

**Background:** Radioactive contamination can arise from accidents involving nuclear reactors, industrial sources, or medical sources. Uncontrolled chain reaction during nuclear reactor accident or nuclear bomb explosion results in the release of a number of radionuclides, especially the long-lived radioisotopes.

**Methods:** The Phase Inversion Temperature (PIT) method was employed for the preparation of nanoemulsion. Prepared nanoemulsion was found to be uniformly homogenous and stable. Dynamic Light Scattering (DLS) measurements were carried out using Nano-sizer/Zetasizer ZS (HORIBA La-900, UK). Globule size of the nanoemulsion is in the expected nano-range. The globules of nanoemulsion are in the expected nano-range, as determined by using the Transmission Electron microscope (Morgagni 268D, FEI, Holland). The homogeneous phase of the nanoemulsion was determined by acquiring confocal microscopic images of the Rhodamine 123-treated nanoemulsion with an optical Leitz Confocal microscope (Leica TCS SP2 UV, Wetzlar, Germany) equipped with Coolsnap ES camera (Roper Scientific, Evry, France).

**Results:** Before and after each decontamination attempt, whole body counts were recorded with NaI(Tl) detectors mounted on chair geometry. The 1,026 channel acquisition time was kept as 10 minutes. A significant decrease in the radioactivity were recorded for  $^{99m}\text{Tc}$ ,  $^{131}\text{I}$  &  $^{201}\text{Tl}$ . The results obtained comply with the previously published results.

**Conclusion:** Developed nanoemulsion could be effectively used for decontamination of the radioisotopes from skin. To remove most of the contaminants, only one to two decontamination attempts are enough. Radioactive waste generation could also be limited. These studies show that the nanoemulsion of p-tertbutylcalix[4]arene could be used as a decontamination formulation against the broad range of radioactive nuclides.

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### Let There be Light: Evaluating Decontamination Effectiveness during a Large-scale Simulation of a CBRNe Disaster

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**Study/Objective:** Evaluate the effectiveness of patient decontamination during a disaster simulation using a visual tool.

**Background:** Chemical, biological, radiological, nuclear, and explosive (CBRNe) disasters have significant impact on affected populations. Health care workers (HCWs) must be prepared to execute a Disaster Plan in order to mitigate the

negative health outcomes of such events. Decontamination constitutes a major component of disaster response. It optimizes health outcomes by limiting the incidence of secondary, contaminant-mediated injury. Maintaining a "locked down" of the decontaminated care area also reduces the risk of significant injury among exposed HCW and uncontaminated patients. This study proposes an objective assessment of decontamination effectiveness, which lacks in the literature.

**Methods:** We organized the largest documented pediatric, hospital-wide, disaster simulation with 64 simulated patients and 97 HCW participants. After a brief training, participating HCWs executed the decontamination procedure for the first time. Liquid-based *Glo Germ*<sup>TM</sup> was randomly applied on different body areas, and recorded in 30 simulated patients. Using an ultraviolet light, two independent raters evaluated the total contaminated body surface area before and after decontamination. Simulated patients triaged as contaminated went through a sequence of undressing, followed by low-pressure, high-volume water and soap washing. Effectiveness of decontamination was calculated using a prepared standardized diagram of body surface area. Inter-rater reliability was assessed with a two-way, mixed consistency, average-measures, intra-class correlation coefficient (ICC) using SPSS.

**Results:** Undressing followed by washing led to an average 80.6% reduction in total body contamination (95% CI [73.6-87.6]). The ICC was 0.91 (95% CI [0.81-0.96]), indicating that decontamination was evaluated similarly between raters.

**Conclusion:** A liquid-based visual tool, used as a way to determine decontamination efficacy, is easily obtainable and innovative, and it can help establish verifiable decontamination standards in disaster literature. Undressing followed by washing led to an average 80.6% decrease in total body contamination.

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### Preparing a Tertiary Medical Center for a "Dirty-Bomb" Threat

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**Study/Objective:** To review hospital preparations and drill design, of a tertiary medical center for a "dirty-bomb" scenario.

**Background:** Terror risk in general, and specifically the risk of terror related to a dirty bomb deployment has increased in recent years. Though the radiation injuries expected to occur in such a scenario are minor, in comparison to the conventional injuries, the psychological impact and the resulting area contamination are expected to be significant. The Israeli Ministry of Health guides and evaluates public hospitals preparedness measures, for a variety of conventional and non-conventional scenarios; these include radiological threats. In April 2016 following 6 months of preparations, a "dirty-bomb" drill was conducted at the Beilinson tertiary medical center.

**Methods:** Descriptive analysis of the drill design and the preparatory actions.