Guidance for Traveler Screening

at Ports of Entry Following an International Radiological Incident

National Alliance *for* Radiation Readiness

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Preface

On April 17, 2013, the National Alliance for Radiation Readiness (**NARR**) and the Centers for Disease Control and Prevention (CDC) hosted the *Tabletop Exercise: Passenger Screening During a Radiological Event* in Seattle. The purpose of the event was to allow federal, state, and local partners the opportunity to identify key activities associated with traveler screening at an airport following a radiological incident in another country and to validate and identify opportunities for improving the traveler screening protocols developed following the 2011 Fukushima Daiichi incident in Japan. Following the April tabletop exercise, CDC and NARR teamed up to convene *Traveler Screening After a Radiological Emergency: Program Review*. The program review gave exercise participants and members of NARR partner organizations a forum to discuss lessons learned during the tabletop exercise and define future strategies and approaches for traveler screening after a radiological emergency.

The program review opened with a four-hour session of presentations with topics such as "CDC's Response to Fukushima," "The Role of CDC Quarantine Stations in Traveler Screening," and "The Role of Epidemiology in Traveler Screening." The rest of the event was dedicated to workgroup discussions.

The following four workgroups were strategically established prior to the exercise and continued collaboration in their respective roles as the document developed:

- Bioassay
- Communications
- Emergency Management
- Screening and Epidemiology

Each workgroup was comprised of approximately eight individuals representing a variety of relevant expertise. Co-leads were assigned to each workgroup to facilitate the discussion and to act as liaisons post-event. Throughout the years following, the workgroups developed the information presented in this guidance.

Acknowledgements

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The NARR is a coalition of public health, radiation control programs, healthcare, emergency management, and non-governmental organizations. Federal agencies provide representatives that participate as liaison members. The NARR serves as the collective "voice of health" in radiological preparedness by upholding its mission to enhance public health and healthcare systems through a coalition of organizations committed to strengthening the nation's ability to prepare for, respond to, and recover from radiological emergencies at the local, state, and national levels.

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Introduction

An accident, natural disaster, or act of terrorism that releases radioactive materials into the environment may expose individuals to radiation and contaminate them and their surroundings. An international radiation release may expose or contaminate travelers who are returning to the United States. In order to prevent additional contamination and provide medical treatment and follow-up to these affected travelers as necessary, state, local, tribal, and territorial public health agencies would screen these individuals for radiation contamination and exposure.

This guide is an introduction to screening travelers arriving at U.S. ports of entry (POE) who may be contaminated with or exposed to radioactive material following an international radiological incident. The information contained in this guide is intended to be used by state, local, and tribal public health professionals to supplement their existing jurisdictional emergency operations plans and procedures during traveler screening activities. The guide is divided into sections that lead the planner or responder through the traveler screening process, beginning with consent and registration and ending with developing an optional long-term registry. Specific key communication messages are presented throughout the document in each response section.

This document aims to provide state, local, and tribal planners with guidance on how to:

- Screen, decontaminate, or provide medical follow-up and long-term health follow-up for travelers, staff at U.S. international POE, and others with contamination or exposure.
- Communicate information and risk effectively with travelers, who may need urgent medical referrals, decontamination, or reassurance that they are not contaminated or exposed.
- Collect and use exposure and epidemiologic data to provide situational awareness and determine the radiological incident's future public health impacts.

As an informational resource, planners may use this guide as a tool to develop and refine jurisdictional plans. The guide is designed to support scalable and flexible planning. This includes exploring and considering all locally-available resources along with traditional and non-traditional responder governmental and non-governmental agencies for collaboration and partnership.

Planning Assumptions

The authors developed this guidance using the following assumptions:

An international radiological incident results in potentially exposed and/or contaminated travelers arriving at U.S. international POE.

The radiological incident has occurred from a known situation, not a covert attack.

Arriving travelers may or may not have been screened for radiological exposure and/or contamination prior to departing the country where the incident occurred.

The traveler screening response is scalable to the size of the incident. There may be a need to screen a large number of people, even though only a small percentage may ultimately be found to be exposed or contaminated. Therefore, screening levels can/should be changed to meet the needs of the incident.

The traveler screening occurs once travelers have been cleared by customs and immigration.

If decontamination is deemed necessary, external decontamination will be performed at the POE.

Local and state government will be responsible for conducting traveler screening and management.

CDC quarantine stations located at some international airports will assist in the traveler screening and management process.

Federal aid and resources may not be available immediately.

Key Radiation Terms and Concepts

The authors use several radiation-specific terms and concepts throughout this guidance, which are defined below. A more detailed understanding of the following terms and concepts is imperative to understanding and using this guidance. See CDC's online **Radiation Dictionary** for a more detailed glossary. Concepts can be further explored by visiting the CDC's online **Radiation Basics Made Simple**, a training module that introduces participants to the fundamentals of radiation and radioactivity.

Acute Radiation Syndrome (ARS)

A serious illness caused by being exposed to a dose greater than 75 rads (0.75 Gy) of penetrating radiation to the body in a short time (usually minutes). The earliest symptoms are nausea, fatigue, vomiting, and diarrhea. Hair loss, bleeding, swelling of the mouth and throat, and general loss of energy may follow. If the exposure has been approximately 1,000 rads (10 Gy) or more, death may occur within 2-4 weeks.

Alpha Particles

One of the primary forms of ionizing radiation, the others being beta particles, gamma rays, x-rays, and neutrons. Alpha particles can be stopped by a thin layer of light material, such as a sheet of paper, and cannot penetrate the outer, dead layer of skin. Therefore, they do not pose a hazard as long as they are outside the body. Protection from this radiation is directed at preventing, or at least minimizing, inhalation or ingestion of the radioactive material. Alpha particles may be measured on the body or other surfaces with portable survey instruments.

Background Radiation

The radiation to which the population is continually exposed to comes primarily from natural sources and it is called background radiation. It consists of radiation from radionuclides naturally present in the environment, such as those found in soil, rocks, air, human bodies, and food, as well as cosmic radiation originating in outer space. A small portion of this background radiation in our environment is from man-made sources such as those left from atmospheric testing of nuclear weapons in the 1950's and 1960's. All screening measurements in this guidance are made in reference to this natural background radiation.

Beta Particles

One of the primary forms of ionizing radiation, the others being alpha particles, gamma rays, x-rays, and neutrons. Although they can be stopped by aluminum as thin as one-third of an inch, beta particles can penetrate the dead skin layer, potentially causing burns. They can pose a serious direct or external radiation threat and can be lethal depending on the amount received. They also pose a serious internal radiation threat if beta-emitting atoms are ingested or inhaled. Protection from this radiation is directed at washing the skin with mild soap and water and preventing, or at least minimizing, inhalation or ingestion of the radioactive material. Beta particles may be measured on the body or other surfaces with portable survey instruments.

Bioassay

An assessment of radioactive materials that may be present inside a person's body through laboratory analysis of the radioactivity in a person's excreta (primarily urine).

Decontamination

The reduction or removal of radioactive materials from people, materials, surfaces, food, or water. For people, external decontamination is done by removing the clothing and washing the hair and skin. *Radioactive contamination is not immediately life-threatening* and should not take precedence over life-saving care. Therefore, any traveler presenting with urgent medical emergencies (e.g., heart attack) should bypass all radiation screening and decontamination procedures and be transported to the nearest medical facility.

External vs. Internal Radiation Contamination

External contamination occurs when radioactive material, in the form of dust, powder, or liquid, comes into contact with a person's skin, hair, or clothing. (In other words, the contact is external to a person's body.) People who are externally contaminated can become internally contaminated if radioactive material gets into their bodies. This can occur when people swallow or breathe in radioactive materials, or when radioactive materials enter the body through an open wound or are absorbed through the skin. Some types of radioactive materials stay in the body and are deposited in different body organs, and some are eliminated from the body in blood, sweat, urine, and feces.

Gamma Rays

Gamma rays are one of the primary forms of ionizing radiation, the others being alpha particles, beta particles, x-rays, and neutrons. Gamma rays are highly penetrating (up to tens of yards in the air) and pose an external radiation exposure hazard. Gamma rays also penetrate tissue farther than do beta or alpha particles. Gamma rays are relatively easy to detect with commonly available radiation detection instruments.

Radiation Contamination vs. Exposure

Radioactive materials give off forms of energy that travel. This energy is called radiation. When a person is exposed to radiation, the energy penetrates the body. For example, when a person has an x-ray, they are exposed to radiation. Radioactive contamination occurs when radioactive material is deposited on or in an object or a person. Radioactive materials released into the environment can contaminate air, water, surfaces, soil, plants, buildings, people, or animals.

Planning Considerations

There are several planning steps that jurisdictions can take now, prior to any radiological event, to make implementing this guidance and conducting traveler screening at a POE much more effective, such as identifying:

- A lead agency.
- Appropriate communication channels.
- Jurisdictional radiological survey equipment and other assets.
- Staff and volunteers trained in radiological response.

These and other planning considerations are discussed in more detail below.

Interagency Communication and Chain of Command

Prior to implementing this guidance, it will be important to establish which jurisdictional agency will be the lead agency in an international radiation event response. In addition, it will be important to identify all potential jurisdictional response partners. It is essential to pre-identify the chain of communication and communication channels that will be used to share information both vertically and horizontally among these response partners to coordinate the response efforts. Consider identifying points of contact at each responding federal, state, local, and tribal agency to promote effective information flow during a response. Also consider maintaining updated contact lists for media outlets, POE, poison control centers, and other potential response partners (see **Appendix A**).

Equipment and Assets

It will be important to have an accurate understanding of the current jurisdictional radiological survey assets prior to any traveler screening response. An inventory of radiological survey assets will both allow planners to determine their current response capacity and determine the type of training that staff and volunteers will need prior to a response.

In addition to inventorying their current assets, jurisdictions should also consider creating a cache of decontamination materials (such as disposable clothing, bags, soap, towels, and wristbands) that could quickly be deployed to a POE. This effort could be coordinated with other chemical, biological, radiological, and nuclear (CBRN) planning to minimize duplication.

Personnel Resources

Screening, population monitoring, and decontamination efforts are accomplished by local, state, tribal, or territorial jurisdictions in coordination with federal partners. Radiation control staff at all levels are often few in number. Radiation protection professionals working outside of the government can be encouraged to volunteer and register in any one of the **Citizen Corps** programs in their community. **Medical Reserve Corps** offers a mechanism to recruit and train radiation professionals already in the community who can assist public health and emergency management agencies in population monitoring operations. Each state has an Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) program that may provide the infrastructure to recruit and register radiological health professionals. The ESAR-VHP program is administered under the Office of the Assistant Secretary for Preparedness and Response (**ASPR**) within the Department of Health and Human Services' Office of Preparedness and Emergency Operations. Note that federal resources to assist with population monitoring and decontamination are limited and will be slow to arrive.

Training and Exercises

Training public health and healthcare professionals and emergency responders in radiological response is essential to building any jurisdiction's traveler screening capability. Training should focus on increasing understanding of radiological contamination, exposure, and their possible health effects. Training should also provide responders with a detailed understanding of their roles and responsibilities in a traveler screening response, including how to:

Properly use radiation detection equipment.

Correctly demonstrate decontamination techniques.

Conduct proper clinical sample collection.

Follow laboratory shipping procedures.

Appropriately collect data.

After developing a jurisdictional traveler screening plan and responder training, state and local planners should use drills and exercises to test their plans and their staff's training. It will be imperative to involve all response partners, including POE staff, to assess the true functionality of any plan.

Importance of Risk Communication

Most people are unfamiliar with radiation and its effects which makes effective communication a critical component to response. Any incident involving radiation will result in public and media interest and involvement that will cross-cut the entire response and recovery effort.

Stakeholders can address respective audience needs by effectively explaining the screening process and clearly identifying those who may be affected, as well as, providing guidance for next steps and resources. A specific population to address will be those in and around the POE that may have concerns about their own safety (e.g., flight crew and airport personnel). Communicating cross-contamination prevention measures and safety protocols will be key for these groups.

Crisis and emergency risk communication (CERC) is the capability to provide accurate, credible, actionable, and timely information to the public in culturally- and linguistically-appropriate ways. It involves developing, coordinating, and disseminating information to the public, responding to inquiries and reactions from the public, and evaluating the effectiveness of these efforts. Some considerations for effective CERC are as follows:

- Public involvement and cooperation are required to facilitate the critical response activities during a radiation event. When communications go well, the right message is delivered by the right person at the right time, resulting in behavioral change and, ultimately, better health outcomes.
- Special populations, such as pregnant women, nursing mothers, those who do not speak English, and people using service animals or assistive technologies may need targeted communications materials to address their specific concerns.

Stakeholders

All-hazards emergency incidents, including international radiation incidents, involve various stakeholders, including partner response agencies or organizations, the public, and the media. Targeted information and communication is essential for each of these groups during emergencies. Having a solid understanding of each stakeholder group's interest, role, and communication needs can facilitate the best possible response outcomes if acted on appropriately by the response agencies involved. A list of possible stakeholders and their roles is included in **Appendix A**.

Communication Channels

Any event requiring traveler screening will result in extensive media interest. The media can (and should) be a partner and an asset, particularly during events in which emergency authorities may need the public to take certain actions to protect their own health and safety.

When dealing with the media during a CERC situation, stakeholders should consider the following:

- Existing jurisdictional CERC plans should ideally address the role of the media in a disaster or public health emergency, specifically how the agency works with the media to get critical information out to the public quickly. Speaking through the media provides an opportunity to build and maintain the public's trust. How agencies interact with the media can promote—or undermine—that process.
- Striving to anticipate and meet the needs of the media will help get key information out to the public quickly and protect health and safety.
- The media has a job to do. Public information officers should be prepared to provide the media with information and answers to questions. Public information officers from multiple agencies should also work together to ensure that messages and information are consistent. To this end, "be first, be right, be credible."

Types of Communication Channels

Customary communication channels such as TV, print, radio, and internet news outlets are still the primary method of getting information quickly and effectively out to the majority of the public. Coordinating public messaging among response partner agencies is essential, as unified messages will help prevent confusion and misinformation caused by mixed messages. This coordination can best be facilitated through a joint information center (JIC).

Web and social media are also effective tools for communicating with the public. Websites are easily updated, but may be best used to provide general radiation information in the form of fact sheets, FAQs, hotline information, and links to other trusted sources of information.[i] Many of these materials can (and should, if possible) be developed and vetted in advance of an emergency.

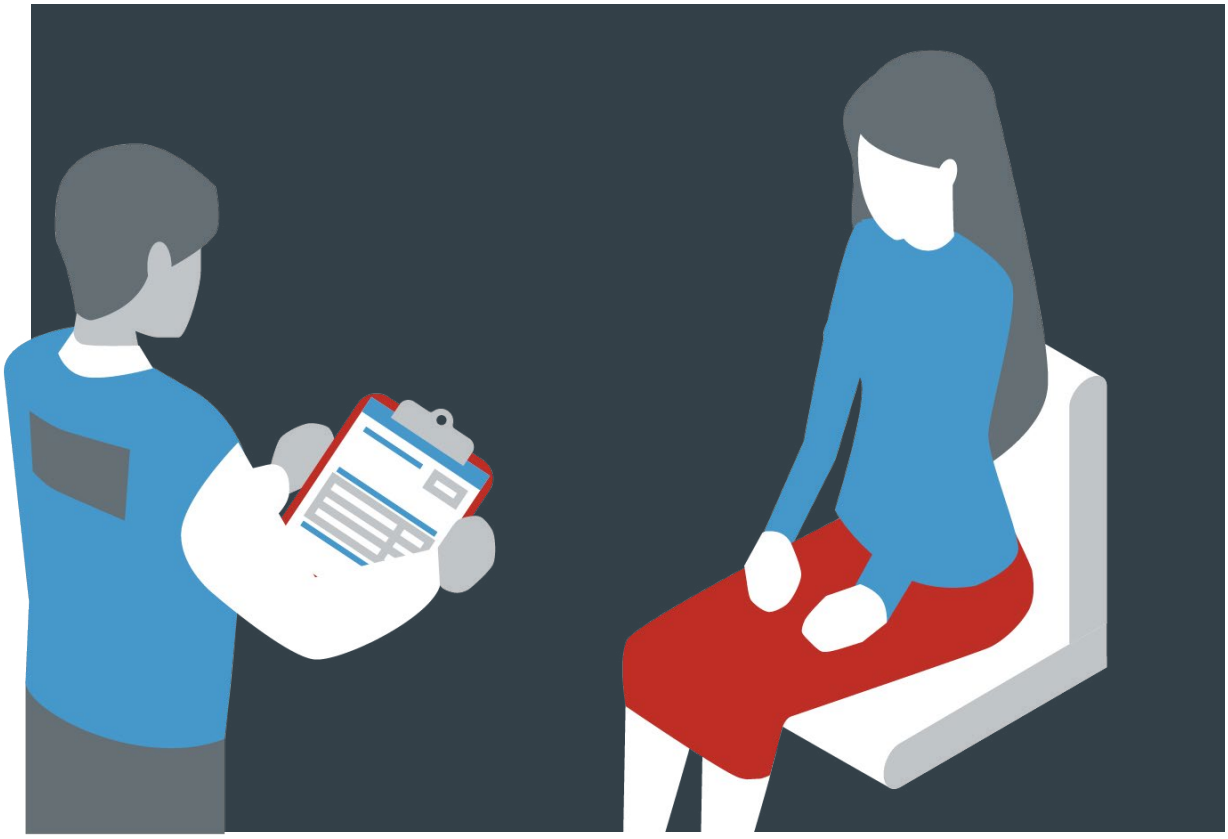
[i] Website managers should consider utilizing **CDC Content Syndication**. Updated content will immediately appear on the user's webpage directly from the source. Content Syndication requires minimal maintenance, supplements local information with relevant CDC details, provides access to CDC information without browsing multiple sites.

In fact, a team can pre-develop an entire web page—or dark site—so that it is ready to go when needed. Social media use is becoming more prevalent among local and state agencies, and can be a useful tool during an emergency, particularly to prevent and counteract misinformation and rumor monitoring. Proper planning and dedicated staffing will be imperative for teams planning to use social media to disseminate information.

Strategies considering communication to diverse, or "vulnerable," populations should be made in advance of an emergency. Organizations and community champions that serve these groups may distill and disseminate critical information to groups more susceptible to adverse health outcomes during emergencies or difficult to reach through traditional channels. These partnerships should be identified and established as part of a traveler(s) screening plan.

Key Messages

Key messages that are specific to an international radiation incident resulting in traveler screening at U.S. international ports of entry are identified throughout this document. These key messages may be used in conjunction with existing jurisdictional CERC plans to develop messages and effectively communicate with various stakeholders. The specific key messages should be adapted and disseminated through accessible channels. The most effective channels may vary depending on the POE's layout, logistics, and resources. Examples of dissemination outlets for these key messages include electronic message boards or screens in processing areas, fact sheets, posters, and social media channels accessible through passenger smartphone or other mobile devices. Staff assisting with traveler screening should also be aware of these key messages in order to answer questions from travelers.



Screening Overview

The screening processes detailed in this guidance are intended to identify travelers who have been contaminated with radioactive material or exposed to radiation and prevent them from further spreading the contamination or identifying any medical needs or follow-up required due to their contamination or exposure.

Initial Screening

The screening process begins after the traveler has passed through the Federal Inspection Services area (FIS) and been cleared by U.S. Customs and Border Protection to enter the country. Travelers arriving from the country where the incident occurred will be directed to the screening location. If the traveler provides consent, he or she will be screened with radiation detection equipment to determine what level of contamination, if any, is present, according to the following guidelines:

- Travelers with any detectable alpha radiation or greater than two times the general background level of beta or gamma radiation present on his or her clothing or body will be given instructions on how to decontaminate themselves using the nearest washing station or restroom. Further instructions are provided below under "Post-Decontamination (Second) Screening."
- Travelers with no contamination or less than two times the general background level of radiation present on his or her clothing or body will be provided with educational information and sent home, as no further decontamination procedures or medical follow-up are necessary.
- Travelers with no indication of radiation exposure (i.e. no signs or symptoms suggestive or ARS) will be provided with educational information and sent home, as no further decontamination procedures or medical follow-up are necessary.

A critical component of this step is that all travelers arriving from the country where the incident occurred will be asked questions to assess if they were exposed to radiation and to capture demographics and other information using the Epidemiological Data Collection form (see **Appendix C**).

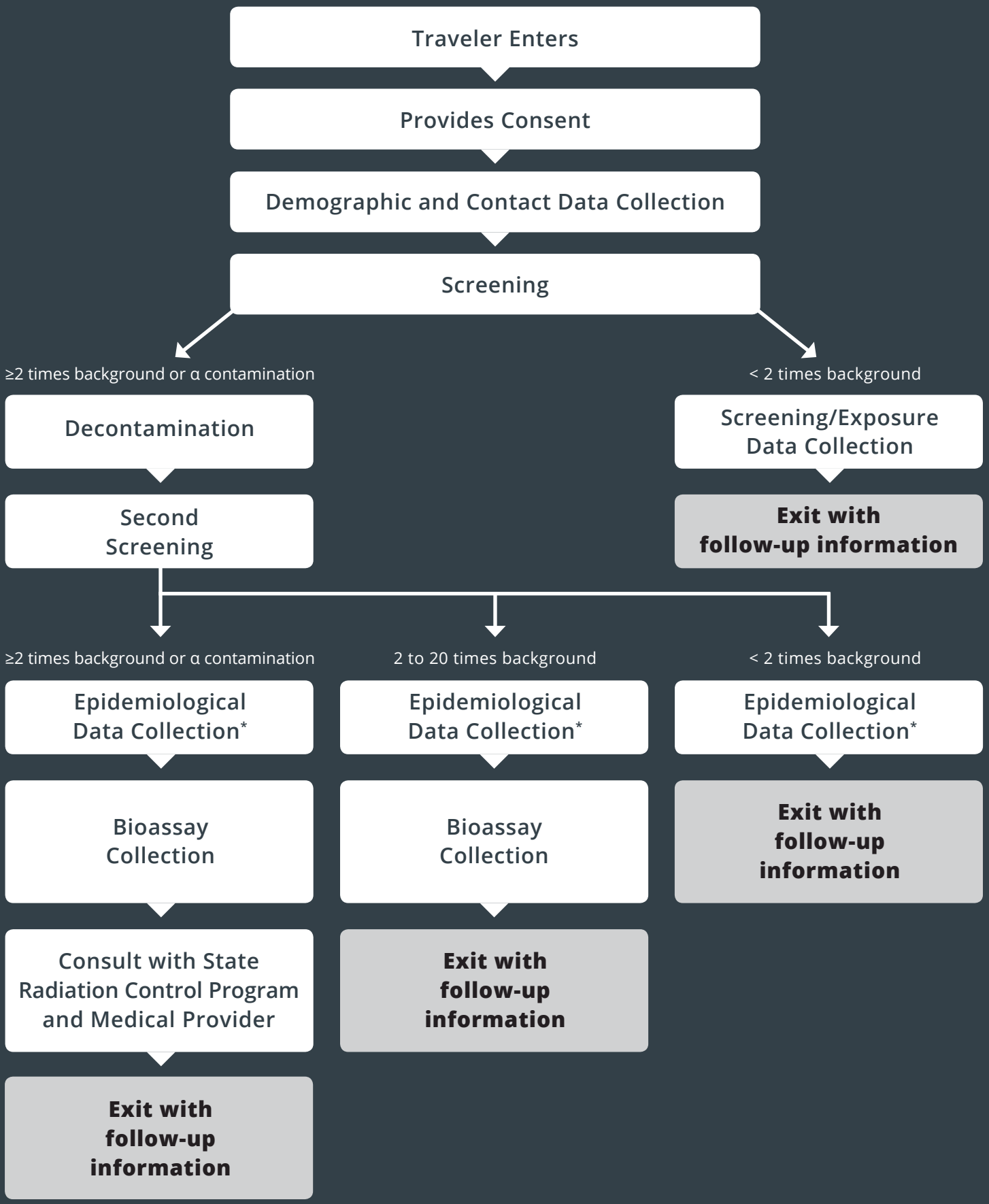
Post-Decontamination (Second) Screening

If decontamination was necessary, travelers will be screened again and further actions will depend on the results of the new radiation screening measurement, as follows:

- Travelers with greater than 20 times background radiation or any detectable alpha radiation should be referred for urine sample collection for bioassay, epidemiological information collection and consult with state radiation control program staff and medical professionals.
- Travelers with between two and 20 times background radiation contamination may be asked to provide a urine sample.
- Travelers with less than two times background radiation will be provided with educational information and will be sent home or to their destination, as no further decontamination procedures or medical follow-up is necessary.

The screened travelers may be asked to provide a urine sample for bioassay or to consult with state radiation control program staff and medical professionals. In addition, the travelers will be asked a series of questions to assess if they were exposed to radiation and to capture demographics and other information on the Epidemiological Data Collection form (see **Appendix C**). If there is no indication of radiation exposure, they will be provided with follow-up information and sent home. If there is indication of radiation exposure the traveler will be asked to consult with state radiation control program staff and medical professionals. *Figure 1* depicts the screening process detailed in this document.

FIGURE 1: Passenger Screening Protocol Flowchart



* Epidemiological Data Collection Form will capture exposure history.

Consent and Registration

Prior to any screening, decontamination, or bioassay sample collection, the state lead agency should obtain traveler consent and, for those younger than 18 years, parental or guardian permission (see **Appendix B**). This form explains why the screening is being done, the process, and what results they can expect from participating. The interviewer will review the consent form with the traveler or parent and then ask for verbal[ii] consent to proceed. In addition to parental consent, travelers 7-17 years of age should also be asked to verbally assent to the process. The interviewer will contact the individual identified as the parent, legal guardian, or emergency contact in the travel documents of any traveling unaccompanied minors or individuals not competent to consent to obtain verbal permission for screening and registration.

After acquiring verbal consent, the interviewer will complete the contact and demographics section of the Data Collection form (**Appendix C**) to obtain personal, demographic, and contact information before the traveler proceeds to the initial screening process. Demographic, exposure, and screening information will be collected from each participating traveler for tracking purposes and for epidemiologic analysis. This data collection form can be customized and administered on paper or electronically.

Being able to register **all** consenting travelers prior to the screening is ideal. However, in the event that there are large numbers of people to be screened or insufficient numbers of interviewers are available, the registration process may be altered to limit data collection to the following sections: verbal consent, contact and demographics information, incident information, and radiation assessment information. Exposed or contaminated travelers should complete the Epidemiologic Assessment Data Collection form in its entirety regardless of crowd size (see **Appendix C**).

If a urine specimen is needed, the traveler will be directed to a collection area. The person collecting the urine specimen will complete the laboratory assessment section of the data collection form, which collects information critical to tracking and interpreting bioassay results.

Registration and Data Collection Key Points for Stakeholders

- Prior to screening any traveler, obtain traveler verbal or written consent and assent from minors aged 7-17 years.
- The sample Traveler Screening Tracking and Epidemiologic Assessment Data Collection form is in **Appendix C**.
- All traveler information (including demographic information, travel history, exposure and clinical information, screening results, and laboratory results) can be recorded on the Traveler Screening Tracking and Epidemiologic Assessment Data Collection form.

[ii] During the screening process, timeliness is a priority. In order to quickly detect those contaminated, only verbal consent is necessary.

Initial Screening

The primary purpose of traveler screening is to detect and remove external contamination (decontamination).

With minimal straightforward instruction, most travelers can perform external self-decontamination, which is designed to remove fallout particles and other radioactive debris from clothes and external surfaces of the body. Removing outer clothing can potentially eliminate up to 90 to 95 percent of external contamination.

Planning should include not only the travelers that have been contaminated, but also consider concerned travelers who may not have been contaminated. Other travelers and individuals may request screening to confirm that they have not been contaminated with radioactive materials.

Screening Key Messages to Share with Travelers

For the initial screening:

- Radiation detection equipment will be used to check you for radioactive contamination that may be on your body or clothes.
- If there are elevated levels of radioactive contamination on you, we will provide washing facilities or other self-cleaning supplies and additional instructions on how to remove the contamination.

If radiation is detected but is less than twice background after decontamination:

- By washing, you are able to remove radioactive contamination from your body and/or clothing, and you do not need to do anything further.
- If you have questions, or would like additional information on radiation, please contact [INSERT CONTACT INFORMATION].

If radiation is detected at greater or equal to twice background after decontamination:

- The washing/cleaning removed some, but not all of the radioactive contamination on you. This could mean that you might have contamination inside your body.
- We can do a test on your urine (called a bioassay) to see if there is contamination in your body.
- You may need to follow up with state radiation control program staff and medical professionals.

Initial Screening for External Contamination

Following notification of an international incident involving a radiological release, the jurisdiction will determine the most appropriate location for initial radiation screening. Initial screening will be conducted by jurisdictional personnel utilizing jurisdictional resources (e.g., portal monitors and/or handheld probes). The number of travelers requiring screening and the jurisdictional resources and personnel available will determine whether the initial screening should move to a community reception center (CRC) model, which is designed to handle larger numbers of individuals.

Jurisdictions should develop a screening plan to include CRC plans, procedures, and protocols. Jurisdictions can customize their CRC plans to meet the needs of international travelers by co-locating the center at the POE (working with the POE authority to establish an appropriate location) or by providing transportation to and from the POE. When working with an airport, planners should give consideration to travelers' travel plans and connecting flights. CDC has developed the guide **Population Monitoring in Radiation Emergencies**[iii] for state and local public health planners, which describes CRCs in detail. Planners should also consider worker's health issues, including when to use personal protective equipment (PPE) and dose monitoring devices or dosimeters for responding individuals.

Depending on the resources of the jurisdiction, any traveler determined to be contaminated will be directed to decontamination areas. In situations where large numbers of people are contaminated above two times background, stakeholders should be flexible in choosing the radiation screening criteria. After initial self-decontamination, the traveler will be rescreened. The jurisdiction will determine which type of screening equipment will be used.

Travelers with No Detectable Radioactive Contamination

If a traveler screens at less than two times background for beta or gamma radiation or no detectable alpha radiation, they will be provided information about the screening process, what their result means, and a contact phone number to follow up with if they have any questions.

Travelers with Radioactive External Contamination

If a traveler is determined to be contaminated (greater than two times background for beta or gamma radiation or any detectable alpha radiation), the traveler's information will be collected and the screening results recorded in the radiation assessment section of the Traveler Follow-up Data Collection form (**Appendix C**). The traveler will then be directed to decontamination and will be provided information about radiation exposure, radiation contamination, and screening.

Initial Screening Key Points for Stakeholders

- The primary purpose of traveler screening is to detect and remove external radioactive contamination.
- The traveler screening response will be scaled based upon the number of travelers requiring screening, from initiating screening at the POE to opening a full off-site community reception center.
- Travelers with initial screening readings less than two times background do not require further decontamination; exposure and clinical information will be captured and, if exposure is not a concern, these individuals will be provided with follow-up information prior to exiting. Those with initial screening results greater than two times background or with any detectable alpha radiation will go through decontamination.

[iii] This document, along with other a variety of other radiation resources, may be found by searching the CDC's Emergency Preparedness and Response, Radiation Emergencies Resource Library at **https://emergency.cdc.gov/radiation/resourcelibrary/all.asp**. The library houses radiation resources under the following topic areas: population monitoring, patient management, countermeasures, communications, mass fatalities, mass care, laboratory, law enforcement, radiation basics, infographics, and videos.

Decontamination

Travelers with an initial screening result of greater than two times background for beta or gamma radiation or any detectable alpha radiation will receive instructions on how to self-decontaminate at the POE using washing (decontamination) stations or existing restroom facilities.

Family members, companions, or caregivers may be able to assist travelers with special needs. The traveler should be provided with easy-to-understand and straightforward instructions in appropriate languages on how to self-decontaminate. In providing instructions for self-decontamination, it is helpful to use less threatening phrases such as "washing" and "change of clothes" instead of "decontamination."

Officials should instruct travelers to act as if they are covered with mud and are trying to minimize tracking the material throughout the POE. Travelers will be asked to remove shoes and, if possible, the rest of their clothing, and place them in a provided bag. The bag will be appropriately labeled and collected by the state or local health department. Travelers will be instructed to shower or use a sink and wash, paying particular attention to hair and areas around the mouth, nostrils and eyes. If no water is available, they can use moist wipes or towels to clean their hands and faces. These actions can be performed at any location of opportunity or at ad hoc facilities set up to facilitate washing. An ample supply of plastic bags and moist wipes should be available and would be a valuable resource at these ad hoc facilities.

Care should be taken not to co-mingle uncontaminated travelers that are referred to discharge stations and contaminated travelers directed to washing (decontamination) stations or restrooms, while ensuring that families are not separated. Although most travelers will be able to self-decontaminate, planners should make provisions for those who cannot. In many cases parents can assist their children with washing.

Remember that travelers may potentially need uncontaminated clothing for wear after decontamination efforts. Luggage arriving with passengers will also need to be screened for contamination. Depending on the workforce capacity and available monitoring devices, this process may be completed before or simultaneous to passenger screening. Once cleared, the luggage may be reunited to its owner and able to provide alternative garments for those requiring disrobing. Otherwise, appropriate garments to replace contaminated clothing must be provided.

Note: Using pumper fire truck systems for mass decontamination, although effective in decontaminating large numbers of people at a hazardous materials scene, is not recommended.

Decontamination Key Points for Stakeholders

- Travelers will be provided with easy-to-understand instructions on how to self-decontaminate in nearby washrooms.
- Travelers may require uncontaminated clothing to wear after decontamination.
- Take care to ensure families are not separated and that provisions are made for special populations requiring assistance.

Decontamination Key Messages for Travelers

- Radiation detection equipment found higher levels of radiation on your body or clothes. You should follow the instructions below to remove this radioactive contamination.
- It is important to get radioactive contamination off your body as soon as possible to lower your risk of harm.
- Radioactive materials on the body or clothes can be removed by washing your body and changing clothes. Follow these instructions:

Self-Decontamination:

NOTE TO PLANNER: *The following decontamination instructions assumes that a plastic bag or other sealable container will be provided to travelers undergoing decontamination procedures to place their contaminated clothing in; and that follow-up instructions will be provided for handling of the bag/container, as well as, replacement clothing for the traveler(s) be readily available.*

1

Take off your outer layer of clothing, which can remove up to 95 percent of radioactive material.

- Be very careful when removing your clothing to prevent radioactive dust from shaking loose.
- Put the clothing in the plastic bag or other sealable container that is provided to you.

2

Wash yourself off.

- **If you can, take a shower.**
  - Use soap and shampoo. Do not use conditioner because it will cause radioactive material to stick to your hair.
  - Do not scald, scrub, or scratch your skin.
  - Keep cuts and scrapes covered when washing to keep from getting radioactive material in open wounds.
- **If you cannot take a shower:**
  - Wash your hands, face, and parts of your body that were uncovered at a sink or faucet.
  - Use soap and plenty of water.
- **If you cannot use a sink or faucet:**
  - Use a moist wipe, clean wet cloth, or damp paper towel to wipe the parts of your body that were not covered. Pay special attention to your hands and face.
  - Blow your nose and wipe your eyelids, eyelashes, and ears with a moist wipe, clean wet cloth, or damp paper towel.
  - Dispose of wipe, cloth or paper towel after cleaning your body as you are instructed.

3

Put on clean clothes.

- Clothes stored in your luggage away from radioactive material are safe to wear.
- If you do not have your own clean clothes, some will be provided for you; or
- If you do not have access to clean clothes, take off your outer layer of clothing. Be sure to re-wash your hands, face, and exposed skin at a sink or faucet.

Second Screening

Following decontamination procedures, officials should rescreen the traveler. The effectiveness of external decontamination performed by the traveler can be verified using a beta and gamma radiation detection instrument or alpha radiation-specific instrument (depending on the type of radioactive materials involved in the incident). For specific information regarding detectors, each jurisdiction should consult its state or local **radiation control programs**.

All screened travelers should be given information about the radiation screening results, including their personal results, a general interpretation of screening results, and resources that can provide further information or answer additional questions (e.g. the **CDC's Frequently Asked Questions About Radiation Emergencies**).

Follow-Up Based on Second Screening Results

For travelers found to be contaminated at levels greater than or equal two times background but less than 20 times background *after* decontamination, the screening staff will notify state/local public health epidemiology and radiation control contacts. If the POE has the capability to perform urine collection, the traveler should be asked to provide a urine sample for analysis. The traveler may then be released with follow-up information.

Any travelers determined to be contaminated with beta/gamma radiation at levels greater than or equal to 20 times background after decontamination or any detectable alpha contamination should be referred for consultation with state radiation control personnel, urine collection bioassay, epidemiological information collection, and be considered for medical evaluation.[iv] The radiation control authorities would use this information for prioritization in bioassay or possible treatment plans. Screening or CRC staff should notify state or local public health, epidemiology, and radiation control contacts, if they are not present, using the state agencies' after-hours emergency hotlines if not during normal business hours. The traveler should be released with follow-up information.

[iv] Guidance for healthcare providers regarding clinical diagnosis, treatment of radiation injuries, along with physician just-in-time training can be found on the Radiation Emergency Medical Management (REMM) system.

In addition to non-radiation-related urgent medical issues (such as a heart attack), a traveler may require urgent medical care for contaminated open wounds, radiation burns, or other radiation-related issues based on field instrument readings (for example, persistently elevated gamma radiation levels after external decontamination). The lead jurisdictional agency should coordinate planning with state or public health epidemiology experts, radiation control professionals, and the medical facilities nearest to each POE that have the capability to provide radiation-related medical evaluations (see **Appendix D**). Medical interventions may be indicated for individuals with internal contamination with certain types of radioisotopes. Empirical therapy during initial presentation may be indicated without the availability of urine bioassay results.

State radiation control should consider referral for further evaluation for:

- Travelers with detected beta or gamma radiation contamination above 20 times background who are children under 18 or pregnant women.
- Travelers with detected initial beta or gamma radiation contamination or any alpha activity in the breathing zone (face or neck).
- Travelers with detected beta or gamma radiation (any level) *after* repeated decontamination attempts.
- Travelers with open contaminated wounds.

The receiving physician may perform a risk-benefit analysis based on field instrument readings, risk factors, and availability of counter measures prior to treatment. For further guidance please see **NCRP report 161** or **NCRP report 166**. Appropriate International Health Regulations and CDC procedures should be followed for contaminated travelers.

Second Screening Key Points for Stakeholders

- Travelers with screening results greater than or equal to 20 times background or any alpha radiation detected following decontamination will be asked to provide a urine sample for analysis and will be referred to the state radiation control program and medical personnel for consultation.
- Travelers with screening results two to 20 times background following decontamination will be asked to provide a urine sample for analysis and will be given follow-up information upon exit.
- Travelers with screening results less than two times background following decontamination will be given follow-up information prior to exiting. No further follow-up is required.

Second Screening Key Messages for Travelers

If contamination levels are less than twice background after decontamination:

- By washing, you were able to remove radioactive contamination from your body and/or clothing, and you do not need to do anything further.
- If you have questions, or would like additional information on radiation, please contact [INSERT CONTACT INFORMATION].

If contamination levels are greater than or equal to twice background after decontamination:

- The washing/cleaning removed some, but not all, of the radioactive contamination. This could mean that you might have contamination inside your body.
- We can do a test on your urine, called a "bioassay," to see if there is contamination inside your body.

Bioassay

In addition to screening for external contamination, it is important to identify people who have incorporated radioactive materials into their body or become internally-contaminated to determine:

- The correct course of treatment.
- Who needs countermeasures.
- The effectiveness of countermeasures being used.
- Who needs long-term follow-up.

Bioassays should be used to determine if a traveler has internal contamination associated with the incident. Bioassays may be ordered by a licensed medical professional; therefore, state and local public health departments will need to obtain an order from their chief medical officer, state health official, or legal medical authority to perform the bioassay. Each jurisdiction should refer to their state guidance on emergency medical authorizations.

Selection Criteria

A jurisdiction's available personnel, resources, and logistical planning will guide both its decision to collect bioassay samples and its process for selecting travelers to provide them. At a minimum, jurisdictions should collect urine samples from all travelers with:

- Any alpha contamination.
- Beta or gamma contamination greater than 20 times background on initial screening or greater than twice background after decontamination.
- Contamination detected around the breathing zone (i.e., face or neck) or at the site of any open wound during initial screening.
- Pregnant women and children under 18.

For the following groups bioassay sample evaluation should be prioritized:

- Travelers with detected beta or gamma radiation contamination above 20 times background who are children under 18 or pregnant women.
- Travelers with detected initial beta or gamma radiation contamination or any alpha activity in the breathing zone (face or neck).
- Travelers with detected beta or gamma radiation (any level) *after* repeated decontamination attempts.
- Travelers with open contaminated wounds.

Although collecting, storing, and shipping urine samples may seem difficult and resource-intensive, results from these tests will enable jurisdictions to accurately and precisely determine travelers' internal radiation doses. This will be crucial during the decision-making process for initiating medical intervention (including using decorporation[v] agents or doing additional clinical testing) and long-term follow-up for travelers.

Jurisdictions should also consider collecting urine samples from the following categories of individuals irrespective of their external radiation screening results:

- Persons who have traveled into highly contaminated zones (individuals with possible exposure).
- Persons with detectable external contamination greater than 20 times background, regardless of location in relation to contaminated zones.
- Persons under the age of 18.
- Pregnant women.
- Persons with open wounds.
- Persons who request urine bioassay testing, resources permitting.

[v] Removal of internally deposited radionuclides from the body after an accidental or inadvertent intake.

Sample Collection[vi]

Jurisdictions should assess individuals and refer them for sample collection and medical follow-up at the screening area/CRC. Officials should start a **shipping manifest** to send with the specimens, as the CDC laboratory will need each traveler's unique identifier and the date and time of the urine collection.

Jurisdictions may store urine collection cups with state radiation control programs or other designated state agencies. **Guidance** for specimen collection, storage, and shipment is included in the urine collection kits that CDC will send to the jurisdiction. Until the kits arrive, locally available urine cups may be used as long as they have a screw top lid. The packaging and shipping **protocol** for these samples is similar to the protocol for chemical terrorism urine samples, which most public health laboratories already practice.

Jurisdictions should freeze and deliver specimens to the state public health laboratory the same day that they are collected. Upon receipt of the urine specimens, the state public health laboratory should contact the CDC laboratory sample logistics group via phone at 770-488-7227 or by email at **NCEHSampleLogistics@CDC.gov**. State public health laboratories should ship urine specimens via next day delivery to:

CDC Warehouse
3719 North Peachtree Road
Chamblee, Georgia 30341

State public health laboratories should include the following information in electronic format (e.g., Microsoft Excel file) with each sample to CDC:

- The traveler's local sample ID number, which CDC will use to match the sample to the traveler.
- The traveler's age.
- The traveler's sex.
- The traveler's height and weight.
- Route of intake if known (inhalation, ingestion, wound).
- The date and time of sample collection.
- The sample priority level, which should be either high or normal and include a reason (e.g., "in vicinity of incident," "elevated counts around breathing zone," "pregnancy").

[vi] Proper collection and handling of specimens is critical. The forms acknowledged in this section, as well as, additional information can be found at the CDC's Emergency Preparedness and Response Laboratory Information for Radiation Emergencies at **https://emergency.cdc.gov/radiation/labinfo.asp**.

Prioritization for Processing Urine Samples in Laboratory

After a large-scale public health emergency, state and local laboratory resources will most likely be stressed and operating at a surge capacity. Depending on the demand for testing, capacity will likely be insufficient, and jurisdictions will need to implement processes to improve turnaround time and throughput in order to maximize available resources. One such process is prioritizing samples for laboratory analysis.[vii]

The goal of laboratory prioritization is to improve the turnaround time for samples collected from individuals who may have had the greatest radiation contamination or circumstances that may require timely medical assessment. This determination is made based on risk factors collected from epidemiological and demographical information. The following categories of individuals should be given priority for sample processing, laboratory analysis, and reporting:

CATEGORIES	JUSTIFICATION
Children (individuals under age 18)	Children are particularly sensitive to ionizing radiation.
Pregnant women	Fetuses are particularly sensitive to radiation exposure.
Individuals with contamination around the breathing zone (face and neck)	Contamination found in these areas of the body can be easily inhaled and is likely to be internalized.
Individuals with detectable contamination after second decontamination attempt	Contamination detected after proper decontamination may reflect internal contamination or fixed-external contamination, which increases the risk for internal contamination.
Individuals with open or contaminated wounds	Open wounds represent a portal of entry that will increase an individual's risk of internal contamination.
Individuals who worked as responders or rescuers in contaminated zones	Workers have higher risk of internal contamination due to their responder/rescuer activities and increased time spent in contaminated zones, especially if they did not use personal protective equipment.
Individuals who could not shelter in place or were outdoors	Contamination and exposure levels are greatest outdoors, where there is no protection from buildings.
Individuals who spent extended time in contaminated zones	Extended time in contaminated zones, even while sheltering in place, increases the risk of internal contamination by eating, drinking or breathing in contamination.

Analyzing, Interpreting, and Reporting Results

CDC's laboratory will analyze the urine samples received by jurisdictions and will report the activity result in terms of concentration (typically reported in Becquerel/liter). CDC will translate this value into a dose using internal dosimetry equations in conjunction with biokinetic models, expressing the dose in terms of Sieverts for the total body. Once the dose is calculated, the laboratory will transmit the results to the ordering physician, state public health laboratory, state epidemiologist, or designee.

State epidemiologists should work with their radiation control program and other epidemiologists to capture the test results and link them to the epidemiologic assessment data collection form completed at the time of screening and bioassay collection. This will provide state and local authorities with a comprehensive data set from all individuals that were tested.

Local or county health departments may not have the expertise to communicate and discuss results from the bioassay and address individuals' concerns and questions regarding radiation, contamination, and health risks. For this reason, collaboration between the state's radiation control program and state epidemiologist and the local or county jurisdictions is anticipated to develop scripts and sample letters applicable to the size of the event. Bioassay results below the agreed upon level may be effectively addressed by a letter that provides the traveler with a telephone number, name, and contact information for additional questions. Travelers with higher results should be given a letter and, if necessary, a follow-up call.

Because the response will cross-cut jurisdictions, it will be important for officials to provide consistent and uniform language when communicating results to travelers and the public. This is particularly true for events that may have contaminated individuals who are residents from another country or from several states or localities. Depending upon the size of the event, jurisdictions may coordinate messaging and scripts with or through CDC to ensure uniform content.

State and local health departments may want to consult with a medical or health physicist once CDC sends the dose results to determine the need for further medical interventions or follow-up. Jurisdictions may also reach out to poison control centers (PCCs), which have 24-hour availability, are uniquely qualified to help physicians and patients interpret laboratory results, and have procedures for following up on health outcomes. PCCs can help ensure that jurisdictions follow correct bioassay collection procedures and that other laboratory tests are recommended if appropriate. All poison centers have medical toxicologists, and most have one or more Radiation Emergency Assistance Center/Training Site (REAC/TS)[viii] trained staff and close relationships with state epidemiologists and Center/Training Site (REAC/TS) trained staff and close relationships with state epidemiologists and other public health personnel.

[vii] For guidance on sample prioritization, see Prioritization on Laboratory Samples Following a Radiological Event: Considerations. June 2012. http://**www.radiationready.org/wp/wp-content/uploads/2012/07/Prioritization-of-Lab-Samples-Following-a-Rad-Event-6.27.12.pdf**.

[viii] The Radiation Emergency Assistance Center/Training Site (REAC/TS) is a **U.S. Department of Energy** (DOE) asset at the Oak Ridge Institute for Science and Education (ORISE) and is operated for DOE by ORAU in Oak Ridge, Tennessee. See: **https://orise.orau.gov/reacts/.**

Bioassay Key Messages for Travelers

- The washing/cleaning process removed some, but not all of the radioactive contamination. This could mean that you might have contamination inside your body.
- We recommend that you provide us with a urine sample, so that it can be determined if there is radioactive contamination inside of your body. This test is called a "bioassay."
- Your urine sample will be sent to the Centers for Disease Control and Prevention for testing.
- You will receive your results in the mail at the address you have provided. The results will let you know if there are additional steps you need to take.
- It will take between [TIME ESTIMATE] to do the test and get the results to you. After you provide a urine sample, we will give you a phone number and website address that can help answer any questions you may have.

Bioassay Key Points for Stakeholders

- Jurisdictions can use bioassays to determine if a traveler has internal contamination, which may require medical countermeasures or long-term follow-up, depending on the levels.
- **Jurisdictions should collect urine samples from travelers who meet any of the following criteria:**
    - Initial external beta or gamma radiation greater than 20 times background.
    - Any initial detectable alpha radiation.
    - External readings less than 20 times background but **greater than** two times background following decontamination.
    - Any contamination detected around the breathing zone (i.e., face or neck) or at the site of any open wound during initial screening
- Prioritizing laboratory samples can improve the turnaround time for samples collected from persons who may have had the largest radiation doses or circumstances that may require timely medical assessment.
- CDC will analyze the urine specimens and will transmit the results to the state radiation control program, the ordering physician, the state public health laboratory, the state epidemiologist, or a designee for communication to the traveler and to guide medical management, if indicated.

Epidemiologic Analysis

Epidemiological Analysis and Data Dissemination

Epidemiologic analysis of data collected during screening is used to provide situational awareness to guide response activities, including radiation screening and public messaging, follow-up services, and mobilization of response resources. In addition to using this information to provide appropriate services to screened individuals, this information can also provide descriptive statistics on the characteristics of the affected population, describe the impact of the incident on the local healthcare system, estimate long-term health effects, and identify individuals' risk factors for contamination. Therefore, epidemiological data analysis and dissemination will improve the understanding of health impacts related to the incident and inform planning and response activities in the future.

Organizing Responsibilities for Data Analysis

The state public health agency or designated local health jurisdiction should take the lead in analyzing and disseminating the epidemiologic information. An epidemiologist assigned to this response should work closely with staff conducting the screening and data collection to ensure that appropriate and useful information can be captured electronically. Jurisdictions should adopt a data management system for everyday use as soon as possible, pre-incident (e.g., **Epi-Info™**).

Ideally, all states with screened travelers would operate under a single data collection or management system. However, each state currently has its own system for data collection. Regardless of the system, the data variables collected should be uniform across jurisdictions (see **Appendix C**). If a state prefers not to use **Epi-Info™**, all states involved should agree upon a common data exchange format (e.g., xml, or SQL readable). A workgroup of involved states and CDC should develop and execute a data collection and analysis plan and put in place agreements for data sharing, publication, and confidentiality.

The data collection and analysis plan will include direction on the transfer of data using a secure transmission system. This is upon execution of a data release document and in accordance with state policy and at the CDC's request. CDC or other federal agencies will coordinate data collection from all involved states.

Data Analysis and Dissemination

To maintain optimal situational awareness, the state public health agency or local health jurisdiction should create a once-daily summary of information on the number of individuals screened, the number of individuals contaminated, the type(s) of radioactive material and severity of contamination, traveler demographic information, referrals for healthcare, and other information useful for organizing the response in subsequent days and estimating the incident's future impacts.

In addition, health departments should monitor and summarize data from other health data systems, including syndromic surveillance based on emergency department chief complaints data and poison control center call data and any other state-based relevant data set, for visits and calls related to the incident.

Jurisdictions should provide daily situation reports through the Incident Command Structure, if it has been activated, to all response partners (e.g., screening operation managers, state public health and radiation control programs involved in the response, local emergency management agencies, hospital command centers, senior management in state and local agencies involved in the response, and state and local agency public information officers) and CDC.

After jurisdictions complete their screening activities and data collection, including bioassay results and medical referrals, the state or local jurisdiction epidemiology program should summarize all available data on the incident, including data collected during the screening process and from other sources, such as hospitals and the poison control centers, and prepare a report with findings and recommendations. In addition to basic descriptive statistics about demographics, travel, and contamination findings, the analysis should explore hypotheses associating traveler contamination levels and demographics to exposure duration and proximity to the incident.

The workgroup of involved states and CDC should develop and execute a data analysis plan. States and localities should release de-identified data to CDC using a system for secure data transmission after executing the data release agreement, in accordance with state policy and at CDC's request. CDC and other federal partners will coordinate data collection from involved states and conduct the combined states' analysis.

Proposals for analyses beyond surveillance summaries, which may be categorized as research, should be reviewed by agency Institutional Review Boards to ensure adequate protection for human subjects. Summary results with findings and recommendations should be issued as state or local agency and CDC reports, and should be published in peer-reviewed journals.

Long-Term Registry

A long-term registry aims to track the long-term health consequences associated with radiological incidents and maintain contact information for registrants in case future follow-up is needed. Commitment to implementing a long-term registry requires careful deliberations, as a long-term registry is a complex and expensive undertaking. Therefore, all involved state and federal agencies should participate in the decision-making process. Agencies should consider the following factors:

- Did our jurisdiction detect radiation-related health effects among the travelers?
- Will travelers possibly experience long-term health consequences based on the exposure dose projections?
- Are there other factors (e.g., political or cultural) that we should consider?
    - E.g., In order to avoid legal repercussion, it may be advisable to include everyone who was decontaminated, even those with levels less than two times background after decontamination. To ensure complete data collection, jurisdictions should make this decision very early in the screening process.
- Is there agency, financial, and political commitment for creating a long-term registry?
- Are there resources for creating a long-term registry?

Jurisdictions should also consult the Agency for Toxic Substances and Disease Registry, the National Institute for Occupational Safety and Health, and the National Institute of Environmental Health Sciences before starting to develop a long-term registry because of their past experiences in managing registries.

If a jurisdiction makes the decision to develop a registry, the decision-making group should address the following issues:

- The criteria for inclusion in the registry.
- Obtaining consent to be included in the registry.
- Which data elements should be maintained and updated (e.g., a registrant's address).
- The agency that will maintain the registry.
- How to obtain funding for the registry.

Epidemiologic Analysis Key Points for Stakeholders

- Epidemiologic analysis of data collected during screening can provide situational awareness to response partners and incident command.
- After all data have been collected, epidemiologic analysis can provide an understanding of the public health impacts of the incident.
- Because a radiation exposure incident will most likely involve traveler screening in multiple states, CDC should organize workgroups to develop and execute a consistent data exchange and analysis plan.
- The U.S. can use long-term registries to track the long-term health consequences associated with the incident, but this is a complex and expensive undertaking that should be led by a workgroup of state and federal partners.

Summary

This guidance was compiled by a variety of state and local preparedness professionals from a variety of backgrounds including communications, emergency management, public health, and radiation control. The guidance is intended to be used as a tool for developing and refining jurisdictional plans. Jurisdictions should recognize the flexibility and scalability of this guidance to accommodate individual needs.

Through collaboration, this guidance was created to increase radiation preparedness by providing effective communication strategies, screening considerations for radiation contamination, and guidance for implementing an efficient screening process including data and sample collection. This guide is a supplementation to screening travelers for radiation contamination and exposure and should be used in conjunction with existing response plans.

The recommendations made in this guidance should not be viewed as policy directives. These guidelines have been devised to determine and reduce contamination of travelers leaving an affected area while securing the health and safety of all individuals at POE.

APPENDIX A:

Planning and Response Stakeholder Organizations

For radiation incidents involving traveler screening, agencies and organizations associated with travel and ports of entry are vital stakeholders and should be included when planning communications for this type of response. Planners should maintain contact information for these partners and others, such as the state's department of environmental quality, state/local radiation control programs, local health physics groups/associations, 2-1-1, and the poison control center, in jurisdictional crisis and emergency risk communication plans. Moreover, these partners should have a seat within the joint information center, if activated, to ensure proper message coordination.

The table on the next page describes the response role of both traditional all-hazards response partners and partners specific to a radiation event involving traveler screening.

STAKEHOLDER	RESPONSE ROLE
Traditional response partners (e.g., law enforcement, emergency management, fire/HAZMAT)	Maintain traditional response roles (e.g., security, resource allocation, situational awareness, and tracking).
Radiation control programs	Provide radiation-specific expertise and experience, radiological survey assets.
State/jurisdictional veterinarian	Provides information and recommendations for decontaminating and treating pets.
State, local, and tribal public health	Recommended lead agency for screening, population monitoring, epidemiological analysis, and public health messaging.
Medical community (e.g., public health, hospitals, healthcare coalitions, and EMS)	Serve as a resource for patients, responders, and healthcare providers to ensure appropriate medical care, follow-up, and education.
Transportation Security Administration	Helps provide access to support screening and decontamination as a partner at the POE.
Customs and Border Protection	Helps provide access to support screening and decontamination as a partner at the POE.
Transit agencies (e.g., airlines and bus lines)	Helps track incoming, possibly affected flights; distribute information; and manage family concerns as a partner at the POE.
Facilities at POE (e.g., airports, bus terminals, and seaports)	Provide the location for the screening and decontamination areas.
Media	Distribute accurate and timely information to instruct the public.
Poison Control Centers	Follow up with screened travelers regarding their bioassay results and serve as a resource for the public, travelers, and medical community.
Medical Reserve Corps	Provide volunteers to assist in traveler screening and decontamination.

APPENDIX B:

Consent/Adolescent Assent/ Parent Permission Form

Purpose: The [state health department] is offering services to people who may have been exposed to the [description of the radiation incident] on or after [date of release] to determine if they have been contaminated with or exposed to radiation, to provide appropriate decontamination based on radiation screening results and to provide educational materials to help people understand their screening results and any recommended additional actions they should take to protect their health.

In addition, the information collected from everyone who participates in the screening process will be summarized and used to understand the impacts of the incident on public health and to improve response activities in the future.

Procedure: Participation is voluntary, if you would like to participate, a radiation expert will measure your radiation levels. The detector used can only measure radiation. It will not expose you to additional radiation or radioactive materials. If radiation levels are above a certain level, you will be advised to go through a washing or cleaning (decontamination) process. It may only involve washing of hands and face or could it could involve showering and disposing of contaminated clothing. Depending on the results, you may be given recommendations for additional actions you should take to protect your health, including obtaining medical care.

You may also be asked to give a urine sample. The urine will be tested for radioactive materials only. Once the radiation levels are measured in the urine, anything left over will be thrown away. A laboratory at the Centers for Disease Control and Prevention (CDC) will perform the analysis and interpret the results. It will take a few weeks or possibly longer to get and interpret the results from these tests. Once we have the results, we will contact you at the address or telephone number you give us in order to explain them to you.

You will be asked for your contact, health, travel, and potential exposure information (for example, how close you were to the radiation incident). This information is necessary for interpreting results of your urine test and communicating with you in the future.

Your personal identifying information will be kept confidential and only staff working on this project will have access to it. Health physicists and laboratory personnel at CDC will be given access to information and your screening results, but only after your personal identifying information has been removed. Your personal identifying information will only be used to contact you about results of your screening and to communicate other information important to your health.

Benefits: If you agree to participate, you can find out information about your possible contamination/exposure during [radiation incident]. We can tell you if and how much radiation you received. We will also tell you what your results may mean for your health. We will tell you how your results compare with other people who were exposed during [radiation incident]. If your screening indicates that you had any significant exposure, we will give you a letter with these results that you can share with your doctor.

Risks: If you agree to this follow-up, the risks are very small. One issue has to do with uncertainty. There is a chance that we may not be able to tell you exactly how much radioactive material you were exposed to or what it means for your health in the future. This could cause you some anxiety. The other risk, although very unlikely, is a breach of confidentiality. All answers and test results will be kept in locked cabinets within locked file rooms and on password-protected computers behind agency firewalls. Only scientists who are a part of this investigation will be able to access your information or the results of your tests. It is extremely unlikely that your personal identifying information could be accessed.

Privacy: All of your personal identifying information will be kept private to the fullest extent of the law. Only the project team scientists will be allowed access to this information. Names and other identifying information will not be used in any report that summarizes the findings from all of the participants in this project. If you would like a copy of the summary report, one can be sent to you.

Cost/Payment: If you take part in this follow-up, there is no cost to you. It will take [time] minutes for you to go through the screening to have your radiation level measured, be decontaminated if necessary, answer the questionnaire, and give a urine sample. If we recommend that you see a doctor, we will not pay for that visit or for any other tests, treatments, or medicine you may need.

Right to Refuse or Withdraw: You can choose to participate in any of parts of this program. You can stop the interview at any time. You can also refuse to answer any question. If you refuse, it will not affect any government benefits that you receive.

Persons to Contact: If you have any questions about your rights in taking part in this program or feel that you have been harmed by it, you can call [contact information]

Consent/Adolescent Assent/Parent Permission Form

I agree to take part in the interview and radiologic screenings. If there is any part of this form that is not clear to me, I will ask about it.

1. I give my verbal consent to participate in the interview and radiologic screenings.

Name of traveler

Name of person obtaining verbal consent

Signature of person obtaining verbal consent

Date

2. By signing below, I give my consent to participate in the radiologic screening and provide information about myself.

Name of traveler

Signature of traveler

Date

3. Sometimes public health officials want to follow up with people who have been exposed during radiologic incidents. They may call or send a survey to check in and see how the people are doing. By signing below, you give your permission for us to contact you again in the future.

Signature of traveler

Date

4. If participant is a minor:

As the parent/legal guardian for the below named, I give my permission for him/her to take part in this program.

Name of minor

Name of parent/guardian

Parent/guardian signature

Date

If verbal consent is given:

Name of parent/guardian

Name of person obtaining verbal consent

Signature of person obtaining verbal consent

Date

5. Sometimes public health officials want to follow up with people who have been exposed during radiologic incidents. They may call or send a survey to check in and see how the people are doing. By signing below, or agreeing verbally, you give your permission for us to contact your child again.

Name of parent/guardian

Parent/guardian signature

Date

Or, if verbal consent given:

Name of person obtaining verbal consent

Signature of person obtaining verbal consent

Date

APPENDIX C:

Traveler Screening Registration and Data Collection Form

TRAVELER SCREENING TRACKING AND EPIDEMIOLOGIC ASSESSMENT

DATA COLLECTION FORM

Follow-Up of Travelers identified at U.S. Ports of Entry with Radioactive Material on their Bodies Associated with the Incident in [Location]

***Note:** The question bank is designed in a modular format to facilitate the development of a customized form for a specific incident.

Available technical assistance:

*For any questions, please contact:

[State/CDC Contact Name], [Position] at (XXX) XXX-XXXX

Contact and Demographics

Today's Date

ID

Contact information for person conducting epidemiologic assessment:

First Name | Middle Initial | Last Name

Organization | Primary Phone

Email | Secondary Phone

First Name | Middle Initial | Last Name

Date of Birth | Age (at date of incident) | Years **OR** Months

Sex ☐ Male ☐ Female

Pregnant ☐ Yes ☐ No ☐ Possible

Race

☐ American Indian/Alaska Native
☐ Native Hawaiian/Pacific Islander
☐ Asian Indian
☐ White
☐ Black
☐ Other:

Ethnicity ☐ Hispanic ☐ Non-Hispanic

Permanent resident of the United States? ☐ Yes ☐ No, country of permanent residence:

Permanent address

City | State | Zip

Current address

City | State | Zip

Home Phone

Mobile Phone

Email

What is the best way to contact you?

☐ Home Phone ☐ Mobile Phone ☐ Email

☐ Other:

Incident Information

ID

Were you in an area that was evacuated due to the radiation incident in [LOCATION}?

☐ Yes ☐ No ☐ Don't know ***If yes, did you evacuate?*** ☐ Yes ☐ No ☐ Don't know

Were you in an area where you were told to shelter in place due to the radiation incident in [LOCATION]?

☐ Yes ☐ No ☐ Don't know ***If yes, did you shelter in place?*** ☐ Yes ☐ No ☐ Don't know

Did you work in a location that was in either the evacuation or shelter in place zones?

☐ Yes ☐ No ☐ Don't know ***If yes, what was your occupation?***

Where were you between the time of the incident on [DATE] and when you left the country?

(List all locations below:)

1. Country
City
Region/State/Province/District
Town/Ward/Village

What did you do at this location?

☐ Evacuated ☐ Both
☐ Sheltered in place ☐ Neither

Beginning date
End date

2. Country
City
Region/State/Province/District
Town/Ward/Village

What did you do at this location?

☐ Evacuated ☐ Both
☐ Sheltered in place ☐ Neither

Beginning date
End date

In [LOCATION], were you screened to assess if you had radioactive material on your body?

☐ Yes ☐ No ☐ Don't know ***If yes, were you told you had radioactive material on your body?*** ☐ Yes ☐ No ☐ Don't know

Have you taken any medications to prevent or treat possible radiation exposure form the incident in [LOCATION]?

☐ Yes ☐ No ☐ Don't know

If yes, what medication(s) did you take?
(choose all that apply)

☐ Potassium iodide (also known as K)
☐ Prussian Blue
☐ Other:

Were you decontaminated?

☐ Yes ☐ No

Radiation Assessment

ID

Contact information for person conducting radiation assessment:

First Name | Middle Initial | Last Name

Organization | Primary Phone

Email | Secondary Phone

Initial screening result **times background**

Was decontamination performed? Yes No

Was a second radiation assessment performed?

Yes No **If yes, second screening result:** **times background**

Was decontamination performed? Yes No

Was a third radiation assessment performed?

Yes No **If yes, third screening result:** **times background**

Date assessment performed **Instrument used**

Was contamination detected? Yes No

Radionuclide(s) detected:

Specify | Dose/ Dose-Rate | Units

Was contamination detected around the breathing zone (face and shoulders, excluding hair or scalp)?

Yes No

Does the individual have any open wounds? Yes No Don't know

Are any open wounds contaminated? Yes No

Disposition

ID

Follow-up actions:	Date:
☐ **Did not give signed consent**	
☐ **Medical follow-up recommended**	
☐ **Letter with bioassay results sent to traveler**	
☐ **Entered into long-term registry**	
☐ **Withdrew**	

Travel Information (Optional)

ID

How did you arrive to the United States? ☐ Air ☐ Land ☐ Sea

AIR

Which flight did you take into the United States? Airline and flight number:

Arrival date: Seat number: Airport:

City of entry: State:

Did you have a connecting flight to another destination? ☐ Yes ☐ No

Which flight did you take? Airline and flight number: Seat number:

What was your final destination? City: Country: ☐ United States ☐ Other:

Airport:

Arrival Date: (If USA) State:

LAND

Which country did you arrive from? ☐ Canada ☐ Mexico

City of entry: State:

U.S. Port of Entry: Arrival date:

What was your final destination? City: Country: ☐ United States ☐ Other:

(If USA) State:

SEA

What was the name of the ship you arrived on?

City of entry: State:

U.S. Port of Entry: Arrival date:

What was your final destination? City: Country: ☐ United States ☐ Other:

(If USA) State:

Clinical Information (Optional)

ID

Since the incident in [LOCATION], have you had or do you currently have any of the following symptoms:
(These symptoms are used to screen for acute radiation syndrome, only use in applicable incidents which include high-dose exposure or high-dose internal contamination.)

Repeated vomiting:
☐ Yes ☐ No

If yes, what was the time of onset following the exposure?
☐ < 10 min ☐ 10 min to < 1 hr ☐ 1 to 2 hrs ☐ > 2 hrs

Diarrhea:
☐ Yes ☐ No

If yes, what was the time of onset following the exposure?
☐ < 1 hr ☐ 1 to 3 hrs ☐ 3 to 8 hrs ☐ > 8 hrs

Severe headache:
☐ Yes ☐ No

If yes, what was the time of onset following the exposure?
☐ < 3 hrs ☐ 3 to 4 hrs ☐ 4 to 24 hrs ☐ > 24 hrs

Fever:
☐ Yes ☐ No

If yes, what was the time of onset following the exposure?
☐ < 1 hr ☐ 1 to 2 hrs ☐ 2 to 3 hrs ☐ > 3 hrs

Confusion (at any time): ☐ Yes ☐ No

Loss of consciousness (at any time): ☐ Yes ☐ No

Additional symptoms:
☐ Yes ☐ No

If yes, symptom:

Onset:

Have you recently received diagnostic tests involving nuclear medicine (e.g. stress test or thyroid exam)?
☐ Yes ☐ No ☐ Don't know

If yes, when (date)?

Have you recently received cancer treatment (e.g. radiation therapy or brachytherapy)?
☐ Yes ☐ No ☐ Don't know

If yes, when (date)?

Before the incident in [LOCATION], did you have any of the following conditions (check all that apply)?

☐ Hypertension
☐ Chronic Obstructive Pulmonary Disease (COPD)
☐ Diabetes
☐ Congestive heart failure
☐ Stroke
☐ Other, specify:
☐ Seizures
☐ Immunocompromised

Have you sought medical attention from a Doctor for the conditions that you believe are associated with the incident in [LOCATION]?
☐ Yes ☐ No ☐ Don't know

If yes, where?

Laboratory Assessment (Optional)

ID

Contact information for person conducting radiation assessment:

First Name | Middle Initial | Last Name

Organization | Primary Phone

Email | Secondary Phone

Was urine collected to test for radionuclides? ☐ Yes ☐ No

Date and time of urine collection:

Laboratory identification number:

How long before the sample was taken did the patient urinate?

☐ Minutes ☐ Hours ☐ Don't know

Height ☐ Feet ☐ Inches **OR** ☐ Meters ☐ Centimeters

Weight ☐ Pounds ☐ Kilograms

Results

Were other biological specimens collected to test for radionuclides? ☐ Yes ☐ No

Which specimens were collected?

Date and time of collection:

Laboratory identification number:

Results:

CDC Laboratory Barcode Label

Laboratory Priority (to be completed by officials after all data have been collected)

Priority: ☐ Yes ☐ No

APPENDIX D:

Radiation Injury Treatment Network Centers

TRANSPLANT CENTERS				
AL - Children's Hospital of Alabama	Ped	NDMS	HPP	
AL - University of Alabama at Birmingham	P/A	NDMS	HPP	
AZ - University Medical Center	P/A	NDMS	HPP	
CA - City of Hope National Medical Center	P/A	NDMS	HPP	
CA - Scripps Green Hospital			HPP	
CA - Stanford Hospital and Clinics	P/A	NDMS	HPP	
CA - UCSF Medical Center		P/A	HPP	
CO - Presbyterian/St. Lukes Medical Center		NDMS	HPP	
CO - University of Colorado (Aurora)		NDMS	HPP	
FL - H. Lee Moffitt Cancer Center		P/A	NDMS	
FL - Shands Hospital at the University of Florida		P/A	HPP	
FL - University of Miami		NDMS	HPP	
GA - Emory University			HPP	
GA - Northside Hospital			HPP	
IA - University of Iowa Hospitals and Clinics	P/A	NDMS	HPP	
IL - Northwestern University MC		NDMS	HPP	
IL - Rush University Medical Center			HPP	
IL - University of Chicago	P/A	NDMS	HPP	
IN - St. Francis Hospital and Health Centers		NDMS	HPP	
KS - University of Kansas Medical Center		NDMS	HPP	
KY - University of Kentucky		NDMS	HPP	
MA - Children's Hospital of Boston	Ped	NDMS	HPP	
MA - Dana Farber/Partners Cancer Care	P/A	NDMS	HPP	
MA - Massachusetts General Hospital		NDMS	HPP	
MI - Barbara Ann Karmanos Cancer Center		NDMS	HPP	
MI - Spectrum Health	P/A	NDMS	HPP	
MN - Mayo Clinic Rochester	P/A	NDMS	HPP	
MN - University of Minnesota BMT Program	P/A	NDMS	HPP	
MO - Barnes-Jewish Hospital at Washington			HPP	
MO - The Children's Mercy Hospital	Ped	NDMS	HPP	
MS - University of Mississippi Medical Center	P/A	NDMS	HPP	
NC - Duke University Medical Center	P/A	NDMS	HPP	
NC - UNC Hospitals	P/A	NDMS	HPP	
NC - Wake Forest Univ Baptist Medical Center		NDMS	HPP	

TRANSPLANT CENTERS				
NH - Dartmouth-Hitchcock Medical Center			HPP	
NY - Memorial Sloan-Kettering Cancer Center	P/A	NDMS	HPP	
NY - Mount Sinai Hospital	P/A	NDMS	HPP	
NY - NorthShore Medical Center		NDMS	HPP	
NY - NYU Langone Medical Center		NDMS	HPP	
NY - Roswell Park Cancer Institute		P/A	NDMS	
NY - Strong Memorial Hospital	P/A	NDMS	HPP	
NY - Westchester Medical Center		NDMS	HPP	
OH - Cincinnati Children's Hospital Medical Center	Ped	NDMS	HPP	
OH - Cleveland Clinic Foundation		NDMS	HPP	
OH - University Hospitals Seidman Cancer Center		NDMS	HPP	
OK - Oklahoma Univ. Medical Center & Childrens Hospital		P/A	NDMS	
OR - Oregon Health & Science University	P/A	NDMS	HPP	
PA - AHN Cancer Institute West Penn Hospital			NDMS	
PA - Children's Hospital of Philadelphia	Ped	NDMS	HPP	
PA - Temple University		NDMS	HPP	
PA - Thomas Jefferson		NDMS	HPP	
PA - University of Pennsylvania Medical Center		NDMS	HPP	
PA - UPMC			NDMS	
RI - Roger Williams Medical Center		NDMS	HPP	
SC - Medical University of South Carolina			HPP	
SD - Avera McKennan Transplant Institute			HPP	
TX - M.D. Anderson Cancer Center		P/A	HPP	
TX - Texas Children's Hospital	Ped	NDMS	HPP	
UT - LDS Hospital		NDMS	HPP	
UT - Primary Children's Medical Center	Ped	NDMS	HPP	
UT - University of Utah	P/A	NDMS	HPP	
VA - Univ of Virginia		NDMS	HPP	
WA - Seattle Cancer Care Alliance		P/A	NDMS	
WI - Children's Hosp of WI & Midwest Children's CC	Ped	NDMS	HPP	
WI - Froedtert Memorial Lutheran Hospital		NDMS	HPP	
WI - Univ. of Wisconsin at Madison	P/A	NDMS	HPP	
WV - West Virginia University Hospitals		NDMS	HPP	

Ped = Pediatric patient only facility

P/A = Pediatric and adult capable facility

**If no capability is annotaed the facility is adult only

NDMS = National Disaster Medical System Center

HPP = Hospital Preparedness Program

Total NDMS Centers | 56 | 84%

Total HPP Centers | 61 | 91%

Total Pediatric or Ped/Adult | 34 | 51%

TC	67
DC	5
CBB	6
Total	78

Associate Donor Centers

CA - City of Hope National Medical Center

CO - Colorado Marrow Donor Program

MD - C.W. Bill Young Marrow Donor Center

MI - NMDP operated donor center

TN - Blood Assurance

Associate Cord Blood Banks

CA - StemCyte International Cord Blood Center

CO - University of Colorado

IL - ITxM Cord Blood Services

MO - St. Louis Cord Blood Bank

NC - Carolinas Cord Blood Bank

TX - MD Anderson

As of September 2017

**please report any corrections to RITN@nmdp.org

National Alliance *for*
Radiation Readiness