS 215A with revised use of personal protective equipment, access to hospital and decontamination areas.	
	Medical-Technical Specialist: Radiological		Continue to support the Operations Section as needed by coordinating information regarding specific decontamination and treatment procedures.	
			Continue to provide expert input into the Incident Action Planning process.	

Extended Response (greater than 12 hours)

Section	Branch/Unit	Time	Action	Initials
Operations	**Section Chief**		Monitor the continuation of medical mission activities, including patient care and hazardous materials (HazMat) activities.	
			Ensure that all documentation, including damage assessments, repair costs, and materials tracking are submitted to Planning Section.	
	Medical Care Branch Director		Continue patient monitoring for radiation exposure and provide appropriate follow up care as required.	
	Infrastructure Branch Director		Continue infrastructure monitoring and air monitoring in collaboration with Safety Officer.	
			When safe and with Medical-Technical Specialist: Radiological, conduct an external inspection of the hospital for damage and determine need for decontamination of outside the hospital.	
			Complete a hospital damage report, progress of repairs, and estimated timelines for restoration of hospital to pre-incident condition.	
	Security Branch Director		Continue to ensure hospital security, traffic, and crowd control.	
			Monitor enforcement of hospital policies and cooperation with local, state, and federal law enforcement agencies when interviewing patients and collecting evidence.	

	Hazmat Branch Director		Provide for hospital and equipment decontamination where appropriate.	
Planning	**Section Chief**		Update and revise the Incident Action Plan in collaboration with the Command Staff and Section Chiefs.	
			Ensure that updated information and intelligence is incorporated into Incident Action Plan. Ensure the Demobilization Plan is being readied.	
	Situation Unit Leader		Update status boards and other communication devices with latest hospital and community status.	
Logistics	**Section Chief**		Refer to the Job Action Sheet for appropriate tasks.	
	Support Branch Director		Monitor and address the health status of staff that participated in, supported, or assisted in decontamination activities.	
			Restock and repair all supplies and equipment used in the response.	
Finance/ Administration	**Section Chief**		Refer to the Job Action Sheet for appropriate tasks.	
	Procurement Unit Leader		Facilitate procurement of needed supplies, equipment, and contractors.	
	Compensation/Claims Unit Leader		Assess and implement risk management and claims procedures for reported staff and patient exposure injuries.	
	Cost Unit Leader		Continue to track response costs and expenditures and prepare regular reports for the Incident Commander.	

Demobilization/System Recovery

Section	Officer	Time	Action	Initials
Command	**Incident Commander**		Determine termination of event or “all clear” in collaboration with Command Staff, Section Chiefs, local law enforcement, and HazMat officials.	
			Oversee and direct demobilization and system recovery operations with restoration of normal services.	

			Ensure that processes are mobilized to complete the response documentation for submission for reimbursement.	
	Public Information Officer		Conduct final media briefing and assist with updating staff, patients, people seeking shelter, families, and others of termination of the incident.	
	Liaison Officer		Communicate the final hospital status and termination of the incident to regional medical health coordinator, local Emergency Operations Center, local emergency medical services, and area hospitals.	
	Safety Officer		Monitor proper disposal of contaminated waste and wastewater.	
			Assist with monitoring completion of hospital repairs and decontamination, in conjunction with Operations Section.	
			Monitor and maintain a safe environment during return to normal operations.	
			Monitor safety practices related to patient care and services returning to normal operations.	

Demobilization/System Recovery

Section	Branch/Unit	Time	Action	Initials
Operations	**Medical Care Branch Director**		Coordinate patient care services returning to normal operations.	
	Infrastructure Branch Director		Restore heating, ventilation, and air conditioning systems to normal service.	
			Continue to monitor proper disposal of contaminated waste and wastewater.	
			Conduct or facilitate hospital repairs and return of hospital to normal operating conditions.	
	Security Branch Director		Return entry and egress restrictions, traffic flow, and security personnel to normal services.	
			Submit all section documentation to Planning Section for compilation in an After Action Report.	

	HazMat Branch Director		Ensure that all personnel, supplies, and equipment utilized in the response have been properly decontaminated and stored.	
			With Infrastructure Branch Director, monitor and manage decontamination of hospital.	
			Finalize and distribute Demobilization Plan.	
			Conduct debriefings and hotwash with: ☐ Command Staff and section personnel ☐ Administrative personnel ☐ All staff ☐ All volunteers	
			Write an After Action Report and Corrective Action and Improvement Plan for submission to the Incident Commander, including: ☐ Summary of the incident ☐ Summary of actions taken ☐ Actions that went well ☐ Actions that could be improved ☐ Recommendations for future response actions	
	Documentation Unit Leader		Collect, correlate, and archive all electronic and written documentation generated in the event response.	
			Prepare summary of the status and location of all incident patients, staff, and equipment. After approval by the Incident Commander, distribute to appropriate external agencies.	
Logistics	**Section Chief**		Inventory all Hospital Command Center and hospital supplies and replenish as necessary, appropriate, and available.	
	Support Branch Director		Initiate long term monitoring of employees exposed to radiation or that participated in decontamination or patient care activities, including provision of behavioral health services, as required.	
Finance/ Administration	**Section Chief**		Refer to the Job Action Sheets for appropriate tasks.	
	Compensation / Claims Unit Leader		Contact insurance carriers to assist in documentation of structural and infrastructure damage and initiate reimbursement and claims procedures.	
	Cost Unit Leader		Compile final summary of response and recovery costs, expenditures and estimated lost revenues; submit to Planning Section Chief for inclusion in the After Action Report.	

Documents and Tools

Emergency Operations Plan, including:

- ☐ Radiation Incident Plan
- ☐ Decontamination Plan
- ☐ Shelter-in-Place Plan
- ☐ Evacuation Plan
- ☐ Surge Plan
- ☐ Triage Plan
- ☐ Patient, staff, and equipment tracking procedures
- ☐ Employee Health Monitoring and Treatment Plan
- ☐ Business Continuity Plan
- ☐ Behavioral Health Support Plan
- ☐ Alternate Care Site Plan
- ☐ Hospital Security Plan
- ☐ Fatality Management Plan
- ☐ Volunteer Utilization Plan
- ☐ Emergency Patient Registration Plan
- ☐ Risk Communications Plan
- ☐ Interoperable Communications Plan
- ☐ Demobilization Plan

Forms, including:

- ☐ HICS Incident Action Plan (IAP) Quick Start
- ☐ HICS 200 – Incident Action Plan (IAP) Cover Sheet
- ☐ HICS 201 – Incident Briefing
- ☐ HICS 202 – Incident Objectives
- ☐ HICS 203 – Organization Assignment List
- ☐ HICS 205A – Communications List
- ☐ HICS 214 – Activity Log
- ☐ HICS 215A – Incident Action Plan (IAP) Safety Analysis
- ☐ HICS 221 – Demobilization Checklist
- ☐ HICS 251 – Facility System Status Report
- ☐ HICS 253 – Volunteer Registration
- ☐ HICS 254 – Disaster Victim/Patient Tracking
- ☐ HICS 255 – Master Patient Evacuation Tracking

Job Action Sheets

Access to hospital organization chart

Access to HazMat/Terrorism/CBRNE annexes of local Emergency Operations Plan

Television/radio/internet to monitor news

Telephone/cell phone/satellite phone/internet/amateur radio/2-way radio for communication

Position	Immediate	Intermediate	Extended	Recovery
Incident Commander	X	X	X	X
Public Information Officer	X	X	X	X
Liaison Officer	X	X	X	X
Safety Officer	X	X	X	X
Medical-Technical Specialist: Radiological	X	X	X	X
Operations Section Chief	X	X	X	X
Medical Care Branch Director	X	X	X	X
Infrastructure Branch Director	X	X	X	X
Security Branch Director	X	X	X	X
HazMat Branch Director	X	X	X	X
Patient Family Assistance Branch Director		X	X	X
Planning Section Chief	X	X	X	X
Resources Unit Leader	X	X	X	X
Situation Unit Leader	X	X	X	X
Documentation Unit Leader				X
Logistics Section Chief	X	X	X	X
Support Branch Director	X	X	X	X
Finance /Administration Section Chief		X	X	X
Time Unit Leader		X	X	X
Procurement Unit Leader		X	X	X
Compensation/Claims Unit Leader		X	X	X
Cost Unit Leader			X	X