

## ELEMENTS OF INCREASED IMPORTANCE IN RADIATION EMERGENCIES

Jodi Strzelczyk, Ph.D.

Tel. 720-848-1109; E-mail: [Jodi.Strzelczyk@uchsc.edu](mailto:Jodi.Strzelczyk@uchsc.edu)

Emergencies involving large segments of population occurred throughout the history of civilization. As we learned on 9/11/2001, a large-scale disaster can strike without warning. The main goal of the preparatory planning is the reduction of secondary damage. Responses must be expedient and appropriate measures planned in advance.

Scenarios based on previous experiences must be considered. As an RDD is likely to occur suddenly and involve rapid dispersion of radionuclides along with physical results of explosion, we need to test our capabilities through carefully designed drills and develop guidelines based on research.

In TOPOFF drills, two important deficiencies were identified: lack of a well-run communication network and inadequate "surge" response to the sudden influx of injured and "worried well" in health care facilities. Technological advancements will address the former; the latter will require improved public education.

RDD research has been conducted at Sandia National Laboratory for over 20 years using 8 high-priority radionuclides and ERAD modeling. The results provide technical basis to assess likely impact, potential health effects, and appropriate emergency response plans. Based on these findings, the area where acute health effects are possible, and the lesser-affected areas with levels that meet the EPA evacuation criteria of 10-50 mSv are bound within a 500 m radius.

This is good news for first responders and for affected area residents. Further DHS-funded study involved a review of this research by over 200 potential community users. The management of "the worried-well" was a concern.

Most people worry about cancer. Based on risks observed in populations exposed to high doses at high dose rates, the ICRP/NCRP use the LNT model to estimate risks at low-levels. No scientific data support these estimates. They add to the confusion and difficulty of communicating radiation risks to the general public. The irrational fear of radiation has led to serious consequences.

With regard to the dose-effect relationship, the main contribution came from radiobiological research. Recent years brought enormous advances, which clearly dispel the notion that any level of radiation is dangerous. In fact, radiation is a very weak carcinogen.

Living organisms have a capacity to maintain system's integrity through complex and efficient defense mechanisms against genotoxic agents. On a cellular level, depending on the dose, dose rate and the LET of radiation, not the same genes are transcribed. Gene expression profiles may assist us in distinction between injured and worried-well.

We have a professional responsibility to question unreasonable estimates of the number of cancers in large populations of individuals exposed to low levels of radiation, particularly in emergency situations. We need to continue working on the means of disseminating facts and rebut bias information about radiation.