From Japan to the World

The Radiation Emergency Medical Assistance Team and Their Vehicles

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A radiation emergency medical assistance team (REMAT) has been established in Japan by the National Institute of Radiological Sciences (NIRS) to support the initial treatment of individuals injured by radiation exposure and contamination due to radiation accidents overseas. This team consists of physicians specializing radiation exposure, exposure-dose assessment experts and radiation protection, and logistics support. The REMAT can respond to a variety of nuclear accidents overseas, carrying medical supplies including decontamination agents and several portable radiation measurement instruments, and the team can then communicate through satellite mobile phones with the NIRS headquarters. NIRS suggests the appropriate medical treatments and exposure dose assessment via the satellite phones. REMAT has already been deployed for the initial medical treatment of individuals injured due to the Fukushima Nuclear Power Plant Accidents in March 2011.

After the Fukushima accident, REMAT developed three types of vehicles for use during radiation emergencies. These vehicles are used to send the REMAT members to accident sites and transport radiation equipment, communication tools, food, and drinking water. The first is a commander's vehicle (Fig. 1). Staff members communicate with the NIRS headquarters to obtain the latest information about accidents, victims, and the head of medical support at accident sites. The vehicle has a shower booth for radioactive decontamination, approximately 40 radiation survey meters [GM counters, NaI(Tl) scintillators, and neutron REM counters] and many radiation protection suits, stored in the side hatch of the car. The team members can stay at the accident site for several days in this vehicle.

The second vehicle is an ambulance (Fig. 2) that can transport six radioactive contamination-injured individuals simultaneously. It has two beds plus four chairs for the less severely injured. A variety of emergency equipment is installed in the ambulance, including first-aid oxygen, a portable medical monitor, a semiautomatic defibrillator, an aspirator, a portable ultrasonograph and a skin-surface recoding camera. In addition to emergency medical kits, iodine tablets and decontamination reagents are carried.

The third vehicle is a measurement vehicle (Fig. 3), specialized for internal-exposure dose estimation. A lead-shielded high-purity germanium (HPGe) detector, a glove box for radiobioassay and a medicine cabinet are installed in the vehicle. A variety of portable radiation instruments are carried

Fig. 1 Commander's vehicle. Many radiation survey meters and radiation protection suits are stored in the side of hatch of the car.

Fig. 2 Ambulance can transport six radioactive contamination-injured individuals simultaneously.

Fig. 3 Measurement vehicle, specialized for internal-exposure dose estimation.

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for dose assessment and the identification of radionuclide contamination in the field, including a handy-type HPGe and NaI(Tl) scintillation spectrometers, several alpha/beta/photon contamination detectors, and an alpha/beta wide-area Si-type contamination survey meter.

In each vehicle, satellite mobile phones and radiation spectrometers are installed. During accidents, the team members communicate with each other and the NIRS headquarters by using the satellite phone, and they transmit the measurement data to the NIRS for further data analysis. The radiation spectrometers measure photon doses from

0.01 mSv/h to 10 Sv/h, and the count rate of neutron detection with an energy range from thermal neutron to 15 MeV. The measurement data obtained with these detectors, along with a GPS (global positioning system) map and CCD views, are shared with each vehicle and the NIRS headquarters. The REMAT members can also control the length of their stay in a highly radioactive zone by monitoring the measurement data.

These vehicles are prepared to respond to a nuclear accident at any time. They have also been to several hospitals for the training of hospital staff on how to respond to a nuclear accident.