County of Santa Cruz
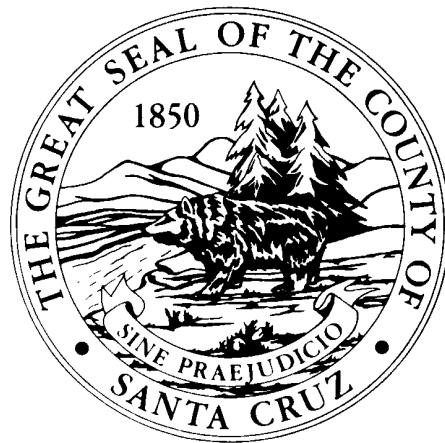
Healthcare Coalition

Radiological Emergencies Annex

CRITICAL ACTION CHECKLIST: FIRST 12 HOURS

First 0-2 hours		
✓	**Description of Action Item**	**Responsible**
	Notifications Per MHOAC Activation JAS. Add EH, BH, HSD, PIO, EP, Coroner, Hospitals, and clinics to activation list	MHOAC, PH Director or designees
	Activate DOC, Request Activation of EOC	PH Director or MHOAC
	Coordinate planning and response for EMP impact as needed	EOC
	Implement Incident Command System	Everyone
	Activate Radiation Plans	Everyone
	Hospitals activate HICS, radiation plan, surge plan. Clinics activate radiation plan, and disaster/surge protocols.	Hospitals, Clinics
	Identify Med-Health Branch Director, who immediately responds to EOC	PH Director, MHOAC
	PIO prepares and releases 1st Public warning in coordination with Public Safety, if not already completed by Public Safety	PIO
	Assure Fire, LE response	MHOAC, EMS
	Get Situation Status (sit-stat)	MHOAC, EMS
	Implement surge strategies in the EMS system	EMS
	Put alert out on ReddiNet in MCI section, contact Soraya Peters (ReddiNet) for assistance with ReddiNet as needed.	EMS, MHOAC
	Identify Healthcare Facilities in Hot Zone and Shelter In Place zone and their needs	MHOAC, EMS, Med-Health Branch
	Identify residents with AFN in Hot Zone, Shelter In Place zone and determine plan for response	HSD
	Conduct 10-minute conference call with Leadership, EOC Director, EP, EMS, MHOAC, HSD Lead, Environmental Health Lead, BH lead: provide sit-stat, ID size, needs, type of radiation, DOC Command structure, shelter lead, communication methodology, Op period lengths	MHOAC, EMS, PH Director
	Request Resources such as AST's, radiation experts, etc.	MHOAC
	Respond to incoming resource requests as needed	EMS, DOC Logs
	EMS travels to Netcom, assists with triage as needed, monitors EMS system and provides frequent updates to MHOAC	EMS
	EMS travels to ICP for incident for coordination	EMS
	AMR representatives respond to ICP, EOC, and to AMR Main office	AMR
	Fill roles in the DOC and EOC for immediate response	HSA
	Provide patient management information to hospitals and clinics as needed	PH
	Provide PPE to staff as needed	Hospitals, EMS, HSD, EH, BH
	Hospitals and clinics prepare for decontamination of incoming patients	Hospitals, Clinics

	Two to Twelve Hours	
✓	**Description of Action Item**	**Responsible**
	Assess radiation dose threat	EH, PH
	Create sit-stat report for RDMHS	DOC
	Create IAP and/or Medical Plan	EOC, DOC, HCC
	Prepare for and manage spontaneous volunteers and donations	EOC
	Provide decontamination and medical care for patients	Hospitals
	Plan for long-term ongoing surge of patients as needed	EMS, Hospitals, HCC
	Form JIC as needed	EOC, PIO
	Update public information a minimum of every 15-30 minutes	EOC, PIO, JIC
	Set up CRCs for public information and decontamination. As needed	HSD, PH
	Set up evacuation shelters as needed	HSD, PH, Med-Health Branch
	Secure appropriate declarations and proclamations	PH, HSA
	Initiate surveillance and epidemiological investigations	PH, HSA
	Review Radiation Plans in detail, determine next steps	Everyone

Note: See Appendices for Acronym Dictionary

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INTRODUCTION

Radiological or nuclear incidents will impose significant challenges to the County of Santa Cruz (SCC) healthcare system, local and county agencies, and general population. It is critical to have the ability to provide adequate medical care during these events. The purpose of the County of Santa Cruz Healthcare Coalition (SCCHCC) Radiation Annex is to provide hazard-specific guidance to support a coordinated healthcare response to radiological incidents.

The primary goals of the SCCHCC Radiological Annex are:

- Ensure optimal patient care at the most appropriate healthcare setting
- To describe the process and organizational constructs county government and the SCCHCC will use during response
- Identify how partners will respond and coordinate in response to nuclear/radiological incidents to reduce morbidity and mortality
- Ensure responder health and safety
- Provide information that is specific and unique to SCCHCC nuclear/radiological incident response and recovery process

This Annex does not replace other county or local emergency operations plans or procedures, but rather builds upon the existing plans and annexes. This Annex will likely be used in conjunction with the SCC Medical Surge Plan.

> *Definition*: For the purpose of this plan, a "radiation exposure" includes or pertains to inadvertent, deliberate, or international nuclear/radiological incidents. The response goes above and beyond routine radiation investigation, coordination, and response; and likely requires significant multi-agency response.

Acknowledgement: Credit and appreciation go to the County of San Mateo and to Phil White for graciously allowing us to use some of their work in creating this plan.

SCOPE

The SCCHCC Radiation Annex is an Annex to the larger SCCHCC Emergency Operations Guide. This Annex applies to a County-wide response to radiological incidents, regardless of size or complexity. This includes suspected or deliberate attacks, inadvertent incidents, and international incidents. For incidents involving suspected federal crimes, including those concerning terrorism, the Federal Government will respond, lead, and coordinate with local law enforcement and investigative activities to resolve threats and prevent further attacks.

This Annex will outline the specific incident response, treatment, operations, and response protocols necessary to properly plan for, manage, and care for responders and patients during a radiological incident.

It may also refer the reader to related considerations, relevant organizational documents, and external sources.

Incidents are managed by Standardized Emergency Management System (SEMS), which incorporates the use of Incident Command Structure (ICS), mutual aid agreements, the Operational Area concept, and multi-agency and inter-agency coordination. This Radiation Annex is compliant with National Incident Management System (NIMS).

INTENDED AUDIENCE

This Annex involves all participating organizations, agencies, and jurisdictions contained within the geographical boundaries of SCC but is particularly aimed at those involved in the SCCHCC. Many of the HCC's facilities and partners have their own protocols for responding to cases of radiation exposure. This document is designed to work with those protocols and does not define or supplant any emergency operating procedures or responsibilities for any member agency or organization in the SCCHCC. It is not a tactical plan or field manual, nor does it provide Standard Operating Procedures (SOP). Rather, it is a framework for organization and provides decision-making parameters to use within an all-hazards planning and response environment. This plan intentionally does not provide specific or quantitative thresholds for activation or demobilization of organizational structures or processes described herein. Such determinations are situation-dependent and left to incident management. It includes a general concept of operations for the response to radiation events.

BACKGROUND

The County of Santa Cruz is home to nearly 300,000 residents dispersed over varying terrains and challenging geographies for prehospital response. At peak Advanced Life Support (ALS) system ambulance deployment, there are nine ALS ground ambulances with potential ALS or Basic Life Support (BLS) ambulance support from neighboring fire departments including Central Fire Protection District, Boulder Creek, Zayante, and Ben Lomond. There is also a private BLS ground transport provider available, who has the potential to deploy six BLS ambulances and up to 28 EMTs to the system possibly within 60 minutes. The two neighboring counties also can send ground ALS and BLS strike teams (i.e., five ambulances with a leader) with varying response times of 45-120 minutes.

Two private air ambulance resources could collectively send four air resources within 30-45 minutes and the potential to share additional air resources with varying response times. Both air resources maintain the flexibility of providing nurse support in ground ambulances if needed. In addition to the primary air support, there is some potential for air ambulances from Moffett field, California Highway Patrol, CAL-FIRE, and the Coast Guard; although response times would be delayed, if available.

The County is supported by numerous local city and county law enforcement and fire departments, a consolidated 9-1-1 communications center, Santa Cruz Regional 9-1-1, as well as one fire resource communication and command center (i.e., CAL-FIRE) in Felton.

The fire agencies in SCC have created a multi-jurisdictional HAZMAT team, the SCHMIT Team, which responds to emergency incidents involving hazardous materials. The team is managed by a Program Manager based with Scotts Valley Fire Protection District, and consists of representatives from participating fire agencies within the county. The SCHMIT team is a key resource for managing radiological emergencies.

The greater county area has large attraction venues vulnerable to surge threats or other events such as beaches and parks, the Beach Boardwalk, Kaiser Permanente Arena, shopping attractions at the Capitola Mall, Capitola Village, and Pacific Avenue, and two college campuses - Cabrillo College and University of California, Santa Cruz (UCSC). Both colleges have student health centers that are staffed during normal business hours. The student health centers do not have the capacity to care for patients exposed to radiation; however, each has basic disaster supplies and medical caches on campus. UCSC does have student and family housing, as well as on-campus law, fire and communications center resources. Additionally, UCSC has made efforts to provide the following training opportunities:

- Stop the Bleed and BLS training to law, fire agencies, and the public for a total of 300 students thus far
- Annual active shooter training for the staff that is open to all community partners
- Approximately 50 aspiring medical professional students in BLS and bleeding control to assist in large scale events

There are two hospitals in the County that offer emergency services: Dominican Hospital and Watsonville Community Hospital. Combined they have a capacity of 329 beds; however, each would be challenged by staffing capacities (223 Dominican and 106 Watsonville, respectively). Sutter Maternity and Surgery Center is an additional specialty hospital that is prepared to offer additional capacity (18 medical/surgical and 12 perinatal with additional 50 alternative bed options and 23 beds for triage surge) and patient care support in surge events. All facilities have various levels of disaster supplies to use in the event of a patient surge or disaster, however it's not certain what Radiological plans, training, or specific supplies are in place.

There are numerous clinics that offer urgent care services throughout the County which could assist with low acuity care during normal operating hours. **All healthcare facilities could be impacted by patients exposed to radiation arriving unexpectedly at their facilities during a radiological or nuclear incident.**

The County Public Health Division oversees a medical professional resource called the Medical Reserve Corps (MRC) that currently has medical professionals with varying licensures that are registered and vetted through the Disaster Healthcare Volunteer (DHV) system. The Emergency Medical Services (EMS) Agency coordinates support through the Medical Health Occupational Area Coordinator (MHOAC) and County Emergency Operations Center (EOC). The agency has the authority to support the County, cities, and hospitals to trigger their surge response plans.

Major trauma patients are typically taken to Level 1 or 2 trauma centers out of county. Trauma Centers most frequently used by County of Santa Cruz include: Santa Clara Valley Medical Center in San Jose, Natividad Medical Center in Salinas, and Stanford Hospital in Stanford (near Palo Alto). SCC does not have any trauma centers within its borders.

Regional Facility Designations:

REGIONAL CENTERS	TRAUMA DESIGNATION
Alameda County Medical Center (Highland)- Oakland	Level 1
John Muir Medical Center – Walnut Creek	Level 2
Kaiser Permanente Medical Center - Vacaville	Level 2
Natividad Medical Center - Salinas	Level 2
Regional Medical Center – San Jose	Level 2
Santa Clara Valley Medical Center – San Jose	Level 1
Sutter Eden Medical Center – Castro Valley	Level 2
Stanford Hospital - Stanford	Level 1
UC Davis Medical Center – Sacramento	Level 1
UCSF Benioff Children's Hospital - Oakland	Level 1
Zuckerberg San Francisco General Hospital	Level 1

HCC OVERVIEW

The SCCHCC is a collection of regional healthcare facilities including hospitals, skilled nursing facilities, clinics, residential care facilities, clinics, home health care, hospice, and behavioral health. Together members of the HCC respond to emergencies by providing support to the medical and healthcare needs of the community.

NATURE OF THE HAZARD

1. OVERVIEW OF RADIATION

Radiological preparedness is one of the five categories within the CBRNE acronym. CBRNE is an acronym for Chemical, Biological, Radiological, Nuclear, and high yield Explosives. These types of weapons have the ability to create both mass casualties as well as mass disruption of society. Emergency responders are taught how to recognize and mitigate attacks from such weapons.

It is important for emergency responders and the public to be aware of these types of weapons. By becoming educated on the various types of weapons and how best to respond in the event of an attack, your chances of surviving are significantly increased.

Types of Radiation[1]:

The radiation we are concerned about is ionizing radiation. Ionizing radiation is energy that is given off from radioactive materials. This radiation is strong enough to damage cells in the body. At high doses, enough cells could be damaged to cause serious illness, or even death.

Radiation from other sources, such as radios, cell phones, and microwaves, is called non-ionizing radiation. Non-ionizing radiation does not pose the same hazard that ionizing radiation does. There are three types of ionizing radiation you need to be aware of:

- Alpha particles
- Beta particles
- Gamma rays

Different radioactive materials give off different types of radiation. We refer to different types of radioactive material as "radionuclides." The following are examples of different radionuclides:

- Polonium-210 is a radionuclide that gives off radiation in the form of alpha particles.
    - We refer to it as an "alpha emitter."
    - Alpha particles can't penetrate the skin, so alpha emitters are only a hazard if you internalize them by ingesting them, inhaling them, or getting them in a wound.
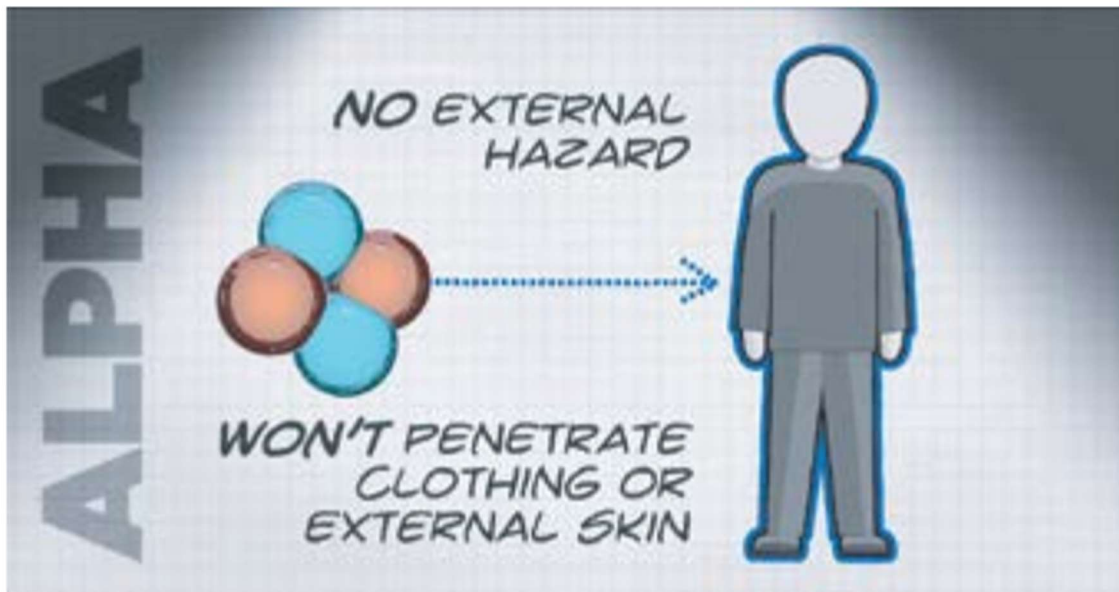
Alpha particles – no external hazard; won't penetrate clothing or skin

- Strontium-90 is a radionuclide that gives off radiation in the form of beta particles.
    - We refer to it as a "beta emitter."
    - Beta particles can damage the skin and can also damage cells from inside the body.
    - Beta emitters are a hazard if they get on your skin or inside your body.

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[1] https://www.cdc.gov/nceh/radiation/emergencies/pdf/20_316861-A_RadiationResponse-508.pdf
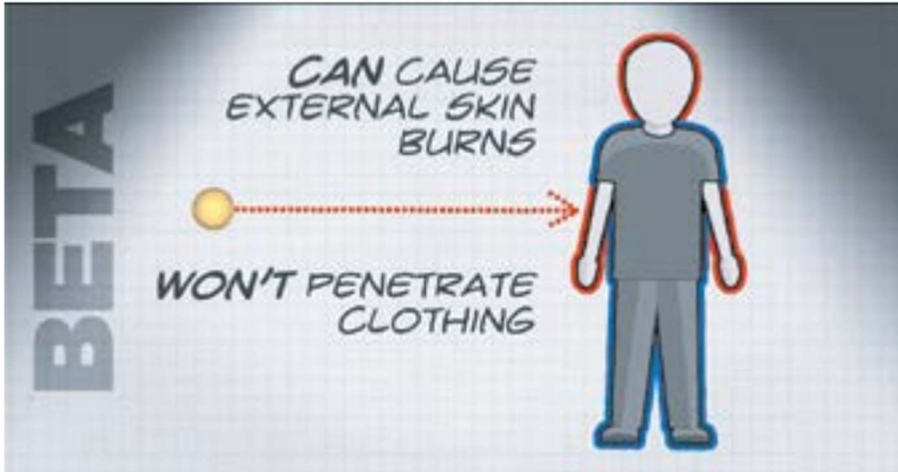
Beta particles - can cause skin burns; won't penetrate clothing or plastic

- Cesium-137, as it decays, is a radionuclide that leads to the emission of radiation in the form of gamma rays.
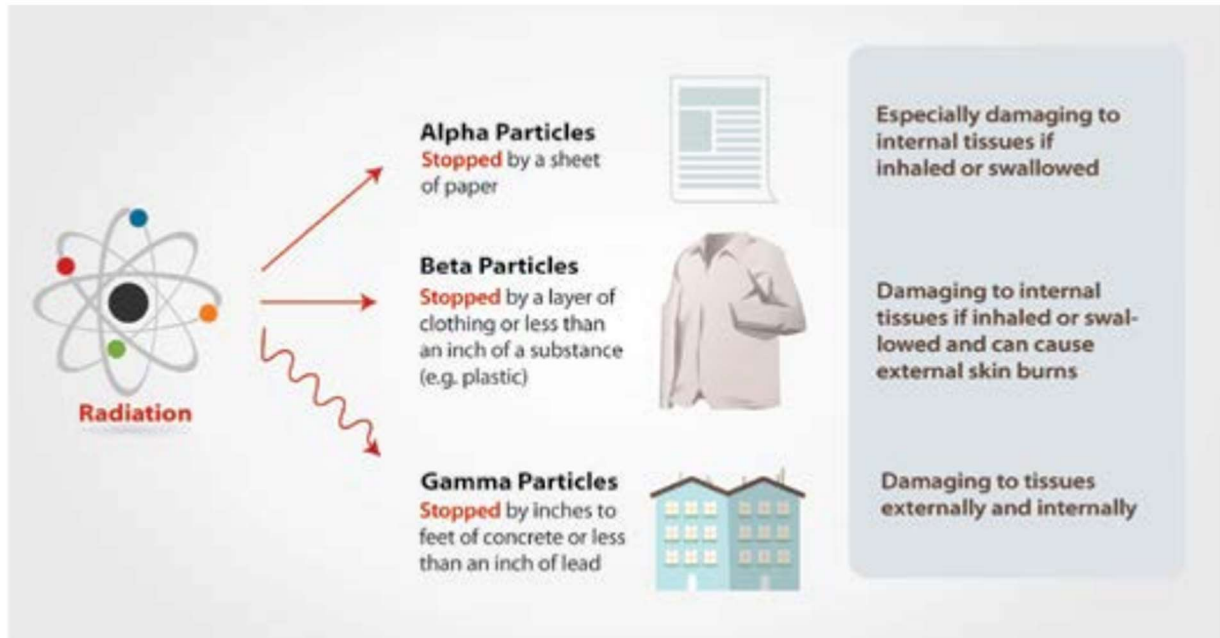   - We refer to it as a "gamma emitter."
    - Gamma rays can travel directly through the body, damaging cells in the skin and other organs along the way.
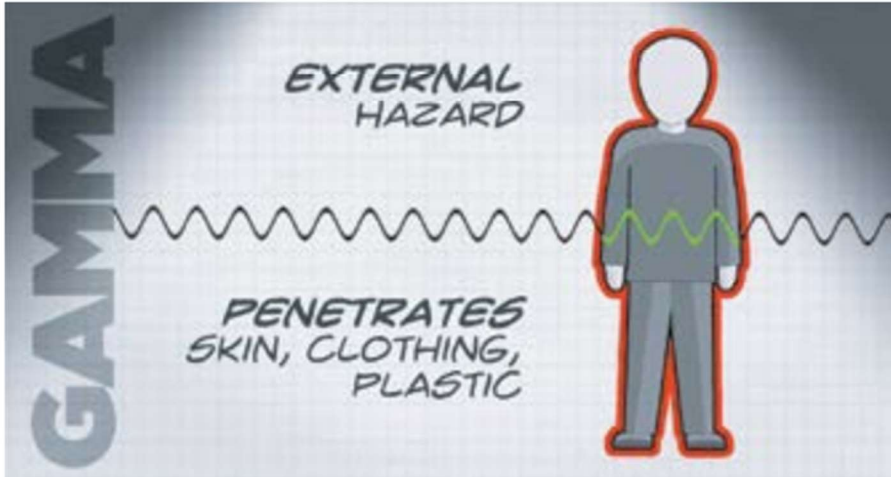
Gamma rays – external hazard; penetrates skin, clothing, plastic

Atom showing penetration abilities of alpha and beta particles and gamma rays. Alpha particles stopped by sheet of paper; beta particles stopped by layer of clothing; gamma rays stopped by inches to feet of concrete like a building

Potential Sources of Radiological Emergencies: There are three potential causes of nuclear/radiological emergencies: inadvertent, intentional, and terrorism incidents. Incidents may take place in tandem and can include spills, leaks, explosion, vehicle accident, local terrorists and extremists, theft, detonated device, large nuclear detonation, etc.

Fixed facilities: There is one fixed nuclear power plant located in California that could affect SCC, which is located in San Luis Obispo County (Diablo Canyon). A second fixed facility is in Livermore, California, at the site of the NNSA Nuclear Security Enterprise National Laboratory (Lawrence Livermore National Laboratory). This site conducts research on the development, production, and dismantlement of U.S. nuclear weapons. Finally, there are Medical facilities that may have equipment and supplies that contain or are radioactive for patient care. Local universities and research centers may also have access to or conduct research with radiological or radioactive materials. Outside of California, the Waste Isolation Pilot Plant (WIPP) is a deep geologic disposal facility in southern New Mexico.

Transportation Accidents: The radioactive materials, such as industrial or medical sources, are routinely transported throughout California, often using common carriers such as FedEx. While shipments of radioactive materials require heavy shielding and are monitored by a number of state and federal agencies such as the California Highway Patrol (CHP), U.S. Nuclear Regulatory Commission (NRC), and U.S. Department of Transportation (DOT), There is risk of radiological exposure to nearby populations should a transportation accident occur

Foreign, Unknown, or Unlicensed Radioactive Materials: Radioactive materials may come from several other sources; imported materials with radioactive contamination, foreign spacecraft, aircraft, ships, shipments of foreign-owned radioactive materials, and unknown sources (referred to as orphan sources) that include abandoned radioactive materials.

Healthcare facilities can additionally be expected to accept patients from Damage Zones of radiological/nuclear incidents. If the hazard occurs outside SCC, facilities should be in contact with the MHOAC for more information.

SCOPE OF RADIOLOGICAL HAZARD

Nuclear/radiological incidents can occur anywhere. The most common incidents include theft/loss/misuse of radiological materials, vehicle accidents, and terrorist activities. Detection of radiation and radiological exposure depends on instrumentation, and the amount of radiation a person receives (known as the projected dose) is dependent on multiple factors. These can include distance from the source, time exposure, chemical composition of the radioactive material, wind speed, etc.

1. ASSUMPTIONS

General Radiation Assumptions:

- **Incident cause**: Radiation incidents may be accidental in nature (e.g., industrial or transportation accident) or purposeful (e.g., terrorism activities).
- **Exposure**: Inadvertent radiological exposure may not be immediately detected until exposure effects become manifested in the exposed population.
- **Extensive geographic areas impacted:** The impacted area expands far beyond the immediate area of detonation. Broken windows and structural damage can extend for miles and the radiation plume will follow the predominant weather/wind patterns for long distances. This large area of impact can make mutual aid and resource sharing difficult.
- **Plume Exposure Pathway**: Response to an incident will depend on the extent of radiological deposition from the plume, requiring operations to be conducted over multiple jurisdictions/counties/states.
- **National Contingency Plan:** A nuclear/radiological incident may require concurrent implementation of the National Contingency Plan and Oil and Chemical Incident Annex to the Response Federal Interagency Operational Plan to address oil, chemical or biological as well as radiological releases into the environment.

Healthcare Facility Level Assumptions:

- **Pre-incident Preparedness:** Preparedness activities and public education before an incident will reduce the number of casualties. But preparedness and community awareness of nuclear/radiological risks may be limited.
- **Overwhelmed Healthcare System:** Damage to hospitals, communication capabilities, EMS, and other critical infrastructure can cripple healthcare response efforts at a time when an overwhelming number of victims (including first responders) will need acute medical care. Triage/treatment casualty collection points should be established and resources brought-in to support compromised infrastructure.
- **Responder Preparedness:** Responder preparedness and expertise in nuclear/radiological response will vary widely.

- **Unique Resources:** The Federal Government will employ technical resources that are specific to a radiological incident. The Nuclear Emergency Support Team (NEST). NEST is a resource within the Federal Department of Energy with ten different response capabilities which can be activated for local assistance and response. For more information, visit their website at: (https://www.energy.gov/nnsa/nuclear-emergency-support-team-nest). Other resources are listed in the Radiation Response Briefing Manual found at the same link.
- **Significant Resource Shortfalls:** A significant nuclear/radiological incident will quickly overwhelm existing local and state resources and capabilities. Competition for scarce resources and significant strain on the healthcare community may occur.
- **Patient movement:** Early on, most patient victim movement will be self-evacuation. Once the exposed population has been identified, they should be moved or directed to areas that have greater healthcare capacity, particularly those with moderate absorbed doses. (ASPR Tracie). In order to minimize secondary contamination, patient transportation and treatment will be very limited until decontamination can be performed on contaminated patients.

Public Assumptions:

- **Public Anxiety and Lack of Awareness:** High public anxiety and fear, low understanding of risks and protective actions, and high demand for information are expected. There will likely be a surge of concerned citizens seeking medical assistance.
- **Public Preparedness:** Public and responder nuclear/radiological expertise and preparedness will widely vary.
- **Sheltering Orders:** Sheltering after a radiological incident is extremely effective at limiting radiation exposures. Orders for those within the plume area (including healthcare facilities) will be issued immediately by the Incident Commander or Health Officer. **Response Assumptions:**
- **Federal Emergency Management Agency (FEMA) Investigation**: FEMA is responsible for reviewing and assessing state and local emergency plans (including radiological emergency planning) for adequacy.
- **Government Responsibility**: All levels of government (local, state, and federal) are responsible for the safety and welfare of the public to the extent of its capabilities.
- **Law Enforcement Response and Criminal Investigation:** As required by policy, there is a presumption of terrorist threat for all radiological incidents, unless clearly accidental.
- **Secondary Threats and/or Incidents:** A terrorist attack may involve multiple incidents, and each location may require simultaneous response activities.
- **Response and Recovery Continuum:** Response mission actions and short-term recovery activities that immediately follow, include lifesaving, life-sustaining, property protection, and other measures intended to neutralize the immediate threat to life, environment, and property as well as to stabilize the community.

Critical Considerations are drawn from the Federal Guidelines and Interagency Operational Plans, then tailored to a County-level and SCCHCC-level response.

2. RADIATION IMPACT CRITICAL CONSIDERATIONS

It is important to define the different forms of radiation impact so planning for treatment is appropriately considered. See below for the definitions:

- **Exposed only:** Individuals exposed to a discrete, intact radioactive source have radiation exposure, not contamination. They present no risk to treating medical personnel.
- **Contaminated:** Radioactive contamination on bodies or clothing (external contamination) or have inhaled/ingested/absorbed (internal) radioactive contamination are at continued risk of worsening radiation injury and after life-saving treatment, should be decontaminated and / or treated for internal contamination. Risk may be mitigated to caregiver and patient.
- **Radiation Combined Injury:** Trauma and / or burns in addition to radiation injury. These patients will increase 1-2 triage acuity categories and will have a worse prognosis.
- **Mitigating Risk:** Rapid removal of casualties from blast site, getting out of the area around the blast site, treating in a solid shelter, when possible, and use of personal protective equipment as appropriate to the hazard complexity.[2] When in doubt, always treat it as more severe.

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[2] https://orise.orau.gov/resources/reacts/documents/factsheet.pdf

CONCEPT OF OPERATIONS

A nuclear or radiation incident can be broken into four-time phases: Pre-Incident, Emergency, Intermediate, and Recovery.

Pre-Incident			Emergency Phase		Intermediate Phase	Recovery Phase
Primarily pre-incident. Should include robust training.			When an incident occurs or upon notification. Actions taken to respond to the incident (range from ½ hour to a few days (continuous release))		Source and release are brought under control	Sustained Operations: actions taken to reduce radiation levels to acceptable levels
1a	1b	2c	2a	2b	3a	4a
Normal Operations	Increased Likelihood or Elevated Threat	Intermediate Options	Activation, Situational Assessment, and Movement	Employment of Resources and Stabilization	Intermediate Options	Long-term Recovery Operations

The emergency phase may include any of the following radiological incidents:

Deliberate Attacks: Operations will begin with discovery or notification of the incident. There may be elevated threat or credible threat information provided by law enforcement officials; therefore, operations may begin with recognition of the threat.

Inadvertent Releases: Operations will begin with discovery or notification of the incident.

International Incidents: Operations will begin with discovery or notification of the incident.

1. ACTIVATION

The SCCHCC Radiation Annex may be activated in response to any radiological incident which is a suspected or deliberate attack, an inadvertent incident, an incident occurring outside of SCC which may have impact on the County, or an international incident. This plan will be activated in the same way SCC EMS Agency functions daily using ReddiNet® in addition to direct contact via text message or phone as described in the MHOAC Activation Checklist. Activation of other plans and annexes, such as the Medical Surge Plan, will be considered and activated as needed.

The primary assumption is that an event has reached an Emergency System Activation Level 2 or 3 as defined in the California Health and Medical Emergency Operations Manual (EOM, see table below) outside of traditional general acute care facility day-to-day operations. In accordance with SEMS, this plan may be activated by any of the following SCC Employee positions or entities:

- MHOAC or his/her designee

- Federal or State Health Officer, or his/her designee

- Public Health Officer, or his/her designee

- HSA Director or Assistant Director

- Local EMS agency director or his/her designee

- Local EMS agency medical director

In addition, any SCCHCC member facility can request activation of this Annex by submitting a request through the MHOAC.

The situation will dictate the following activation level declaration by the county:

ACTIVATION LEVELS OF EVENT COMPLEXITY	
Level 1	Requires resources or distribution of patients within the affected Operational Area only or as available from other Operational Areas through existing agreements.
Level 2	Requires resources from Operational Areas within Mutual Aid Region beyond existing agreements and may include the need for distribution of patients to other Operational Areas.
Level 3	Requires resources or distribution of patients beyond the Mutual Aid Region. May include resources from other Mutual Aid Regions, State or Federal resources.

2. SURVEILLANCE & SITUATIONAL ASSESSMENT

Santa Cruz County Health Services Agency (SCC HSA) will gather information from the following surveillance programs to detect radiological incidents and to surveil the resulting impact and specialty needs.

Surveillance Program	Monitoring Level	Available Information
Outpatient and Hospital Surveillance	Individual facilities	SCC Health Services Agency (HSA) receives data through Confidential Morbidity Report (CMR) and Automated Vital Statistics System (AVSS).
Emergency Department Surveillance	Individual facilities	SCC HSA receives Emergency Department (ED) surveillance data through the ad hoc reports to the MHOAC, ED Census, and ReddiNet.
Emergency Department Consensus (ReddiNet) coordinated by EMS	Individual facilities	ReddiNet provides online hospital ED status and Immediate Bed Availability reporting. Daily information on ED visits is reported as the census count. Facilities reporting an ED Census greater than 20% above their average census are noted. A cumulative ED Census for all facilities totaling higher numbers indicate that area hospitals are experiencing a

Surveillance Program	Monitoring Level	Available Information
		patient volume that may stretch care capacities. When the ED Census is high, the MHOAC and Health Officer are notified. SCC HSA may request that area hospitals report an ED Census into ReddiNet at a higher frequency to monitor ED census as needed.
FirstWatch	County/ Regional	FirstWatch provides automated, real-time feedback from a variety of data sources. Alerts will signal for early signs of a radioactive or nuclear incident.
Bay Area UASI Preventive Radiological/Nuclear Detection Program (PRND)	Regional	The PRND Program provides a regional reporting mechanism for Bay Area partners to share radiological data. This data can help inform resource deployment decisions and reduce the risk of radiation exposure to first responders and the public.
California State Warning Center	State	Staffed 24 hours per day, seven days per week, provides alert notification to all levels of government as well as critical situational awareness during an emergency or disaster.
State Threat Assessment Center	State	Operated by CHP, California Governor's Office of Emergency Services (Cal OES), and California Department of Justice (Cal DOJ).
Radiologic Health Branch (RHB)	National	RHB conducts routine monitoring of radioactive materials in California. Environmental monitoring for radioactive materials includes sampling air, milk, food, water, and other media.
Domestic Nuclear Detection Office	National	Supports a global nuclear detection architecture to detect and report on unauthorized nuclear or radiological material use or transportation.
RadNet, Inc.	National	National environmental radiation monitoring via air, precipitation, and drinking water. (https://www.epa.gov/radnet)
Interagency Modeling and Atmospheric Assessment Center (IMAAC)	National	IMAAC is an interagency coordination element which provides the single federal consensus on atmospheric predictions of hazardous material concentration through plume modeling analysis. Aids in decision making for emergency responders.
Federal Radiological Monitoring and Assessment Center (FRMAC)	National	Coordinates all federal and aviation environmental radiological monitoring, sampling, assessment, and product dissemination. Agency will be activated on request on the Federal Agency with primary authority in the incident.
Health Situation Assessment Programs	**Model Owner**	**Available Information**
Nuclear Evacuation Analysis Code	Sandia National Laboratories	Calculates evacuation and sheltering timing

Surveillance Program	Monitoring Level	Available Information
Debris Model	FEMA model	Predicts cost of debris removal
National Mass Evacuation Tracking System	FEMA model	Evacuee tracking and management system
MedMap/GeoHEALTH	US Dept. of Health and Human Services (HHS)	HHS situational awareness viewer for health facilities, views health-specifics and facility data during an event.
Biomedical Advanced Research and Development Authority (BARDA-ADS)	HHS	Modeling tool for IND and radiation countermeasures
Radiation Emergency Medical Management	HHS	Numerous tools for triage and treatment, including calculator for radiation dose from time of symptom onset
Centers for Disease Control and Prevention (CDC)	US Government Public Health Agency	Numerous tools for all hazards. CDC is planning for a **Radiological Laboratory Response Network (LRN-R)** comprised of select state public health laboratories with the equipment and trained personnel to provide surge capacity using CDC's URS. The LRN-R will build on the current Laboratory Response Network designed to respond to biological and chemical threats. Radiological Emergency Fact Sheet | CDC - Centers for Disease Control: www.cdc.gov/nceh/dls/radiologic_emergency_factsheet.html

3. COORDINATION OF EMERGENCY OPERATIONS

Following a radiological event, the complexity and scope of the response will require intergovernmental coordination. Each level of government (local, state, and federal) is responsible for the safety and welfare of the public based on their capabilities. A medical response, health care, emergency services, law enforcement, criminal investigation, protective activities, emergency management functions, and technical expertise will all be required. OR3 would take the lead and Med-Health would support the response.

Once a nuclear incident has occurred, FEMA and Nuclear Regulatory Commission (NRC) are responsible for radiological emergency planning. The NRC will review state and local plans and will make the final determination as to the overall (on-site and off-site) response, informing the county's Incident Commander.

Direction and control of the SCCHCC's emergency response is the responsibility of the SCC Office of Response, Recovery, and Resilience (OR3/EOC) Incident Commander (IC). County departments identified

in Section 2, Santa Cruz County Agency Roles, will provide support to the overall emergency response as directed or requested by the IC or by the Medical Health Branch Director or Department Operations Center.

The MHOAC will coordinate with the Incident Commanders or Emergency Managers of SCCHCC facilities.

4. NOTIFICATION AND COMMUNICATION

A Joint Information Center (JIC) may be activated to manage public messages and media inquiries. Telephone, ReddiNet, and Code Red will be the primary means of communication. Facility Public Information Officers (PIOs) should be prepared to coordinate with the County PIO and/or JIC to reinforce emergency communications. The Integrated Public Alert & Warning System (IPAWS) is FEMA's national system for local alerting that provides authenticated emergency and life-saving information to the public through mobile phones using Wireless Emergency Alerts, to radio and television via the Emergency Alert System, and on the National Oceanic and Atmospheric Administration's Weather Radio.[3] IPAWS may also be used to communication quickly with the public. More information is contained in Appendix 1.

Alternate modes of communication: Phone and cellular circuits are frequently overloaded in disasters, possibly rendering them useless. In a nuclear blast event, Electromagnetic Pulse (EMP) may render electronic communications or electronic equipment useless. Therefore, 2-way radios, microwave phones, HearNet, and satellite phones should be available as backup communication methods for key hospital personnel. Runners should be used as needed with guidance regarding their health and safety. More information is available from REMM noted in the References section at the end of this document

National/Inter-state: The primary reporting method for interagency information flow is Homeland Security Information Network (HSIN) and WebEOC. FEMA's Integrated Public Alert and Warning System (IPAWS) provides public messaging capability to broadcast alert messages to all cellular phones in a given area.

CRITICAL INFORMATION REQUIREMENTS FOR THE PUBLIC:

Ensure that messages are consistent, **immediate**, accurate, and open. Key message topics might include: "Get inside. Stay inside. Stay tuned." and "If you think you are exposed…" and "Likely effects of radiation contamination include…" and "How to self-decontaminate." Rumors will arise to fill information gaps. Practice rumor control by monitoring the local media reports and addressing and correcting "misinformation" immediately.

Preplanned messaging templates and plans for radiological incidents are included in Strategies section by the CDC as well as in Appendix 1.

Focus on communication and outreach to persons experiencing housing from the very start of the incident to provide relevant instruction is imperative.

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[3] https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system

See Appendix 1 for additional messaging information.

CRITICAL INFORMATION REQUIREMENTS FOR SCCHCC RESPONSE AND RECOVERY:

Radiation Identification	o Identification of the radiation source as well as the area of highly hazardous or lethal radiation. o Movement and timing of fallout/plume (if present).
Incident Characteristics	o Identification of damage zone(s) and fallout/plume pathway to identify safe locations for support bases and response teams' deployment. o Impacted healthcare facilities (hospitals, Skilled Nursing Facilities (SNF) and elder care, clinics, etc.). o Current and projected weather conditions. o For operational communications: identify command structure.
Protective Actions	o Status of protective action recommendations issued to the public, to response and recovery workers, and to healthcare personnel. o Identification of response and medical care tasks specific to the incident that workers can safely perform.
Radiation Exposure	o Projections and real-time data for population and recovery worker radiation exposure and food/environment contamination. o Recommended exposure guidance. o Ongoing assessment of the radiation dose threat.
Resource Availability	o Availability of radiological assets within the impacted area will affect response and recovery options. o Private sector radiological response and recovery resources. o Status of state and local radiological response resources. o Status of healthcare facilities and patient movement directions.
Evacuation & Sheltering	o A map of the plume/fallout to identify safe (lowest risk) locations for triage sites, reception centers, and evacuation shelters. o Locations of host communities with concentrations of evacuees. o Long-term evacuee/displaced persons status tracking
Health Effects	o Dose and exposure limits for workers (authorities for approving modification of dose/exposure limits). o Long- and short-term health effects, including dose-response relationships and regulatory limits for routine and emergency exposure. o Availability of treatment and prophylaxis agents for public & responder use. o Dosing guidelines for treatment and prophylaxis agents. o Guidelines for diagnosis and treatment of radiation injury or injury complicated with concomitant radiation exposure. o Radiation in this context covers both penetrating radiation exposure and internal/external radioactive material contamination.
Reentry/ Reoccupation	o Acceptable levels of decontamination to determine reentry and relocation of impacted individuals and householders.

Infrastructure Impacts	o Current and forecast impacts to critical infrastructure, which may affect mobility within the area (e.g., hospitals, major highways, etc.) o Impact to transportation modes (e.g., which can enter contaminated areas).
State and Local Plans Related to -	o Pre-incident waste management plans and potential sites for temporary debris/waste storage. o Host community agreements to support displaced populations, etc.
Mass Fatality Management	o The level of Personal Protective Equipment (PPE) personnel must wear for each operational phase. o Determine under what conditions, if any, human remains can be safely recovered and processed for disposition. o Identify contaminated remains processing facilities.

*Modified from FEMA Annex

Other communication resources and for more information:

- CDC Radiation Communication and Media Tools
- CDC Radiological Communications and Public Information
- CDC Radiation Hazard Scale: Communication Tool
- FEMA: Improvised Nuclear Device Response and Recovery-Communicating in the Immediate Aftermath
- Protective Action Guide (PAG) Public Communication Resources for a Radiological Emergency
- https://www.fema.gov/sites/default/files/2020-07/fema_radiological-dispersal-device_response-planning-guidance_2017.pdf
- Appendix 1

ROLES AND RESPONSIBILITIES

1. STATE AND FEDERAL AGENCY ROLES

Pre-Incident

Preparedness and Planning
FEMA: Establish policy and provide leadership for coordination of Federal Assistance and guidance to State and local Government. Assess plans for radiological and nuclear incidents for adequacy and assess State/local government capabilities to implement plans.

EMS: Facilitate trainings ard emergency operations planning for the Healthcare Coalition

CDPH: Provide leadership and review of radiation annex and planning for the Healthcare Coalition

Incident

Response

Federal Agencies Significant Responsibilities During Incident:
• Principal responsibility determined by jurisdiction and location of the incident
FEMA: policy and leadership, coordination and storage of resource, guidance on emergency management, coordination of intergovernmental relief efforts.
Employs NIMS and NRF systems.
CBP: Coordinates for incidents invotving illegal or inadvertent import of radiological materials.
DHS: is the principle federal official for domestic radiological incident management.
DOO: coordinates federal actions related to nuclear weapons, facilities or materials under DOO jurisdiction. DOO may establish a national defense area in this event.
DOE: responsible for coordinating response on or from DOE facilities or vessels.
DOI/FBI: leads responsibility for criminal investigations. Acts primarily through FBI Joint Terrorism Task Force and the FBI On-Scene Commander (who retains authority to take appropriate law enforcement during a response).
HHS: Has the authority to declare a PHE if conditions warrant it.
NRC: Assess nuclear facilities, evaluate emergency preparedness at nuclear sites, and is responsible for coordinating at any NRC sites or NRC Aereernent States.

EMS:
Operates the Med/Health position in the EOC coordinates with state and federal agencies alongside other Health Departments during response.

CDPH:
Coordinates with local and federal agencies, assists in resource allocation and mutual aid provision.

HCC:
Follows the direction of the MHOAC or federal Incident Commander to serve and treat affected populations. Facility IC or EM will coordinate with the MHOAC for instruction, resources, and to receive information on emergency plans

Preparedness and planning

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[4] San Mateo county Draft Radiological Emergencies Annex, revised.

2. SANTA CRUZ COUNTY AGENCY ROLES

County Agency or Facility	Responsibility
SCCHCC	o Coordination of regional healthcare in the response to the radiological event o Distribution of situational awareness information to and from healthcare organizations and SCC HSA o Advocacy with SCC HSA for medical and non-medical resource needs for healthcare organizations o Dissemination of SCC HSA guidance for patient management, surge, sample transport, surveillance reporting, contact tracing, testing, treatment, and public information.
All Healthcare Facilities	o Provide PPE for healthcare providers, monitor staff exposures. o Provide decontamination and medical care for patients following a nuclear or radiological event and/or exposure. o Communicate with SCC EMS regarding patient placement, movement, and care through ReddiNet, and Sit-Stat reports, or via the HearNet radio system located in the local hospital ED's, the EOC, and the EMS Office.. o Initiate internal steps to increase patient capacity and implement surge plans before requesting outside assistance. o Communicate with the MHOAC all medical and non-medical resource needs. o Provide timely situational awareness information regarding patient numbers or surge level to MHOAC or PH Department Operations Center (DOC). o Provide assistance to other healthcare organizations during a response in line with signed mutual aid agreements. o Provide samples to laboratories. o Provide victim/casualty information o Plan for long term ongoing surge of patients.
Hospitals	o Hospital Incident Command System should be activated o Develop a Hospital Medical Response Team o Equip Emergency Department for Decontamination o Activate Radiological Plan as needed o Guidance: Radiation Emergency Medical Management.
Skilled Nursing Facilities	o Nursing Home Incident Command System should be activated. o Respond to bed poll if requested to provide surge relief. o Prepare for step-down and surge transportation of patients. o Provide PPE, monitor staff exposures
MHOAC	o Notification of internal and external stakeholders o Conduct conference call (as needed) o Coordinate medical health resources and represent Med/Health in the EOC o Process mutual aid requests

County Agency or Facility	Responsibility
SCC EMS Agency	o Lead policy decision making for healthcare and public health response o Coordinate with other SCC Departments o Determine 911 system triage and response in coordination with NetCom o Respond to PPE and other resource requests as needed o Provide guidance regarding the use of altered standards of care
SCC EOC (OR3)	o Activate to appropriate level o Make immediate notification of incident to MHOAC/EMS Director and HSA o Activate Radiological Emergencies plan as needed o Coordinate planning and response for EMP impact o Coordinate with Environmental Health (EH) for hazardous waste and contaminated items management o Manage spontaneous volunteers o Activate Communications/Amateur Radio Groups o Assure county responsibility for cleanup and mitigation takes place
Fire-Rescue	o Provide a decision-making official to the County EOC o Responder safety: provide PPE, monitor staff exposures o Provide Response, Rescue, Triage, Treatment for trauma, burns, or other needs o Activate the Multiple Casualty Incident (MCI) Plan as needed o Activate the SCHMIT team as needed o Coordination and direction of HazMat response, detection, and assessment activities o Identifying radiation hazard zones (SDZ, MDZ, LDZ, DRZ, HZ) o Coordinate decontamination activities o Identify and establish an incident perimeter, zones, and evacuation sites. o Remove victims from any situation (or potential situation) in which injury or loss of life has occurred o Consider proactive purchase of individual radiation detectors for early awareness of radiological event for each staff member if not already in place
Law Enforcement	o Provide a decision-making official to the County EOC o Maintenance of law and order o Provide security at the County EOC o Responder safety: provide PPE as needed, monitor staff exposures o Carry out investigation with procedures that apply to acts of terrorism, have criminal intent, and/or civil liabilities o Coordinate the arrest, detention, and adjudication process of accused persons o Guidance: https://www.cdc.gov/nceh/radiation/emergencies/pdf/Radiological-Nuclear-handbook-09-01-11.pdf o Consider proactive purchase of individual radiation detectors for early awareness of radiological event for each staff member if not already in place

County Agency or Facility	Responsibility
Santa Cruz Regional 9-1-1	o Provide **immediate** notification of the incident to the EMS Director and/or MHOAC o Activate surge and/or radiological emergency plan as needed o Communicate with SCC EMS regarding patient placement, movement, and care through ReddiNet, and Sit-Stat reports, or via the HearNet radio system o Provide timely situational awareness information regarding incident status to MHOAC or EMS Director
Public Information	o Secure means of disseminating public instruction and emergency information. o Form JIC as needed o Provide immediate, timely, frequent, and ongoing information to the public
Community Organizations (COAD/VOADs)	o Disseminate public instruction and emergency information to hard-to-reach populations o Provide PPE as needed, monitor volunteer exposures as needed
Public Health Department, HSA	o Activate the DOC, identify and communicate the Med-Health Branch Director assignment o Coordinate and direct SCC HSA Departments to respond to the incident o Provide PPE as needed, monitor staff exposures o Coordinate with other counties and the California Department of Public Health. o Disseminate medical information and instruction to healthcare stakeholders in coordination with the County PIO o Secure appropriate declarations and proclamations o Initiate health surveillance and epidemiological investigations
Behavioral Health (BH) Dept.	o Provide decision-making official 24-hour contact information to Med-Health Branch o Provide BH services as needed to: evacuation shelters, emergency responders o Request additional resources through the MHOAC proactively and early o Assess for ongoing BH needs of the county and create a plan for this o BH Responder safety: provide PPE as needed, monitor staff exposures o Guidance: https://remm.hhs.gov/psych.htm
Human Services Dept. (HSD)	o Coordinate with Public Health, HSA, and the EOC to set up evacuation shelters, community resource centers o Address the needs of the population with Access and Functional Needs (AFN) o Guidance: https://www.emergency.cdc.gov/radiation/pdf/operating-public-shelters.pdf
Disaster Recovery Organizations	o Coordinate with the MHOAC and EOC for direction o Recruit disaster volunteers as needed to assist o Provide PPE as needed, monitor staff exposures o Consider proactive purchase of individual radiation detectors for early awareness of radiological event for each staff member if not already in place

County Agency or Facility	Responsibility
Emergency Preparedness Program	o Respond to PPE and other resource requests as needed o Assist coordinating requests for mutual aid o Assist with coordination with federal agencies o Fill roles in the DOC and EOC o Assist with coordination with the HCC o Develop medical section of Incident Action Plan (IAP), or develop IAP as needed
American Medical Response (AMR)	o Provide a decision-making official to the County EOC o Responder safety. o Provide PPE for healthcare providers, monitor staff exposures. o Provide Response, Triage, and Treatment for trauma, burns, or other needs o Activate the MCI Plan as needed o Facilitate decontamination and provide medical care for patients following a nuclear or radiological event and/or exposure o Communicate with SCC EMS regarding patient placement, movement, and care through ReddiNet, and Sit-Stat reports, or via or via the HearNet radio system o Initiate internal steps to increase patient capacity and implement surge plans before requesting outside assistance. Call back staff as needed. o Communicate with the MHOAC all medical and non-medical resource needs unable to be met internally. o Provide timely situational awareness information regarding incident, patient numbers or surge level to MHOAC or PH DOC. o Provide assistance to other healthcare organizations during a response in line with signed mutual aid agreements and direction from EMS. o Provide victim/casualty information o Activate Radiological Plan as needed o Consider proactive purchase of individual radiation detectors for early awareness of radiological event for each staff member if not already in place.
Local Ambulance Service	o Maintain ongoing communications with EMS Director o Provide PPE and information about the event to field providers and dispatch center o Monitor staff exposures o Respond to mutual aid requests o Communicate with SCC EMS or DOC regarding patient movement and destinations o Provide sit-stat reports to EMS Director as requested

County Agency or Facility	Responsibility
Environmental Health Dept.	o Assist with radiological measurements as needed o Conduct ongoing population monitoring and dose determination https://www.cdc.gov/nceh/radiation/emergencies/pdf/population-monitoring-guide.pdf o Provide 24-hour decision-making official contact to the Med-Health Branch Director o Provide PPE for EH staff, monitor staff exposures. o Respond and evaluate evacuation shelters as requested to ensure safe shelter operations o Activate radiological Plan as needed o Address food and water safety o Coordinate with Federal Environmental Protection Agency (EPA) and local jurisdictions on clean-up activities o Consider proactive purchase of individual radiation detectors for early awareness of radiological event for each staff member if not already in place
County Coroner	o Activate radiological Plan as needed o Provide PPE, monitor staff exposures o Manage mass fatalities o Plan for ongoing increase in fatalities into the future o Guidance: https://www.cdc.gov/nceh/radiation/emergencies/pdf/radiation-decedent-guidelines.pdf

Regional Agency or Facility	Responsibility
American Red Cross	o Coordinate family reunification and family assistance centers. o Coordinate with County to open evacuation centers and shelters. o Provide PPE, monitor staff exposures
Radiological Assistance Program (RAP) Region 7	Part of Radiation Emergency Medical Management (REMM), they provide guidance for health care providers, primarily physicians, about clinical diagnosis and treatment of radiation injury during radiological and nuclear emergencies. They also provide guidance for the wider health care community about issues related to planning for and responding to radiation mass casualty incidents. The Radiological Assistance Program (RAP) can be reached any time at DOE Watch Office 24hr Number: 202-586-8100.
Bay Area UASI Preventive Radiological/Nuclear Detection Program (PRND)	Goal: Establish regional framework for the coordination of rad/nuc detection activities that has broad participation while minimizing the impact of program development and implementation on Bay Area agencies: http://www.bayareauasi.org/sites/default/files/resources/041014%20Agenda%20Item%209%20Appendix%20A%20Bay%20Area%20Radiological%20Nuclear%20Detection%20Program%20Development%20Initiative.pdf

OPERATIONS

1. PREPARING FOR RADIOLOGICAL SURGE

Activation of the SCC Surge Plan in conjunction with this annex should occur quickly if a large surge of patients is anticipated.

You should contact the County Environmental Health (831-346-7556) and Public Health (831-471-1160) to discuss handling radioactive waste. As mentioned above, HSD and OR3 will be the lead for setting up community reception centers which will divert individuals who think they are contaminated to be screened and evaluated to alleviate the surge to medical facilities.

If your facility is facing a radiological surge event you should immediately notify the:

MHOAC: 831-471-1160

Using Radiology Meters

It is essential for hospital staff to know how to use radiology meters (dosimeter) to monitor the levels of radiation exposure to staff. Patients who have been properly decontaminated will have little to no ability to contaminate the environment and people around them. However, being trained and understanding the readings of a dosimeter is important to ensure exposure levels remain safe.

For more information, Radiation Detection and Survey Devices:

- https://remm.hhs.gov/civilian.htm#personal

Healthcare Provider Personal Protective Equipment (PPE)

Time, distance, and shielding are the key components to reduce radiation exposure. Safety Officers at the scene of an incident will need to establish perimeters based on the environmental readings and first responders should have dosimeters to monitor their exposure rate.

Medical workers providing care to the contaminated victims of a radiological incident are unlikely to exceed the occupational dose limits for a radiation worker, 50 mSv (5 rad) (REF: ASPR TRACIE). Nevertheless, prior to an emergency you should know what PPE is required and the proper donning and doffing procedures.

See: PPE in Radiation Emergencies https://remm.hhs.gov/radiation_ppe.htm (PPE) for more information.

Training of Healthcare Personnel

There are a number of in-person and online trainings available to healthcare personnel to enhance knowledge about radiological emergencies. The SCCHCC should participate in training offered by organizations such as CalOES, FEMA and CDC that focuses on radiological emergencies for hospital personnel. These courses cover radiological basics, facility preparation, use of survey instruments, decontamination, patient care and other topics essential for preparation.

If time does not permit, RITN, REMM and REAC/TS offer videos to provide Just-In-Time training. These can be found:

https://www.cdc.gov/nceh/radiation/emergencies/arsphysicianfactsheet.htm

https://ritn.net/training/

https://remm.hhs.gov/training.htm

https://orise.orau.gov/resources/reacts/just-in-time-training-videos.html

2. TRIAGE AND SCREENING

Ensuring that patients get the right treatment dependent on their ailment in the timeliest manner is essential, particularly during a radiological based MCI or emergency, when resources like staffing, space, medical equipment, and treatments, are likely to be scarce. Therefore, understanding and knowing the steps to effectively triage those who may be suffering from varying levels of trauma, injury and/or radiology exposure.

Prehospital Radiological Triage Tool

The Prehospital Radiological Triage tool (https://orise.orau.gov/resources/reacts/documents/prehospital-radiological-triage-poster.pdf) is for use by field responders assessing patients directly following a radiological MCI. Once an incident with radiation exposure is identified, it is important to first triage and treat injuries, then follow correct radiological triage procedures, to ensure that the highest need patients are being attended to first, and healthcare facilities are not overburdened with patients whose exposure or injuries may be less timely.[5]

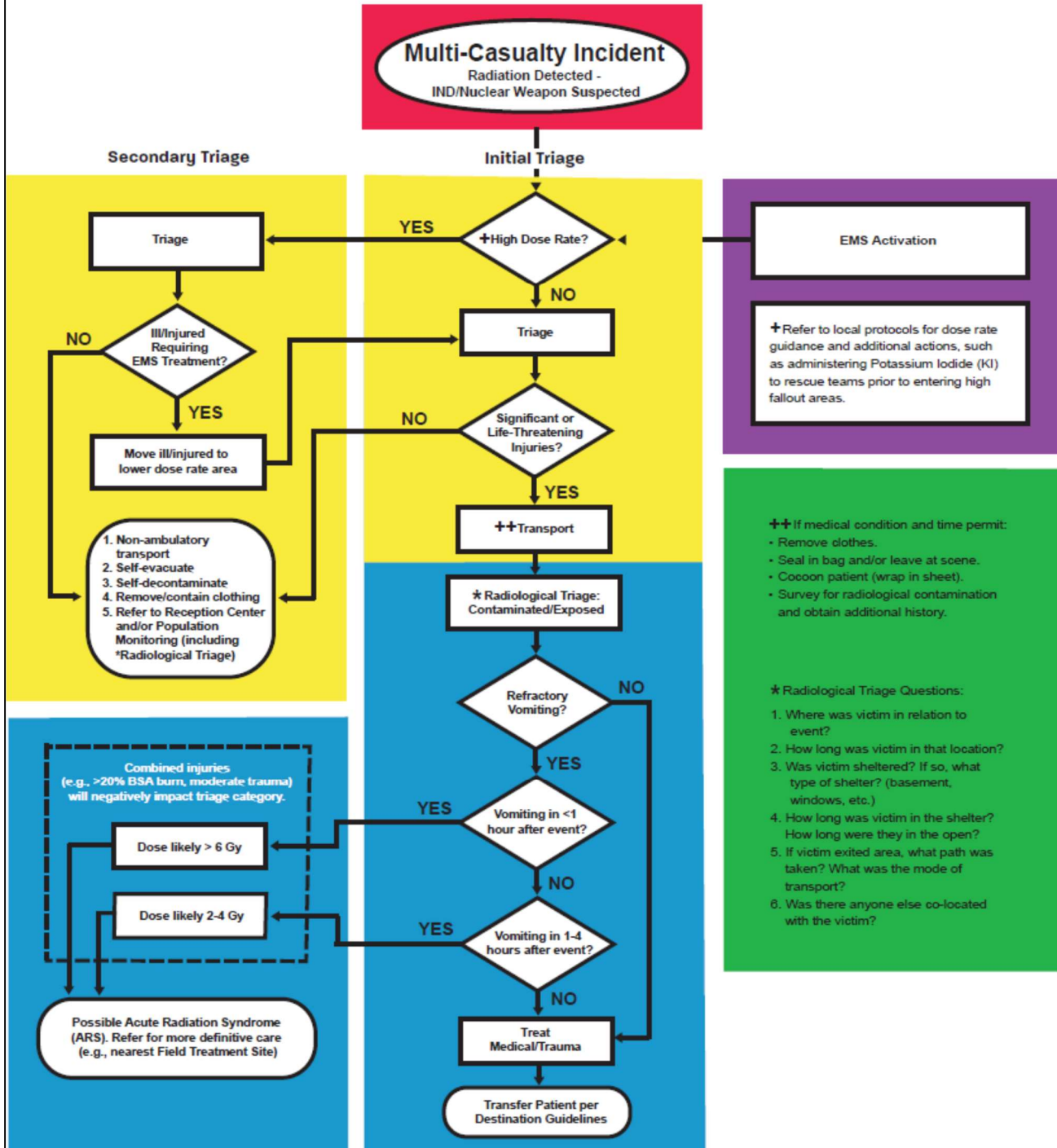[5] Prehospital Medical Management - ORISE (orau.gov)

Hospital and Healthcare Facility Triage Tool

For prioritization of treatment once patients have reached their destination hospital, healthcare facilities should refer to the Exposure and Symptom Triage (EAST) sorting tool (https://remm.hhs.gov/EAST-tool-notes.htm) after radiation exposure or a radiological emergency. This tool provides guidance for initial rapid triage and screening of patients to determine the likelihood and need for treatment of Acute Radiation Syndrome (ARS). This tool is best used in resource-poor environments where treatment may not be available for all exposed patients. It is important to continually reassess patients and obtain serial values to better understand the progression of illness over time.

Exposure and Symptom Triage (EAST) Tool to Assess Radiation Exposure After a Nuclear Detonation[6]

ARS Severity Prediction	Severe ARS Predicted (>6 Gy)	Moderate ARS Predicted	Mild ARS Predicted (<2 Gy)
ALC/lymphocyte single value estimate (x10^9) (3)	< 0.7 at 24h < 0.4 at 48h	0.7 – 1.1 at 24h 0.4 – 0.9 at 48h	> 1.1 at 24h > 0.9 at 48h
Vomiting onset (4)	Rapid (within 1h) after exposure	Intermediate (1-4h)	Delayed > 4h
Vomiting (per day) (5)	>6 or worsening with time	Moderate 3-6	1-2 or resolved
IMAAC /official 12-24h estimated dose map (6)	>6 Gy (modify to 2-6 Gy if good shelter for 24h)	2-6 Gy (modify to < 2 Gy if good shelter for 24h)	<2 Gy
Location in damage or fallout zone (non-IMAAC map) first 12-24h	In damage or fallout zone with minimal / no sheltering	In damage/fallout zone with good sheltering (e.g. concrete)	Not in damage/fallout zone according to map
Diarrhea (stools / day)	Severe (>6)	Mild / moderate (<6)	None
Headache (7)	Severe, interferes with activities	Mild/moderate	None/minimal
Fever (unexplained)	High/sustained	Low (< 101F) or resolved	None
Skin (beta) burns (8)	Burns / blisters > 3% BSA	Burns/blisters < 3% BSA	None
Match dominant signs/symptoms in column above to suggested triage category in same column below			
GCSF/myeloid cytokine **priority** (9)	**2** – Possible benefit	**1** – Most benefit	**3** – Unlikely benefit
Evacuation **group** (10)	**2** – Second evacuated	**1** – First evacuated	**3** - Third evacuated

It is important to consider that the need for screening and care should occur in separate areas from treatment areas to avoid overload and contamination. Each coalition partner should ensure their own plans consider spaces at their facility that can be made available for different needs such as triage, screening, decontamination, and treatment, as well as what additional spaces may be leveraged for a large-scale incident. SCC Public Health Dept. and Human Services Dept. will work with the EOC to determine locations for non-injured possibly exposed persons and communicate those to the healthcare facilities to make referrals for non-injured persons easier.

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[6] https://remm.hhs.gov/EAST-tool-notes.htm

The SCHMIT Team, Santa Cruz County's Hazardous Incident Team, is the key expert in hazardous materials incidents in Santa Cruz County. They can be reached by dialing 9-1-1, and have access to various experts in radiation response and injury, which may include contacts at UCSC or teams or organizations from outside the county. They, along with the Incident Commander of an incident, can provide real-time guidance, resources, and instructions.

3. PATIENT CARE/MANAGEMENT

The following section outlines the role of hospitals and healthcare personnel in preparing for and responding to radiological incidents.

Radiation Emergency Medical Management (REMM, https://remm.hhs.gov/) provides guidelines and information for patient triage and treatment following a nuclear or radiological incident, including management and treatment of combined physical injuries and radiation exposure.

For more information also see Radiation Emergency Assistance Center/Training:

- Checklist for Hospital-Based Radiation Professionals Dealing with a Radiological Incident

Checklist for Healthcare Personnel Assess resources for a potential influx of blast/burn victims (blood, medications, burn supplies, etc.)

- Hospitals submit resource requests for anticipated supply needs and advise MHOAC of sit-stat.
- Local health department or MHOAC adjudicates requests (i.e., fills/denies) requests.
- Escalation of resources will be made from the Local level upwards through the MHOAC and RDMHS if required.

All healthcare facilities should prepare for receipt of patients who may self-report to local hospitals and clinics

- Determine radiation screening needs; locate instruments and staff to operate them.
- Prepare for decontamination of patients that spontaneously arrive
- Develop communications to staff in the event patients self-report.

Establish communications with local response partners, including EMS, MHOAC, Fire, Law, Netcom, EH, PH

Determine any just-in-time training needs

- Identify needed content, to which staff, and staffing resources to provide the training to staff.
- Assess and request as needed resources of G-CSF, antifungals, blood and other supplies for radiation injury patients

In the event that patients are suffering from extremely high radiation exposure it is likely that they will be transported to your local Radiation Injury Treatment Network (RITN) facilities. See References and Information for "Guidelines for Identifying Radiation Injury and Considering Transfer to a Specialized Facility", prior to making a decision. The local RITN specialized facilities are:

- UCSF in San Francisco: 415-476-2188
- Stanford Health Care in Stanford: 650-725-7121
- UC Davis in Sacramento: 916-734-3355
- Scripps Green Hospital in La Jolla (San Diego area): 858-436-4712
- City of Hope National Medical Center (TC) in Duarte (near Pasadena): 626-256-4673

For more information on RITN centers see the RITN Participating Centers General Contact Directory (https://ritn.net/-/media/project/nmdp/ritn/documents/treatment/ritn-participating-centers-general-contact-directory-2022-02

RITN Centers and Hospitals can support SCCHCC member by doing the following in the lead up and during the emergency:

- Initiate outreach to coalition to provide guidance on training, RITN templates and terminology
- Assess capability and determine feasibility to decompress the Bone Marrow Transplant (BMT) unit or other beds to care for radiation injuries
- Coordinate with the HCC to identify non-RITN hospitals where decompressed BMT patients can be transferred

The figure below illustrates the flow of casualties to a RITN center or hospital following radiological or exposure.[7]
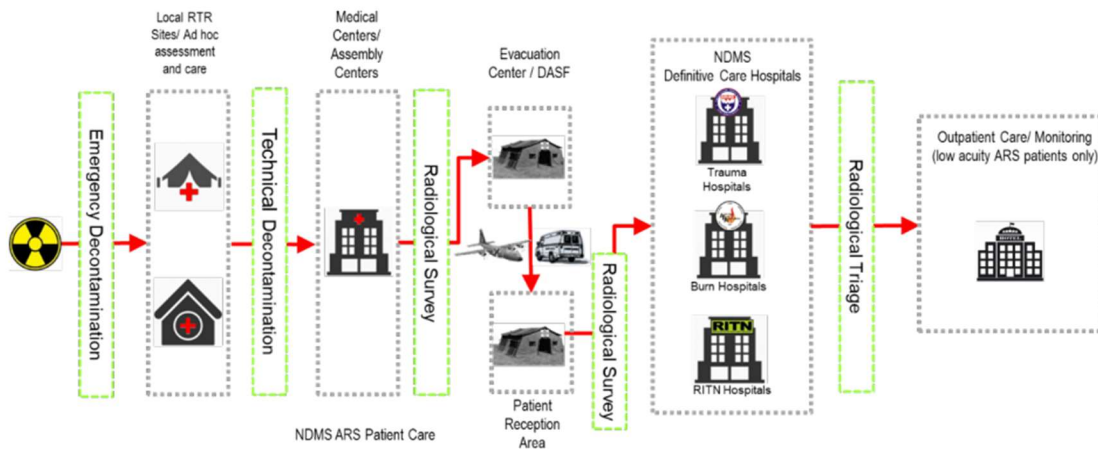
Expected response to a nuclear detonation. This stylized diagram illustrates the expected flow of casualties from the affected area to specialty centers around the country, including RITN. The injury pattern and required resources will vary depending on the location relative to the blast. Casualties are expected to undergo decontamination prior to triage for evacuation.

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[7] https://ritn.net/workarea/downloadasset.aspx?id=17179869224

4. TECHNIQUES OF CONTAMINATION CONTROL

The Goals of Contamination Control are to Prevent the Spread of Radioactive Materials from:[8]

- The patient: In most circumstances the victim will be the source of the contamination; however, in rescue and extrication, some contamination may have been transferred to others
- The rescue personnel
- The gurney and equipment used in patient care (stethoscope, blood pressure cuff, etc.)
- The ambulance

This contamination can be transferred to:[9]

- Care providers as they touch or move the patient to correct the medical problem
- The equipment used to assess the patient's condition and to treat the medical emergency
- The surrounding area (treatment gurney, floor, etc.)
- In rare cases where dust or powders are present, the air could contain radioactive particles

Preparing the Treatment Area for Contamination Control

- If possible, select a treatment room near an outside entrance. Clear the area of visitors and patients. Remove or cover equipment that will not be needed during emergency care of the radiation accident victim.
- Several large plastic-lined waste containers will be needed. The treatment table should be covered with several layers of waterproof, disposable sheeting. Plastic bags of all sizes will be needed and should be readily available.
- Survey instruments should be checked and ready for use before the patient arrives. Background radiation levels should be documented.
- The treatment team should be prepared to meet the patient at the ambulance where the patient can be transferred to the prepared treatment gurney.

Covering Floor Areas

- Rolls of brown wrapping paper or butcher paper three to four feet wide can be unrolled to make a path from the ambulance entrance to the decontamination room. Ordinary cloth sheets or square absorbent pads can be used if paper is unavailable. Whatever the floor covering, it should be taped securely to the floor. This route should then be roped off and marked to prevent unauthorized entry. The floor of the decontamination room or treatment area should be covered in a similar way if time allows. This will make cleanup of the area easier.
- A control line should be established at the entrance to the decontamination room. A wide strip of tape on the floor at the entrance to the room should be marked clearly to differentiate the controlled (contaminated) from the non-controlled (uncontaminated) side.

Control Ventilation

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[8] https://remm.hhs.gov/hospitalprep.htm#control
[9] https://remm.hhs.gov/hospitalprep.htm#control

- While it may be desirable that the room, or rooms, have either a ventilation system that is separate from the rest of the hospital or a means of preventing the unfiltered exhaust air of the radiation emergency area from mixing with the air that is distributed to the rest of the hospital, there is very little likelihood that contaminants will become suspended in air and enter the ventilation system. Hence, no special precautions are advised. (Ref.: AMA. A Guide to the Hospital Management of Injuries Arising from Exposure to or Involving Ionizing Radiation. 1984).

Techniques of Contamination Control

- Set up a controlled area large enough to hold the anticipated number of victims.
- Prevent tracking of contaminants by covering floor areas and monitoring at exits of controlled areas.
- Restrict access to the controlled area.
- Monitor anyone or anything leaving the controlled area.
- Use strict isolation precautions, including protective clothing and double bagging.
- Use a buffer zone or secondary control line for added security.
- Control waste by using large, plastic-lined containers for clothing, linens, dressings, etc.
- Control ventilation.
- Change instruments, outer gloves, drapes, etc., when they become contaminated.
- Use waterproof materials to limit the spread of contaminated liquids, for example, waterproof aperture drapes.

If Radioactive Contamination Is Discovered After Patient Has Been Admitted

- Continue attending to the patient's medical needs.
- Secure entire area where victim and attending staff have been.
- Do not allow anyone or anything to leave area until cleared by the radiation safety officer.
- Establish control lines and prevent the spread of contamination.
- Completely assess patient's radiological status.
- Personnel should remove contaminated clothing before exiting the area; they should be surveyed, shower, dress in clean clothing, and be resurveyed before leaving area.

4.1 Contamination Control Zones

Effective provision of screening and decontamination services hinges on the establishment of contamination control zones. Typically, a response to any hazardous materials incident will include establishment of three zones:

- *Hot zone*: The area that presents the greatest hazard due to the presence of hazardous material
- *Warm zone*: The area surrounding the hot zone, where transitional activities, such as decontamination of personnel and victims, take place
- *Cold zone*: The staging area for responders and supporting elements

For a radiation emergency response, the contamination control zone encompasses operations in the hot and warm zones. Screening and decontamination of decedents should take place in the warm zone at dedicated decontamination areas. These steps will help limit the spread of radioactive contamination to the field morgue in the cold zone. Figure 3 shows a general schematic of the arrangement of mortuary response areas in a hazardous materials response.

Figure 3: Placement of screening and decontamination site
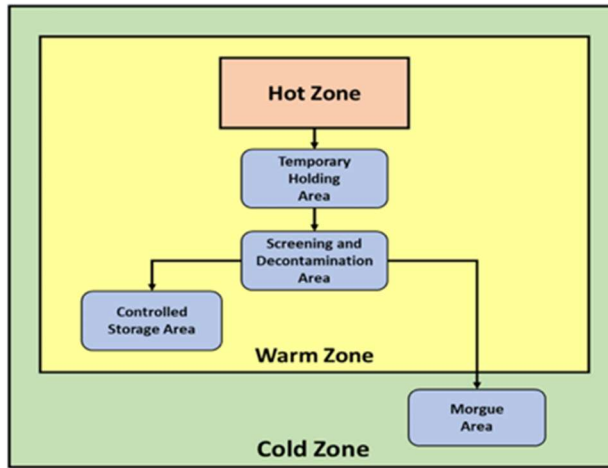
DECONTAMINATION

Decontamination should not delay or impede stabilization of any patient's injuries or illness not related to their radiation exposure.

For more information: https://remm.hhs.gov/ext_contamination.htm

From Administration for Strategic Preparedness and Response Technical Resource Assistance Center Information Exchange (ASPR Tracie): If running water is available:

- People should first be quickly and effectively spot decontaminated by using material such as baby wipes to reduce the amount of contaminated wash water.
- Carefully removing the outer layer of clothing can greatly reduce contamination.
- If clothing removal and spot decontamination efforts are not effective, then wash exposed skin at a sink or shower with soap and water.
- Do not allow wash water to run into lacerations. Cover deeper wounds prior to decontamination and then selectively assess and decontaminate them to avoid internal contamination.
- Do not allow wash water from hair to run down the body into creases to avoid contamination of skin crevices (i.e., bend over toward shower stream to wash hair).

If running water is NOT available:

- Practice dry decontamination techniques that focus on clothing control. Tape or lint rollers may be used to remove visible dust from clothing or skin.
- Carefully remove the outer layer of clothing and decontaminate exposed skin with moist wipes, damp towels, or other available methods.
- Use the "single wipe" technique (wipe and discard); do not scrub or wipe back and forth across the same area to avoid spreading contaminant

RADIATION TREATMENT

1. THE REQUIRED CONDITIONS FOR ACUTE RADIATION SYNDROME (ARS):

- **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 radiation.
- **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.

See Acute Radiation Syndrome: A Fact Sheet for Clinicians for greater detail about ARS Syndromes and stages.

- https://www.cdc.gov/nceh/radiation/emergencies/arsphysicianfactsheet.htm
- https://www.cdc.gov/nceh/radiation/emergencies/pdf/clinicianpocketguide.pdf

Per the CDC (https://www.cdc.gov/nceh/radiation/emergencies/countermeasures.htm) there are select medications that can help limit or treat the health effects of certain types of radiation in a radiological emergency.

During a radiological or nuclear emergency, radioactive materials may be released into the air and then breathed into the lungs, or they may get into the body through open wounds. Radioactive materials can also contaminate the local food supply and water and get into the body through eating or drinking. This is called internal contamination.

Removing internal contamination from the body will help reduce the risk for health effects. Small amounts of internal contamination may not need treatment.

Some medical treatments are available for limiting or removing internal contamination depending on the type of radioactive material involved. These treatments include the following:

- Potassium Iodide (KI)
- Prussian Blue
- DTPA (Diethylenetriamine pentaacetate)

Medical professionals will determine if treatments are needed.

Medical Countermeasures for Radiation Exposure: During a radiation emergency, a person who is exposed to a very high dose of radiation over a very short time may experience bone marrow suppression, meaning the marrow produces less blood cells. This bone marrow suppression occurs with Acute Radiation Syndrome. Medications that speed up blood cell production, including Neupogen, may help the body heal and protect from infections. Medical professionals will determine if treatments are needed.

- Neupogen: General Information for the Public
- Neupogen: General Information for Clinicians

2. USE OF POTASSIUM IODIDE (KI)

Potassium iodide (KI) is best taken before entering an area where there has been a radiological release. If it is not possible to take KI prior to exposure, it should be taken within 12 hours of the potential exposure. It is important to stay informed of the public health authority's directions in your areas when it comes to the use of KI during or following a radiation exposure.

For more information on the use of KI and treatment dose by age brackets see:

- Do I Need to Take Potassium Iodide (KI) (REAC/TS)

3. CRISIS STANDARDS OF CARE

Care of Patients: In a large MCI or radiological disaster causing injury or illness to numerous patients over a large area, Crisis Standards of Care may need to be considered as noted below:

Response Resource Availability and Crisis Standards of Care

Resource continuum:		Normal	Good	Fair/Poor
Operating conditions:		Normal/usual operating conditions, with normal "space, staff, and supplies"	Care functionally equivalent to normal but with constrained resources	Austere operating conditions: care with insufficient "space, staff, and/or supplies"
Response resource adequacy	Space	Usual patient care space fully utilized	—Patient care areas re-purposed (PACU)	Facility damaged/unsafe, or, Non-patient care areas (i.e.,

			—Monitored units for ICU-level care	classrooms, etc.) used for patient care
	Staff	Usual staff called in and utilized	Staff extension: —Brief deferrals of non-emergent service —Supervision of broader group of patients —Change in responsibilities, documentation, etc.	Trained staff unavailable or unable to adequately care for volume of patients even with extension techniques
	Supplies	Cached and usual supplies used	Conservation, adaptation, and substitution of supplies with occasional re-use of select supplies	Critical supplies lacking, possible re-allocation of life-sustaining resources
Standard of care continuum:		**Medical Standards of Care**		
		Conventional care[1]: usual care	Contingency Care[2]	Crisis standards of care[3]: austere operating conditions

↑

Indicator: potential need to implement "crisis standards of care"
Trigger: "crisis standards of care"

↑

Incident demand / resource imbalance

increases ➔

Risk of morbidity / mortality to patient

increases ➔ [10]

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[10] https://remm.hhs.gov/stdsofcare.htm

For more information:

- Crisis Standards of Care, A Systems Framework for Catastrophic Disaster Response.
  https://www.ncbi.nlm.nih.gov/books/NBK201063/

LABORATORY INFORMATION

Laboratory personnel play a crucial role in response to radiological emergencies by collecting, packaging, and shipping specimens to confirm potential exposures to radiation.

Collecting Specimens: **Following a radiological incident, collect urine samples for each person involved.** View this flowchart for directions on how to collect urine samples from potentially exposed individuals: CDC Specimen-Collection Protocol for a Radiological/Nuclear Incident

Package and Ship Specimens: After collecting the samples, package and ship them to the appropriate laboratory destination based on your state's radiological terrorism comprehensive response plan. If you are instructed to ship your specimen to the CDC laboratory, follow the directions in this flowchart: Instructions for Shipping Urine Specimens to CDC after a Radiological/Nuclear Incident

You can find the required paperwork for specimen packages here: Radiological/Nuclear Incident Specimen Collection and Shipping Manifest
The Planning and Intelligence section, in coordination with the Communicable Disease Unit and the Health Officer(s) are responsible for gathering and maintaining this information.

More information: CDC Laboratory Information for Radiation Emergencies

LOGISTICS

1. COMMUNICATIONS

Because of the potential for communication system infrastructure impact due to being overwhelmed by the population using their cell phones, by electrical magnetic pulse (EMP) surge, temporary or permanent destruction of electrical circuits, or infrastructure damage due to blasts, rapid deployment of the Amateur Radio groups is important. This resource is coordinated through the County EOC.

2. SPACE

During a nuclear/radiological incident, bed capacity and hospital personnel safety will be a major challenge for all facilities. After a nuclear detonation or radiation exposure, many residents will self-evacuate and may present for assessment and care at hospitals hundreds of miles from the detonation or exposure site.

There are many locations following a radiological or nuclear incident where patient care and victim assessment may take place, including casualty collection points, healthcare facilities, alternate care sites, community reception centers, evacuation shelters, and assembly centers.

- **Surge space** are within a healthcare facility or in the surrounding area (e.g., parking lot) where medical care and/or decontamination can occur.
- **Alternate care sites** may be spontaneous or planned locations that act as overflow for healthcare facilities and provide patient care.
- **Community Reception Centers (CRC)** are designed for formal screening, decontamination, registration, assessment of potential internal and external contamination, and sample collection for bioassays. They require significant resources and are not established in close proximity to a nuclear detonation or radiation exposure event but must be established in nearby communities where resources are sufficient.
- **Evacuation Shelters** may be spontaneous or planned locations where displaced populations may stay for 24 or more hours. They, too, require significant resources, including medical staff, and should not be established in close proximity to a nuclear detonation or radiation exposure event, but must be established in nearby communities where resources are sufficient. More information about Shelters can be found in Appendix 2.
- **Assembly centers** (Community Reception Centers) are intended for rapid, qualitative screening of large numbers of uninjured persons that were in a fallout or prompt radiation exposure area after a nuclear detonation or radiation exposure. They are assessed for symptoms of ARS and prioritized for cytokines and evacuation. These centers should be located near the margins of the dangerous fallout zone (DFZ) and opened around the time the 24-hour sheltering orders expire. More information about Shelters can be found in Appendix 2.

When healthcare facilities become overwhelmed with patients, healthcare facilities will be engaged in MHOAC-led discussions, likely via conference call, to determine which facilities are available and willing to take patients in order to decompress hospitals and other critical care facilities. The coalition may also choose to activate smaller subgroups or committees, such as a SNF/LTCF (Long Term Care Facility) committee, to further coordinate bed capacity expansion and sharing amongst similar facility types.

If a nuclear/radiological incident occurs outside of SCC, SCCHCC staff may be contacted by the MHOAC. Facilities outside damage zones should be prepared to accept patients from facilities within damage zones (e.g., if a radiological or nuclear event takes place outside of SCC).

For more information on Mass Care Services and sites: *A Guide to Operating Public Shelters in a Radiation Emergency* (CDC)

3. SURGE STAFF

The below table provides additional regulatory considerations for various staffing strategies.

STRATEGIES	CONSIDERATIONS
• Train clinical staff for hazmat and decontamination	• MD malpractice coverage
• Contact Nurse Staffing Agencies (registries/travel nurses to assist with supplemental staffing needs • Disaster Healthcare Volunteer Database and Medical Reserve Corps • Contact other healthcare organizations within the county if the incident is small • Contact nearby counties for surge staff assistance • Contact the MHOAC for mutual aid assistance	• During a radiological incident occurrence, nearby counties are likely to also be impacted. • The arrival of additional staff may take many hours or days to arrive.
• Use of non-conventional staff (e.g., Emergency Medical Technicians (EMTs) or paramedics, students (medical and nursing), military licensed staff, volunteer, dentists, retired healthcare professionals with active licenses)	• Regulations to expand clinical professionals' scope of practice may require a CDPH waiver and a Governor's order. Need clarification from professional boards. • 22 CCR 70217: Nurse-patient ratios required. Example: critical care unit shall be one nurse to two or fewer patients at all times • Liability/licensing regulations • State laws regarding malpractice coverage for volunteers • County regulations and liability coverage may be needed

STRATEGIES	CONSIDERATIONS
• Utilize pediatric skilled RNs to supervise adult skilled patients and vice versa	• Liability regulations and insurance limitations
• Implement and/or develop just in time training for clinical staff normally assigned to non-direct patient care positions	• None

4. SUPPLIES / "STUFF"

The MHOAC can provide PPE and other medical supplies including medications when needed via the County warehouse or local caches when otherwise unobtainable. The MHOAC may provide "Go-Kits" (See Appendix 3) with equipment for use by nurses or other healthcare providers if not in use at evacuation shelters or CRC's. The MHOAC may also request these and other supplies, including Advanced Life Support supplies and medications, through the medical and health mutual aid systems in place in California from the region and/or state.

The Civil Support Team, available by a call to the FBI through Cal OES, may be available to bring items such as decontamination equipment, and other radiological emergency response equipment and personnel. They can bring 22 staff and command personnel, which includes medical personnel and a two-person decontamination team and equipment.

5. CONTROL OF INVENTORY

PPE is stored in the County warehouse. Large space expansion materials (e.g., Mobile Hospital tents) are stored in Watsonville and may be available through the Medical Health Operational Area Coordinator (MHOAC). Smaller tents may be available through the County EOC. The MHOAC processes requests for these items from SCCHCC members and other healthcare facilities. The Medical Health Logistics Section of the SCC Health Department Operations Center (DOC) will process all requests for medical health resources. These will be distributed to healthcare workers, community partners, and public safety personnel by their respective organization after receiving the items from the DOC.

Regular inventory control (e.g., vendor visits, normal transportation routes, etc.) may not be able to occur due to damage or the location of Light, Moderate, and Severe Damage Zones. The MHOAC will coordinate with the Region, State (CDPH), and Federal agencies to request mutual aid in the event that the SCC warehouse is inoperable or if inventory is required to come from a different location.

6. TRANSPORTATION

The MHOAC will continue to assist with patient transportation direction with local ambulance partners and mutual aid resources as needed. The Med/Health team will additionally work with the DOT and CHP to ensure safe routes for patient transport.

SPECIAL POPULATIONS

Special populations include pregnant women, immunocompromised patients, equipment-dependent patients (especially those requiring ventilators), disabled persons requiring wheelchairs or other mechanisms of assistance, nursing home and jail residents, people with various physical challenges, the mentally ill, children, elderly, individuals experiencing homelessness, and persons with cultural and language barriers.

1. PREGNANT PERSONS AND NEONATES

There are no special pharmaceutical treatments for a pregnant woman, but they should not receive repeated doses of KI as it might reduce thyroid function in the fetus. They will require considerable reassurance and communication.

For breastfeeding persons, internal contamination could reach breastmilk (based on biokinetic modeling data) and risk of exposure to the neonate/infant should be evaluated to determine when the infant can resume breastfeeding. More information can be found in CDC Guidelines for pregnant and infant feeding people and in the "Pediatric Considerations Before, During, and After Radiological or Nuclear Emergencies" technical report.

2. PEDIATRIC POPULATIONS

Pediatric populations, including infants, children, and adolescents, are likely to experience higher internal and external radiation exposure levels in comparison to adults due to their smaller body and organ size. Children are therefore at higher risk of developing cancer and related conditions as several tissues are more sensitive to radiation in children than in adults. See "Pediatric Consideration Before, During, and After Radiological or Nuclear Emergencies" for more information: https://publications.aap.org/pediatrics/article/142/6/e20183000/37501/Pediatric-Considerations-Before-During-and-After?autologincheck=redirected

Children and Youth with Special Healthcare Needs (CYSHCN): Nearly 1 out of every 5 children in the United States has a special healthcare need. Children and youth with special healthcare needs (CYSHCN), also known as children with special healthcare needs (CSHCN)external icon, require more care for their physical external icon, developmental, behavioral, or emotional differences than their typically developing peers. A special healthcare need can include physical, intellectual, and developmental disabilities, as well as long-standing medical conditions, such as asthma, diabetes, a blood disorder, or muscular dystrophy.

All children have unique needs in emergencies, but care for children with special healthcare needs is often more complex because of their various health conditions and extra care requirements. They may have a hard time moving from one place to another, urgent or constant medical needs, difficulty communicating

or have trouble with transitioning to different situations. A disaster can present all these difficulties at once.[11]

An Emergency Information Form for Children with Special Healthcare Needs may be available from the parents of the child. A copy is available in the following link, and could be used to gather information about the child should one not already be available. https://www.acep.org/siteassets/uploads/uploaded-files/acep/clinical-and-practice-management/resources/pediatrics/medical-forms/eifspecialneeds.pdf

As SCC does not have any pediatric hospitals or facilities, coordinate with the MHOAC and patient transportation to transport pediatric patients to pediatric care facilities (Lucille Packard Children's Hospital at Stanford Medical Center or UCSF Benioff Children's Hospital in Oakland, Children's Hospital Central CA in Fresno, UC Davis Children's Hospital in Sacramento, and several more in Southern California). If transportation is not possible, please consult the MHOAC and subject matter experts to receive instruction on treating children.

3. BEHAVIORAL HEALTH AND PATIENT MENTAL HEALTH CONCERNS

Mental health effects are a known major clinical problem associated with most radiological incidents. Radiation-related disasters present a concern with the intangible nature of radiation exposure, public fear of radiation, conflicting reports or rumors of adverse effects, and short- and long-term health effects of radiation exposure.

Significant mental and behavioral health impacts (e.g., depression, anxiety, post-traumatic stress disorder) will overwhelm mental and behavioral health facilities and counseling professionals. Typical symptoms of those exposed to radiation include cognitive, emotional, behavioral, physical, and spiritual symptoms. There are a number of recommended mental and behavioral health interventions recommended to be integrated into care of patients exposed to or contaminated during a radiological incident including:

- Psychological First Aid
- Psychological Recovery
- For more information and tools: Disaster Mental Health: Assisting People Exposed to Radiation

The SCCHCC may perform the following additional activities to support disaster mental health:

- Enhance communication, coordination, logistical, and moral support to providers
- Implement just-in time training for mental/behavioral health interventions specific to radiological or nuclear incidents

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[11] https://www.acep.org/by-medical-focus/pediatrics/medical-forms/emergency-information-form-for-children-with-special-health-care-needs

- Promote resources (e.g., the Substance Abuse and Mental Health Services Administration (SAMHSA) Disaster Distress Helpline)
- Activate substance use disorder specialists
- Identify and reduce duplication of efforts
- Deploy behavioral health specialists to facilities, shelters, CRC's or other locations to assist healthcare workers as part of outreach teams
- Identify community resources that could assist in behavioral health services, such as social workers, chaplains, and counselors, to bring to healthcare where needed
- Request additional assistance through the MHOAC as needed if additional assistance is unavailable in SCC.

During recovery periods, long-term public health monitoring and behavioral health programs should be in place. Healthcare facilities will coordinate with the MHOAC, Department of Victim Services, American Red Cross (ARC), and SCC Behavioral Health.

4. INDIVIDUALS EXPERIENCING HOMELESSNESS

As of 2022, approximately 2299[12] individuals in SCC were found to be experiencing homelessness during a one-day count. As a shelter in place is most likely to be announced following a radiological incident, the MHOAC, SCC Public Health and Human Services Department, the SCC Homeless Persons Health Project (HPHP) and (Other Homeless Organizations), and the Department of Housing and Urban Development should coordinate to reach and house individuals experiencing homelessness. The Department of Housing and Urban Development will also assist with placing individuals experiencing homelessness due to the radiological incident in available housing.

Focus on communication and outreach to persons experiencing housing from the very start of the incident to provide relevant instruction is imperative.

5. SENIORS

As of 2021, about 18% (48,935) of the SCC population is over 65 years of age, and another 18.6% of the population is over 55 years of age[13]. There are 35 Assisted Living & Nursing Homes in SCC. The MHOAC will coordinate with the Department of Aging & Adult Services as well as with the Assisted Living & Nursing Homes within the SCC HCC to assist seniors and to provide direction to facilities regarding up-to-date information, recommendations, and guidelines.

6. PEOPLE WITH DISABILITIES

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[12] https://housingmatterssc.org/2022-homeless-point-in-time-count/
[13] https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/california/county/santa-cruz-county/?utm_source=bing&utm_medium=cpc&utm_campaign=ND-DemPop&msclkid=28b6ee8434b91bae91b68a013744a1cc

Approximately 5.4% of the population are children with major disabilities[14]. Approximately 911 persons are considered "Severely Impaired and receive IHSS services[15]

Pediatric cancer patients or children who are being treated with radiation are at high risk of harmful tissue reactions during exposure to a radiological incident. Additionally, individuals with disabilities or with access and functional needs may have a difficult time accessing healthcare services or safely sheltering in place during a radiologic incident. Supplies or radiation dose testing may need to be delivered to individuals who are home-bound, and additional radiation dose testing or treatment may be necessary for those undergoing radiotherapy.

7. INCARCERATED INDIVIDUALS

SCC operates three jail facilities: the Main Jail located at 259 Water St., Santa Cruz; Blaine Street Facility at 141 Blaine St., Santa Cruz; and Rountree Facility located at 90 Rountree Ln., Watsonville.

Juvenile Hall is located at 3650 Graham Hill Rd., Felton.

Supplies or radiation dose testing may need to be delivered to individuals who are incarcerated, and additional radiation dose testing or treatment may be necessary for those undergoing radiotherapy. Care of the incarcerated population should be coordinated with the SCC Sheriff's Dept.

8. PETS AND ANIMALS

Pets and animals may be exposed to radiation in a radiological or nuclear emergency. Owners and pet families may be as concerned about the care of their animals as themselves.

Information for decontamination of Pets::
https://www.cdc.gov/nceh/radiation/emergencies/selfdecon_pets.htm?CDC_AA_refVal=https%3A%2F%2Femergency.cdc.gov%2Fradiation%2Fselfdecon_pets.asp

Service animals may show up at hospitals and shelter locations, and police or other working K9's may need care or decontamination during a disaster. The "Hospital Decontamination System and Decontamination Methods for Assistance Dogs that Accompany Incoming Disaster Victims" provides information to help manage this situation:
https://www.urmc.rochester.edu/MediaLibraries/URMCMedia/flrtc/documents/Hospital-Decon-for-Service-K9s-Gordon.pdf.

All healthcare facilities should plan for managing any pets that may arrive with owners who spontaneously arrive at the facility.

- After a large mass radiation casualty event, medical resources will be scarce. Using scarce, radiation-related resources for animals may be difficult.

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[14]https://www.census.gov/programs-surveys/acs/
[15] https://www.cdss.ca.gov/inforesources/ihss/program-data

- Animal preparedness information resources below provide general emergency and disaster information, not specifically related to a radiological or nuclear event.

Consideration should be given to requesting additional resources to manage animal exposure and care during a radiation or nuclear emergency.

National Veterinary Response Teams information: https://aspr.hhs.gov/NDMS/Pages/nvrt.aspx

DEMOBILIZATION

The information below is taken from the SCC Surge Plan and applies to radiological emergency response.

"When the surge response is no longer needed, demobilize healthcare resources, volunteers, and other personnel as appropriate. Return healthcare system to pre-incident operations by incrementally decreasing surge staffing, equipment needs, alternate care facilities, and transition patients back into their pre-incident medical setting. Assure volunteer or other personnel return all equipment. Document all resources, staff as well as equipment.

Institute plan for staff counseling, stress debriefing, or other follow-on activities to address response workers mental or behavioral health needs (acute and long-term) due to participation in the response. When requested or indicated, refer volunteers to medical and mental/behavioral health services. Document services offered and utilized.

Institute plan for staff physical needs, including sleep, eating, hygiene, play, etc. Document services offered and utilized.

Transition to normal operations and return to normal staff scheduling. Conduct and document a "Hot-Wash" debrief with personnel.

Reconstitute medical supply, equipment inventory. Complete inventories of medical and non-medical supplies, pharmaceutical, and equipment. Request replacement or servicing of equipment, supplies, and pharmaceuticals used during the response through Logistics and Planning Section Chiefs."

END STATE

The end state of activation for a nuclear/radiological incident occurs when:

- All lifesaving and life-sustaining recovery operations have been provided.
- Residents' needs have been met and successful recovery (as defined by affected communities) is achieved, including public safety and health protection assurances.
- Environmental impacts (including infrastructure capacity, contaminated waste managed effectively, etc.) have been minimized.
- Displaced populations have returned or relocated.

- Long-term public health monitoring and behavioral programs are in place.
- All long-term contaminated areas are identified and contamination and/or access control measures are in place.
- All deployed staff are returned to their normal positions and roles.

STAKEHOLDER STRATEGY GUIDES

Please see the SCC Surge Plan for surge guides which are broken down into four categories: space, staff, stuff, and system.

1. STRATEGIES: HCC/PUBLIC HEALTH

Strategies: Policies and Protocols.

The list below contains a recommendation for policies and protocols which should be created by each of the sectors addressing specific radiation emergency response.

- EMS
- Decontamination protocols and methods
- Behavioral Health
- Environmental Health
- Hazmat Response Team
- Hospitals and acute medical care
- Clinics and medical care
- Law Enforcement
- Skilled Nursing, Assisted Living, and Independent Living facilities
- Hospice
- Special Populations

2. STRATEGIES: PREHOSPITAL PROVIDERS

Definition: Prehospital providers are any ambulance company or fire departments that provide prehospital medical care.

Surge Indicators:

- Inability to support treatment and/or transport of all patients
- Regular communication channels are not working

Staff: Treatment Strategies for Prehospital Providers		
Indicator/Trigger: Staffing inadequate and undetermined ETA of incoming staff, System overwhelmed; public assistance needs exceed available resources		
Strategy	**Regulatory**	**Other Considerations**
Enact Alternate Staffing Plan	Defer to MHOAC for assistance	Consider writing plan if none exists
Establish process for accepting MRC volunteers	Defer to MHOAC for assistance	
Establish plan for utilization of volunteers from neighboring county prehospital agencies	Establish Memorandum of Understanding (MOU) with neighboring agencies or waiver of sponsorship requirement in Prehospital Care Policy	Request assistance from MHOAC for strike team support
Encourage medical-health staff to register with the MRC		Ongoing process
Utilize private BLS ambulance providers and staff to transport ALS patients	Defer to MHOAC for assistance and coordination	Send staff to site immediately for care assistance despite inadequate ambulance levels.
Create casualty collection points		Patients go to one assessment site instead of providers responding to each patient directly.
Hand over patient care to receiving facility immediately to get back into service. Allow EMS staff unassigned to ambulances to work at triage sites at the receiving facility to assist with offloading and patient triage and care.	EMS agency issue directives to receiving facilities to release prehospital provider/no wall times	
Utilize air resources to transport patients		
Transport more than one patient per ambulance		Group appropriate patients that are going to the same facility
Enact Simple Triage and Rapid Treatment (START) triage	MCI declaration	
Request mutual aid	Utilize SEMS and MHOAC	Road and response times could vary

Staff: Treatment Strategies for Prehospital Providers		
Indicator/Trigger: Low equipment and supplies due to surge, not enough ambulances		
Strategy	**Regulatory**	**Other Considerations**
Designate surplus EMS or admin staff to deliver supplies and incoming staff to triage sites and event	Pre-agreement with ParaCruz/Metro for utilization in surge events needed	Utilize vans from ParaCruz, Metro, or wheelchair vans to bring supplies and transport people as needed after
Ensure all out of service ambulances are stocked to par levels at all times.		
Identify and utilize available medical caches at fire stations and hospitals		
Utilize public transport system to transport greens with EMS supervising	Pre-agreement with ParaCruz/Metro	
Designate ambulances to transport moderate and red only		
Request resources through EMS agency	MHOAC utilization	
Have a fuel plan in surge events		Utilize resources to make fuel available for all response vehicles (i.e., ambulances fill at fire stations)
Have contracts with other providers for assistance with supplies		

System Operations: Treatment Strategies for Prehospital Providers		
Indicator/Trigger: Regular communications hindered, large influx of calls to dispatch center from event and family of victims		
Strategy	**Regulatory**	**Other Considerations**
All private ambulance companies are on ReddiNet		ReddiNet training

Send liaison to Public Safety Answering Point (PSAP)/IC		
Establish communication failure protocols		
Use notification tools e.g., Everbridge		
Dedicate dispatcher to incoming calls/information to outside and to PIO and train both parties in how to use family reunification center feature of ReddiNet	Defer to EMS/MHOAC for assistance	
Establish a "hotline" number to broadcast through media outlets for family to contact regarding their loved ones and designate dispatcher or PIO to staff the line	Defer to EMS/MHOAC for assistance	
Ensure communications between three location incident command (IC) posts: event, Dominican Hospital, and Watsonville hospital; dedicate channel to IC intercommunications between locations, Netcom dispatch, and EOC/MHOAC	Defer to EMS/MHOAC for assistance	
Familiarize stakeholders with job action sheets and other resource forms utilized in MCI and surge scenarios		
Familiarize stakeholders with downtime forms in event Internet and ReddiNet is unavailable		
Develop surge plan with dispatch center and dedicate dispatchers to record and track transport resources, allocation, and destinations.		

3. STRATEGIES: HOSPITAL PROVIDERS

Definition: General acute hospitals that provide 24/7 inpatient care. Can provide specialty centers such as emergency care and ST Elevation Myocardial Infarction (STEMI).

Surge Indicators:

- EMS Agency notification of system-wide surge
- Inpatient beds at capacity
- Mass influx of patients

Space: Surge Strategies for Hospitals		
Indicator/Trigger: Inadequate space for surge of patients, need to secure space, mass influx of patients by several modes of transport		
Strategy	**Regulatory**	**Other Considerations**
Utilize licensed bed space for other types of patients	Use outpatient beds for inpatient care	CDPH Temporary Permission for Program Flexibility for Increased Patient Accommodations Forms, EMTALA Waivers
Convert space for other uses e.g., Cath Lab to Operating Room (OR)	Declaration of Public Health Emergency (local and/or State)	
Increase capacity in patient care areas		Expedite discharges and downgrade patients, cancel elective surgeries, increase capacities of patient rooms, if possible, create additional negative pressure rooms as needed
Use non-traditional areas of hospital for patient care	Utilize SEMS and MHOAC	Cafeterias, hallways, conference and break rooms, tents/shelters
Partner with local Metro bus and EMS to transport and medically supervise mild or walking wounded patients to alternative sites to offload hospitals		

Create plan to shift minor surgeries to local surgery centers		
Partner with admin departments to create perimeter security outside of hospital and reevaluate incoming/outgoing patient flow to establish: • One-way traffic only • Entry validation points confirming staff by badges and ambulances contain patients. • Support staff and provider meeting points. • Secure triage area with stretchers concentration point and escorts. Ensure voice amplification devices are available at triage and stretcher concentration points to control area. Stretchers concentration point should be managed by escort supervisor who will have radio communication on a medical frequency with all treatment areas. • Secure landing zone locations • Minimize threat of secondary injuries from chaotic traffic patterns		

Staff: Surge Strategies for Hospitals		
Indicator/Trigger: Staffing and provider inadequate and undetermined ETA of incoming staff		
Strategy	**Regulatory**	**Other Considerations**
Create a reporting scheme for providers based on geographic home location and their proximity to the hospitals	Utilize MHOAC for assistance	Consider writing plan if none exists

Encourage local hospitals to have standing MOU's that accept neighboring hospitals' credentialing process in surge situations for a reasonable time period. Identify local nurse agencies and locum tenens registries to call upon if additional need.	Utilize MHOAC for assistance	
Develop quick credentialing process for hospital staff at designated check-in center	Establish MOU with neighboring agencies or waiver of sponsorship requirement in Prehospital Care Policy	Request assistance from MHOAC for strike team support
Create surge ratio expectations	CDPH Declaration of Emergency	
Encourage staff to be prepared at home and develop/implement disaster training for staff and family		Just-in-Time training, family of staff center, disaster training, first aid training for staff's family
Enact plan to send prehospital staff to hospitals for support after initial/primary incident is resolved or if there is a surplus of EMS staff response. Prepare to send crews of 3-5 per ambulance depending on EMS personnel response.		Send staff to site immediately for care assistance despite inadequate ambulance levels.

Staff: Surge Strategies for Hospitals		
Indicator/Trigger: Large influx of patients depreciating supplies and equipment, limited equipment for patient volumes, staff needs to stay on site past regular shift to sustain care		
Strategy	**Regulatory**	**Other Considerations**
Ensure emergency supply for staff, patient and visitors for 96 hours		Food, water, pharmaceuticals, generator fuel, waste management products, personal supplies, and generator testing/maintenance

Contract traditional and non-traditional vendors for resupply		Agreements with non-traditional vendors (Costco, Home Depot, grocery stores, sporting stores, local animal hospitals)
Contact DOC for medical resources		
Map out critical equipment/supplies to pre-designate staff meeting points and personnel dedication for ED intake and management per severity patient to decided Maximal Number of Patients per hospital.		Rad techs should congregate where all portable X-ray machines are, etc.
Disaster carts should be stocked to care for 20 patients each and utilized in triage sites		

System Operations: Surge Strategies for Hospitals		
Indicator/Trigger: Staff staying past normal shift hours, large influx of patients arriving at hospital by different modes of transport, more patients than capacity causing bottleneck to patient flow, communications impacted due to surge		
Strategy	**Regulatory**	**Other Considerations**
Utilize California Unified Patient Tracking System (CUPTS) (See Below). Consider assigning triage color to patient chart and have Transporter follow pre-established pathways for patient identified by direction arrows on hallway flooring and walls according to that assigned color. The arrows should match the color of the chart of the patient to simplify patient transport from triage to hospital treatment sites. Charts and armbands should have pre-determined registration number, and total number of charts and armbands will have to be determined according to total number of patients expected. • Initial private transports of mild or walking wounded should not be brought into ED		

and should be treated at triage site by prehospital or hospital staff or transported to triage hospital.		
Have registration take digital photos of incoming comatose patients (including by private vehicle transports) during registration and link photo to tag number to assist tracking patients for Family Reunification Center. Pictures should be linked to health information system of hospital to help those at Family Reunification Center identify patients or via ReddiNet Family Identification Tool.		
Encourage hospitals to have a minimum of two working channels with one dedicated to medical and one to security that are tested and drilled regularly		
Triage officer at initial triage site should be surgeon physician or advanced practitioner familiar with traumatic outcomes points and personnel dedication for ED intake and management per severity patient to decided Maximal Number of Patients per hospital.		Rad techs should congregate where all portable X-ray machines are, etc.
Develop plans to provider dependent care for staff		Identify space and protocols to provide dependent care
Create an Ethical Committee comprised of a medical team of Lead MD, ED RN, and house supervisor to determine hospital resource allocation to patients and treat/transport		

APPENDICES

Appendix 1: Messaging and Communications

Appendix 2: Guidance for Community Receptions Centers and Shelters-66 pages

Appendix 3: Go Kit Contents

Appendix 4: Medical-Health Branch Response Organizational Chart

Appendix 5: References and Helpful Information

Appendix 6: Acronyms

Appendix 7: Radiation Plan Maintenance, Education, and Training

1. MESSAGING AND COMMUNICATIONS

Examples of critical public messages and communications expectations are included is this excellent 69-page guide: https://www.fema.gov/sites/default/files/documents/fema_improvised-nuclear-device_communicating-aftermath_june-2013.pdf

Example of a Lifesaving Message that Could be Broadcast Immediately After an Improvised Nuclear Detonation, from REMM: https://remm.hhs.gov/message.htm

- A nuclear explosion has occurred at [location] in [city].
- Potentially deadly radiation will be in the air right after a nuclear explosion.
- If you are in the [defined location] area, get inside a building immediately.
  - Cover your mouth and nose with a protective layer-like a cloth or a towel to reduce the amount of potentially harmful particles you breathe.
- You can survive a nuclear explosion by taking the following steps:
  - **Get inside:**
    - If you are anywhere in the [location] area, get inside a building as quickly as possible.
    - If a multistory building or a basement can be safely reached within a few minutes of the explosion, go there immediately.
    - The safest buildings have brick or concrete walls.
    - Close all windows and doors and go to a basement or to the center of the building, away from windows and outer walls.
    - If you are in a car, find a building immediately and get inside. Cars will not protect you from radiation.
  - **Stay inside:**
    - Inside a building or in an underground area is the best place for you and your loved ones after a nuclear explosion.
    - Plan to stay inside for at least 12 to 24 hours or until you are instructed to leave by authorities or emergency responders. The most dangerous radiation levels will decrease significantly during this time.
    - Do not leave your building to get children and adults. Children and adults in schools, hospitals, nursing homes, and daycare facilities will be cared for at the facility and will not be released to go outside.

> > > Going outside to get your loved ones will expose you and them to extremely dangerous radiation.

- o **Stay tuned:**
  - The Emergency Alert System will broadcast important safety messages over cell phone, radio, television, and the internet.
  - Instructions will be updated as more information is available.
- These steps to protect you and your family are the same for your pets and animals.
- Again, get inside, stay inside, and stay tuned for more information. Following these steps can save your life.

Note:

- These instructions are adapted from Coleman et al. [Medical Planning and Response for a Nuclear Detonation: a Practical Guide](#), Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science 2012; 10(4):346-371. See Figure 10.
- This example is only a potential template.
- Senior managers of an incident will customize the exact message as appropriate for the incident specifics and venue.
- See [CDC public message on this topic](#).

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Additional public messaging examples copied from: https://www.fema.gov/sites/default/files/2020-07/fema_radiological-dispersal-device_response-planning-guidance_2017.pdf

2. GUIDANCE FOR COMMUNITY RECEPTIONS CENTERS AND SHELTERS

Guidance for Community Reception Centers and Shelters can be found in the 66-page CDC Guide: "A Guide to Operating Public Shelters in a Radiation Emergency" at:

https://www.cdc.gov/nceh/radiation/emergencies/pdf/operating-public-shelters.pdf

3. GO KIT CONTENTS

(Add Go Kit Contents here)

4. MED-HEALTH BRANCH ORGANIZATIONAL CHART

(Add chart here)

5. REFERENCES AND HELPFUL INFORMATION

- Radiation Response Briefing Manual: A Guide for Key Leaders and Public Health Decision Makers (July 2020).
  https://www.cdc.gov/nceh/radiation/emergencies/pdf/20_316861-A_RadiationResponse-508.pdf

- Radiological Dispersal Device (RDD) Response Guidance.
  https://www.fema.gov/sites/default/files/2020-07/fema_radiological-dispersal-device_response-planning-guidance_2017.pdf

- Planning for the first 72-hours of nuclear detonation.
  https://www.fema.gov/sites/default/files/documents/fema_cbrn-72-hournuclear-detonation-response-guidance.pdf

- Planning guidance for Response to a Nuclear detonation.
  https://www.fema.gov/sites/default/files/documents/fema_nuc-detonation-planning-guide.pdf

- Guide for Handling Radioactive Contaminated Decedents.
  https://www.cdc.gov/nceh/radiation/emergencies/pdf/radiation-decedent-guidelines.pdf

- Population Monitoring in Radiation Emergencies.
  https://www.cdc.gov/nceh/radiation/emergencies/pdf/population-monitoring-guide.pdf

- POD to CRC Planning Tool.
  https://www.cdc.gov/nceh/radiation/emergencies/POD_to_CRC_Planning_Tool.docx
- A Guide to Operating Public Shelters in a Radiation Emergency.
  https://www.emergency.cdc.gov/radiation/pdf/operating-public-shelters.pdf

- Training: Use of Environmental Monitoring Data to Support Public Health decision Making in Radiation Emergencies.
  https://www.cdc.gov/nceh/radiation/emergencies/infosharing.htm

- Radiological/Nuclear Law Enforcement and Public Health Investigation Handbook – September 2011.
  https://www.cdc.gov/nceh/radiation/emergencies/pdf/Radiological-Nuclear-handbook-09-01-11.pdf

- Acute Radiation Syndrome: A Fact Sheet for Clinicians.
  https://www.cdc.gov/nceh/radiation/emergencies/arsphysicianfactsheet.htm

- Exposure and Symptom Triage (EAST) sorting tool.
  https://remm.hhs.gov/EAST-tool-notes.htm

- Prehospital Radiological Triage.
  https://orise.orau.gov/resources/reacts/documents/prehospital-radiological-triage-poster.pdf

- Guidelines for Identifying Radiation Injury and Considering Transfer to a Specialized Facility.
  https://ritn.net/workarea/downloadasset.aspx?id=17179869248

- RITN Triage – multiple various references.
  https://ritn.net/triage/#:~:text=RITN%20Radiation%20Injury%20Referral%20Guidelines%20%28PDF%29%20The%20purpose,have%20received%20a%20clinically%20significant%20dose%20of%20radiation

- Hospital Activities During Radiation Emergencies.
  https://remm.hhs.gov/hospitalprep.htm#:~:text=If%20Radioactive%20Contamination%20Is%20Discovered%20After%20Patient%20Has,control%20lines%2C%20and%20prevent%20the%20spread%20of%20contamination

- Guidelines for Hospital Response to Mass Casualties from a Radiological Incident.
  https://emergency.cdc.gov/radiation/pdf/MassCasualtiesGuidelines.pdf

- REMM Procedures for Radiation Decontamination.
  https://remm.hhs.gov/ext_contamination.htm

- Radiation and Pregnancy: A Fact Sheet for Clinicians.
  https://www.cdc.gov/nceh/radiation/emergencies/prenatalphysician.htm

- Infant Feeding and Pregnancy.
  https://www.cdc.gov/nceh/radiation/emergencies/prenatal.htm?CDC_AA_refVal=https%3A%2F%2Femergency.cdc.gov%2Fradiation%2Fprenatal.asp

- Pediatric Consideration Before, During, and After Radiological or Nuclear Emergencies:
  https://publications.aap.org/pediatrics/article/142/6/e20183000/37501/Pediatric-Considerations-Before-During-and-After?autologincheck=redirected

- Disaster Mental Health: Assisting People Exposed to Radiation.
  https://portal.ct.gov/-/media/DMHAS/Publications/DMHRadiationParticipantManualpdf.pdf?la=en

- Decontamination – Pets.
  https://www.cdc.gov/nceh/radiation/emergencies/selfdecon_pets.htm?CDC_AA_refVal=https%3A%2F%2Femergency.cdc.gov%2Fradiation%2Fselfdecon_pets.asp

- Hospital Decontamination System and Decontamination Methods for Assistance Dogs that Accompany Incoming Disaster Victims.
  https://www.urmc.rochester.edu/MediaLibraries/URMCMedia/flrtc/documents/Hospital-Decon-for-Service-K9s-Gordon.pdf

- National Veterinary Response Teams.
  https://aspr.hhs.gov/NDMS/Pages/nvrt.aspx

  Radiological Terrorism Planning and Response Toolkits.
  https://www.cdc.gov/nceh/radiation/emergencies/toolkits.htm

- Nuclear/Radiological Incident Annex to the Response and Recovery Federal Interagency Operational Plans (FEMA website).
  https://www.fema.gov/sites/default/files/documents/fema_incident-annex_nuclear-radiological.pdf

- Electromagnetic Pulse Following a Nuclear Detonation. https://remm.hhs.gov/EMP.htm

- Ambulance Guidelines for Response to Radiological/Nuclear Emergencies.
  https://file.lacounty.gov/SDSInter/dhs/216885_AmbulanceGuidelinesforResponsetoRadiationEventsRev7-20131030.pdf

6. ACRONYMS

AMR	American Medical Response
AST	Ambulance Strike Team
BH	Behavioral Health Dept.
CRC	Community Reception Centers
DOC	Department Operations Center
ED	Emergency Department
EH	Environmental Health Dept.
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EP	Emergency Preparedness Program
Fire	Fire Agencies
HCC	Healthcare Coalition
HSA	Health Services Agency
HSD	Human Services Department
IAP	Incident Action Plan
ICP	Incident Command Post
ID	Identification
JAS	Job Action Sheet
JIC	Joint Information Center
LE	Law Enforcement Agencies
MCI	Multiple Casualty Incident
MHOAC	Medical Health Operational Area Coordinator
PH	Public Health Department
PIO	Public Information Officer
PPE	Personal Protective Equipment
RDMHS	Regional Disaster Medical Health Specialist

7. RADIATION PLAN MAINTENANCE, EDUCATION, AND TRAINING

This plan should be reviewed annually and updated as needed. Responsibility for review and updating belongs to the SCC Emergency Preparedness Program.

The following education and training are recommended:

a. Provide overview of radiation and the Radiation Emergencies Annex every 3-5 years to the HCC.

b. Practice tabletop exercise with all stakeholders regularly

c. Provide interagency exercises that utilize all stakeholders every 3-5 years.

d. Provide radiation triage refresher training every 3-5 years to MRC members, hospital staff, school health center and volunteers, and prehospital providers

e. Provide MHOAC and EOC education training that reviews the Plan and their immediate and long-term roles during a radiation emergency. Provide tabletop exercises in training to demonstrate flow and collaboration, and use of job action sheets.

f. Incorporate MHOAC utilization training in annual prehospital training that identifies what threshold is appropriate for enacting MHOAC and how MHOAC integrates within the IC system.