

THE NEED FOR RAPID BIODOSIMETRY IN PUBLIC HEALTH EMERGENCIES INVOLVING RADIATION

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The Centers for Disease Control and Prevention (CDC) supports the Department of Health and Human Services (DHHS) under the National Response Framework as part of the overall federal response to a radiological or nuclear emergency. In that capacity, a crucial CDC role is to provide advice and guidance on assessing and treating exposed and contaminated individuals to State, tribal, and local public health officials and medical response personnel. In addition, the CDC may supply medical countermeasures through deployment of the Strategic National Stockpile.

In the aftermath of a mass casualty radiological or nuclear event, initial evaluation of individuals must include rapid assessment of radiation exposure and body burden of radioactive contamination. Should an event occur in a heavily populated urban area, potentially thousands of people will require or seek immediate screening as a part of medical triage and delivery of critical care. Because medical countermeasures represent a limited commodity, care should be taken to avoid distributing these resources to large numbers of individuals who may not benefit from their administration. Furthermore, all medicines carry some inherent risk of adverse effects and it is in the best interest of the public's health not to provide countermeasures without strong evidence of need.

Current field methods for prompt evaluation rely heavily upon an individual's location relative to the incident and time to onset of vomiting and nausea, as outlined in DHHS's guidance on Radiation Event Medical Management (<http://remm.nlm.gov>). While useful, these methods alone are not reliable indications for exposure or internal contamination assessment and reliance upon them may give rise to inappropriate allocation and distribution of medical countermeasures. Furthermore, waiting for definitive findings of exposure or internal contamination may require a delay of hours to days; such delays can appreciably diminish treatment efficacy.

It is paramount that techniques and instrumentation be developed that will allow responders in the field to rapidly identify acute and potentially lethal radiation exposures as well as internal contamination likely to have a significant adverse effect on an individual's health. Although results must be reliable and reproducible, for rapid screening they do not require the precision, accuracy, or sensitivity of traditional cytogenetic or radioanalytic laboratory measurements. Ideally, such devices should be: (1) economical for purchase by local emergency medical services; (2) portable and easily used by those properly trained; and (3) free of contamination interference in their operation so that they can be readily used at or near incident sites.