

## Recommendations for the Follow-Up Assessment of Contaminated Travelers by Radiation Control Health Physics Staff

State radiation control program health physicists will perform the follow-up assessment of contaminated travelers in coordination with the local or state health department. This assessment may be done at the state radiation control program office, the traveler's place of residence, or other locations as convenient. This screening process may be stressful for travelers. The health physics staff should consider requesting assistance from behavioral health professionals or risk communicators to help reduce anxiety for travelers throughout the process.

The follow-up assessment should consist of four main activities:

- 1) Ensure the effectiveness of external decontamination
- 2) Assist in completion and review the Epidemiologic Assessment form with the traveler and assess potential for internal contamination
- 3) Perform a thyroid count
- 4) Evaluate the need for bioassay, and collect a urine sample if necessary

Based on current environmental monitoring results reported from Japan, it is highly unlikely for any external or internal contamination to present a public health concern for people outside of the 50-mile (80-kilometer) radius around the Fukushima nuclear power plant.

### 1) Ensure the effectiveness of external decontamination

Travelers identified as being contaminated with radioactive materials by U.S. Customs and Border Protection (CBP) are offered an opportunity – at the airport – to change into clean clothes and wash exposed skin surfaces, such as their hands and face. Additional washing (such as a full shower) may be necessary to remove all traces of external contamination. The effectiveness of external decontamination performed by the traveler at the airport or at home can be verified using a beta/gamma radiation detection instrument such as a Geiger Muller (GM) pancake probe or equivalent.

It would not be unusual to find traces of contamination in the hair, including facial hair. In such cases, repeat washing is recommended and the water can be drained as ordinary wash water. If a traveler chooses to shave facial hair after washing, no precautions are necessary for disposal of that hair.

It is possible for some amount of contamination to be “fixed” to the skin and not removed by gentle washing. The reason is that small radioactive particles may be lodged within the skin's pores. Abrasive washing is not recommended. This residual contamination does not present a health risk to anyone and will gradually disappear with radioactive decay, washing, and shedding of the skin over the next several days.

## 2) Assist in completion and review the Epidemiologic Assessment form with the traveler and assess potential for internal contamination

The information that travelers provide about locations visited in Japan and the time periods and duration of those visits can be helpful in assessing potential for internal contamination. Having lived or travelled within 50 miles (80 kilometers) of the Fukushima nuclear power plant since March 11, 2011, may indicate a potential for internal contamination. Conversely, if a traveler had only visited Tokyo or other areas greater than 50 miles away from the Fukushima nuclear power plant, the potential for internal contamination would be extremely low. Travelers younger than 18 years or pregnant women represent special populations for which further assessment for internal contamination (described in steps 3 and 4) may be warranted.

The radiation control staff should acknowledge to the traveler that everyone in Japan is likely to have inhaled or ingested some trace amounts of radioactivity released from the Fukushima nuclear power plant. For people who did not live or travel within a 50-mile radius of the plant, it is extremely unlikely that the amount of internal contamination will be of any health concern.

## 3) Perform a thyroid count

A thyroid count is accomplished by placing a gamma detection instrument next to the patient's neck (throat) and recording the measurement. A mobile thyroid uptake counter, similar to those available in most nuclear medicine departments, would be ideal for this application. However, any gamma radiation detector (microR meter, GM detector, portable gamma spectrometer) can be used for this purpose. Prior to performing the thyroid count of the traveler, it is important to measure and document the background radiation level or count rate of the instrument.

If a traveler's thyroid count is distinguishably higher than background, it is indicative of radioactive iodine uptake, but not necessarily a cause for alarm. If a spectrometer is used, the presence of I-131 may be confirmed. Some instruments (such as a thyroid uptake counter) may be capable of estimating the amount of I-131 in the thyroid. Other instruments may be able to make similar estimates based on prior calibrations (e.g., see [TMT handbook](#), Annex B, Tables A8.2 and Table A8.3). If so, such estimates should be recorded. Otherwise, the net count rate (measurement minus background count rate) should be recorded.

Health physics staff may take an additional reading from the posterior chest wall (the traveler's back), and record the results. If the count rate is distinguishable from background and a spectrometer is available, that instrument may be used to see what radionuclides (other than I-131) are present. Not detecting additional gamma-emitting radionuclides (such as Cs-137) would be reassuring although lack of detection cannot rule out the possibility that some amounts of radioactive material other than I-131 may have been inhaled or ingested.

If any elevated counts are detected, the health physicist should recommend that travelers consult their physician about follow-up clinical evaluation. The health physicist should arrange to provide travelers with the results of their radiological assessments. The traveler's physician can contact the local Poison Control Center or the physicians at the Radiological Emergency Assistance Center/Training Site (REAC/TS) for assistance.

It would also be useful to place any radiation readings above background into perspective for the traveler. For example, individuals receiving common nuclear medicine procedures (such as a heart stress test) can exhibit measurable exposure rates in the range of 1 millirem per hour or higher for several days after their procedure.

#### 4) Evaluate the need for bioassay, and collect a urine sample if necessary

A urine bioassay can help identify if a traveler has internal contamination with Cs-137, I-131, or other radionuclides associated with the Fukushima nuclear power plant. The exposure history of contaminated travelers returning from Japan is complex and uncertain due to multiple releases of radioactivity from the nuclear power plant on different days. Each contaminated traveler may have been affected by one or more of those contamination events.

Knowing the precise concentration of radionuclides in a traveler's urine will not accurately determine the amount of intake or the committed dose to the traveler's thyroid or whole body. It is important to acknowledge this fact to the traveler because typically, a collection of urine sample creates the expectation that a definitive answer can (and will) be provided to the individual.

Nevertheless, it will be prudent to collect urine samples for a subset of contaminated travelers for further analysis. This subset may include:

- a) Travelers who have lived or travelled within a 50 mile radius of the Fukushima nuclear power plant
- b) Travelers  $\leq 18$  years of age or who are pregnant
- c) Travelers with an elevated thyroid count (i.e., distinguishable from background)
- d) Travelers with an elevated count (i.e., distinguishable from background) taken at back of chest
- e) Travelers with high levels of concern

Confirming the presence of radionuclides in the urine is not necessarily a cause for alarm. At levels below an identified threshold, intervention may not be required. The National Council on Radiation Protection & Measurements (NCRP) Report No. 161 introduces the concept of the Clinical Decision Guide (CDG), or intervention threshold levels. Tables 11-1 and 11-2 list the CDG values for Cs-137 and I-131:

Isotope	Contamination route	Population	Clinical Decision Guide value
Cs-137	inhalation	adults	1600 $\mu$ Ci
Cs-137	inhalation	$\leq 18$ y.o and pregnant females	320 $\mu$ Ci
Cs-137	ingestion	adults	760 $\mu$ Ci
Cs-137	ingestion	$\leq 18$ y.o and pregnant females	152 $\mu$ Ci
I-131	(inhalation or ingestion)	adults $\geq 40$ y.o	350 $\mu$ Ci
		adults $>18$ and $<40$ y.o.	6.9 $\mu$ Ci
		pregnant or nursing women	3.5 $\mu$ Ci
		children $>12$ and $\leq 18$ y.o.	2.2 $\mu$ Ci
		children $>7$ and $\leq 12$ y.o.	1.4 $\mu$ Ci
		children $>3$ and $\leq 7$ y.o.	0.7 $\mu$ Ci
		children $\leq 3$ y.o.	0.4 $\mu$ Ci

### Resources

Management of Persons Contaminated With Radionuclides, National Council on Radiation Protection & Measurements (NCRP) Report No. 161, Bethesda, MD, 2008. (Available for purchase at [http://www.ncrppublications.org/Reports/161\\_I](http://www.ncrppublications.org/Reports/161_I))

Triage, Monitoring and Treatment Handbook for management of the public in the event of malevolent use of radiation, TMT Handbook, 2009. Available from [www.tmthandbook.org](http://www.tmthandbook.org)

The local Poison Control Center can be reached 24 hours-a-day by calling 800-222-1222.

Radiation Emergency Assistance Center/Training Site can be reached 24 hours-a-day by calling 865-576-1005 (ask for REAC/TS).