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Centers for Disease Control and Prevention Communication Products, Tools, and Training for Radiological Emergency Preparedness

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Narrative Abstract

The mission of the Radiation Studies Program (RSP) in the Centers for Disease Control and Prevention, National Center for Environmental Health, is to analyze scientific advances, educate the public, and build public health capacity for all communities in the United States to reduce morbidity and mortality from unnecessary exposures to radiation—both in daily life and in the event of a radiation emergency. The program accomplishes these goals by collaborating with national and international partners and supporting scientific advancements in collaboration with national and international organizations.

Since 2001 RSP has developed tools, training, and communication products to prepare and support local, state, tribal and federal agencies in the United States that are engaged in a response to a nuclear or radiological incident. This paper summarizes the latest RSP resources, which were presented during the 17th REMPAN Coordination Meeting in Seoul, South Korea, on September 14, 2023.

Keywords

Radiological emergency preparedness; radiation training; radiation communication

Introduction

The dearth of radiation professionals or even radiation-savvy professionals who could be available to support the response to a nuclear or radiological emergency is well known.

In fact, this need is more evident in the public health community where few public health professionals are familiar or comfortable with the topic of radiological emergency

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preparedness and response. Recognizing that the response to a nuclear or radiological emergency will require an “all hands-on-deck” approach, a major focus for the Radiation Studies Program (RSP) at the Centers for Disease Control and Prevention (CDC) since 2001 has been to develop self-study trainings and tools that can be used to prepare the public health and emergency preparedness workforce to respond to a nuclear or radiological emergency. The efforts also have focused on developing easy-to-understand materials for the public that are based on needs identified during current events and exercises and, importantly, input from partners, and that have been audience-tested.

Discussion

The products described here were presented at the 17th REMPAN Coordination Meeting held in Seoul, South Korea, in September 2023. These products are just a small subset of the materials currently available on the CDC Radiation Emergencies webpage (<https://www.cdc.gov/radiation-emergencies/index.html>).

The products are grouped into three categories: new products addressing a specific topic or need, updated products to reflect new knowledge/information, and existing products of general interest to the public health agencies and the public. The author encourages readers to explore the website to learn about other available resources for preparing their workforces.

New Products

Exposure Vs Contamination – Animated video: This short, animated video (<https://www.cdc.gov/radiation-emergencies/causes/index.html>) uses simple language to explain the differences between radiation exposure and radioactive contamination (both external and internal contamination) and the concept of decontamination. In addition, the video highlights that these terms may have a different meaning when applied to an infectious disease scenario or a pandemic, an important distinction to avoid confusion. The video shows that a person who is exposed to radiation does not pose a risk to others. It also indicates that if a person is externally contaminated with radioactive materials and subsequently decontaminated (by removing clothes and washing), that person does not pose a risk to others. And lastly, it states that a person with internal contamination poses little risk to exposing others to radiation. It ends by reminding people that the best way to protect themselves is to “go inside, stay inside, and stay tuned.”

What to Expect at a Community Reception Center – Infographic: This infographic (<https://www.cdc.gov/radiation-emergencies/infographic/community-reception-center.html>) was designed to help people going through a Community Reception Center (CRC) understand the workflow and stations they would be visiting. In a radiation emergency, local officials will likely set up CRCs to screen, decontaminate, assess, and register people for potential follow-up. Recognizing that going through a CRC can be stressful, especially when people don’t know what to expect, the infographic aims to explain the process of triage (sorting), contamination screening, decontamination (wash station), first aid and dose assessment (if needed), registration, and leaving the CRC.

Updated Products

Potassium Iodide (KI) – Animated Video and Updated Web Content: RSP's website monitoring has indicated an ongoing strong interest in the topic of potassium iodide as a radiation countermeasure. This interest rises even more when current events suggest potential radiation emergencies (e.g., at the outset of the war in Ukraine, during the Fukushima disaster in 2011). The program also noted an increase in reports of people unnecessarily obtaining potassium iodide in Europe and in the United States to protect themselves against a nuclear attack. To clarify the appropriate use of KI, RSP developed a new animated video on KI (<https://www.cdc.gov/radiation-emergencies/treatment/potassium-iodide.html>) that includes language to explicitly address that KI is not effective in a nuclear detonation and, furthermore, that KI can cause serious health effects if taken when not needed.

- The key messages in the video and website content are these: Radiation from radioactive fallout is the biggest threat to health after a nuclear detonation (explosion). Fallout is made up of hundreds of types of radioactive materials.
- KI protects only your thyroid after breathing, eating, or drinking something that is contaminated with high amounts of one type of radioactive material: radioactive iodine (e.g. I-131).
- There is a relatively small amount of radioactive iodine in fallout compared with other types of radioactive materials that can cause harm. KI would not protect you against the harmful effects of any radioactive materials other than I-131.
- Thus, to warrant taking KI for I-131, a person would have to be exposed to deadly levels of external radiation from fallout.

I-131 contamination is mainly associated with nuclear power plant accidents. In other types of nuclear emergencies, such as a nuclear detonation, the biggest risk is external exposure to many types of radioactive materials. The best protection is to shelter in place.

Infant Feeding During a Radiation Emergency – Updated Web Content: RSP recognizes that parents of young children would be a key group needing specific messages during a radiation emergency and has updated existing website content on infant feeding during such an incident with more specific details to accommodate different situations. The revised content (<https://www.cdc.gov/radiation-emergencies/caring/infant-feeding.html>) includes

- General information regarding immediate steps to take
- Breastfeeding guidance depending on whether the mother was inside or outside when the event happened
- Instructions for when the mother should stop breastfeeding
- The use of pumped and stored breast milk
- Formula feeding and steps to take if the mother doesn't have stored breast milk or formula

The website also includes a decision tree and a link for more detailed information regarding clinical considerations for people who are pregnant or breastfeeding (<https://www.cdc.gov/radiation-emergencies/hcp/clinical-care/breastfeeding.html>). This new content was prepared in collaboration with CDC's Maternal and Infant Health Branch, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion.

“Get Inside, Stay Inside, Stay Tuned” – Updated Web Content: CDC developed the concept of “get inside, stay inside, and stay tuned” as a key protective action (possibly the most important protective action) during a nuclear or radiological emergency many years ago and has worked extensively to promote this simple but critical message. Fortunately, it has been adopted across U.S. federal agencies involved in preparedness and response. Feedback from our partners has indicated a need for more specificity in this messaging.

In response, the “get inside” content (<https://www.cdc.gov/radiation-emergencies/response/get-inside.html>) was updated to provide specific information for sheltering in place during different situations: if you are indoors or outside; if you are in your car, bus or other vehicle; if you have pets; if you have loved ones in schools, daycares, hospitals, or nursing homes; and if you are asked to let someone into your home during a radiation emergency.

In addition to providing details for the “stay inside” concept (<https://www.cdc.gov/radiation-emergencies/response/stay-inside.html>), the program developed an animated video (<https://www.youtube.com/watch?v=IhE4QAWL59g>) that describes sheltering in place for a radiation emergency. The program saw the need to compare and contrast sheltering in place for a radiation emergency vs an infectious disease such as the recent COVID pandemic, because some of the recommendations that were issued for sheltering in place during a pandemic would not be appropriate when sheltering in place for a radiation emergency.

Lastly, the “stay tuned” content (<https://www.cdc.gov/radiation-emergencies/response/stay-tuned.html>) was updated to add more details such as different ways to stay tuned, how to evacuate, information about CRCs and emergency shelters, helping others, and mental health.

Existing Products of Interest to Public Health Agencies and Partners

Radiation Response Briefing Manual – A Guide for Key Leaders and Public Health Decision-makers: The Radiation Response Briefing Manual (<https://www.cdc.gov/radiation-emergencies/php/resourcelibrary/briefing-manual.html>) was designed to provide a just-in-time overview of radiation hazards and response considerations for radiation emergencies. It is intended to give leaders and other personnel a working knowledge of radiation emergency response, so that they can ask the right questions, work effectively with partner agencies, and make informed decisions.

The main topics covered in the briefing manual are

- What do I need to know about radiation?
- What are the different types of radiation emergencies?
- What decisions need to be made early in a radiation emergency?

- What are the roles and responsibilities of the various agencies?
- What responsibilities fall to public health during a radiation emergency?
- What is the response timeline?
- What assets are available to respond to a radiation emergency?
- What planning and guidance documents should I know about?

The briefing manual includes appendices covering radiation measurement and risk, medical management of radiation casualties, and phases of radiation response. It also includes links where readers can get more in-depth information on the topics.

Radiation Emergencies Media Toolkit: In a radiation emergency, whether intentional or not, journalists and other members of the media will play an important role in making certain the public receives timely and accurate information that can save lives. CDC has tools and resources to help journalists provide accurate and actionable information about this complicated and poorly understood topic. The media toolkit (<https://www.cdc.gov/radiation-emergencies/toolkit/index.html>) includes information about protection in a radiation emergency, decontamination, health effects of radiation, preventive measures and medical treatments, and links to many resources, including infographics, educational videos, frequently asked questions, and tools to communicate radiation risk.

Crisis and Emergency Risk Communication Tools: The principles of crisis and emergency risk communication that state that the right message at the right time from the right person can save lives are even more critical when applied to radiation emergencies, where immediate communication can save lives. CDC's crisis and emergency risk communication (CERC) draws from lessons learned during past public health emergencies and research in the fields of public health, psychology, and emergency risk communication. CERC is an evidence-based framework for communicating effectively during public health emergencies. Communication is one of the fundamental tools in an emergency response and can significantly shape the outcome. The CERC principles of being first, being right, being credible, expressing empathy, promoting action, and showing respect apply to any public health emergency and can help communicators, leaders, and responders in their response (<https://www.cdc.gov/radiation-emergencies/php/communication-resources/cerc-rad.html>). This tool provides detailed information on each of these principles and is available in short and expanded versions. The short version also is available in Spanish.

A companion training for this tool, *Radiation Risk Communication for Public Health* (<https://www.cdc.gov/radiation-emergencies/php/training/rad-cerc.html>), highlights basic radiation concepts, and several communication resources and lessons learned. Understanding these concepts can help professionals involved in emergency response prepare for and deliver clear messages during a radiological or nuclear disaster. The training also highlights several myths and misunderstandings related to radiation exposure and contamination.

Radiation Epidemiology for Public Health Decision Making – Training Video:

This video (<https://www.cdc.gov/radiation-emergencies/php/training/rad-epidemiology.html>) was developed to help public health professionals and other professionals learn important concepts in radiation epidemiology. This is particularly important in identifying which studies are well designed (and therefore more reliable) vs studies that are not well designed or have flaws that affect the validity of the findings. Correct interpretation of radiation epidemiologic studies is essential in shaping public health policy and evidence-based health practices.

Success Stories in Radiation Emergency Preparedness: CDC supports many state and local public health and emergency management jurisdictions in radiation emergency planning and preparedness activities. These videos (<https://www.cdc.gov/radiation-emergencies/php/communication-resources/success-stories.html>) highlight some of the ways state and local partners have used CDC training, tools, and other resources and can be used as models for other jurisdictions in their planning and exercise efforts.

Conclusions

CDC has been at the forefront of developing tools, training, and products to support the public health response to a nuclear or radiological emergency. The information presented here represents an effort to raise awareness about the availability of many products covering a wide range of topics relevant to the public health response to a nuclear or radiological emergency. Recognizing that the products presented here are a small subset of the products available on the CDC Radiation Emergencies webpage (<https://www.cdc.gov/radiation-emergencies/index.html>), readers are encouraged to become familiar with the website and share with their local, state, federal, and international public health partners in an effort to build our collective emergency preparedness and response capabilities.

List of Abbreviations

CDC	Centers for Disease Control and Prevention
CERC	Crisis and Emergency Risk Communication
CRC	Community Reception Center
KI	Potassium Iodide
NCEH	National Center for Environmental Health
REMPAN	Radiation Emergency Medical Preparedness and Assistance Network
RSP	Radiation Studies Program