LESSONS OF THREE MILE ISLAND FOR THE HEALTH CARE COMMUNITY

Niel Wald, M.D.

Some of the lessons to be learned from the Three Mile Island emergency and its aftermath can be quite instructive despite the absence of any clinically significant radiation injuries.

The emergency took place on March 28, 1979. A very damaging sequence of events led to uncovering and overheating of the reactor core, massive fuel damage, and release of a large amount of radioactivity into the plant structure. Off-site releases of radioactivity were minor but widespread public confusion and fear were immense. The core was reduced to less than two-thirds of its former size because of melting fuel rods, which led to puddling at the bottom of the reactor vessel of a composite of fuel and cladding. The clean-up has taken a number of years and is still not complete.

EFFECT ON POPULATION

It is important to recognize that a significant population lived and worked in the Three Mile Island area--about 36,000 people within five miles, more than 150,000 within ten miles, and nearly 750,000 within twenty miles. Some 24,000 residents evacuated themselves from the area in the course of the accident.

Many different groups estimated the amount of radioactivity released and the exposure of the population.[1] Other than the noble gases, only about 15 Ci of radioiodine were released. Thus, a maximally exposed individual theoretically would have received 80 to 100 mrem. The average dose received by the population more than 50 miles away was 1.5 mrem. The composite population dose estimates for the population at risk, obtained by multiplying the number of people by the average dose, were between 2,000 and 5,000 person-rem.

From prior epidemiologic studies of irradiated populations, 750,000 people exposed to 1.5 mrem would be expected to develop less than one case of cancer. The inference is that no real carcinogenesis is expected or, at the very least, the incidence would be very minimal and would be lost among the much larger number of cases that occur spontaneously.

Professor and Chairman of the Department of Radiation Health, University of Pittsburgh Graduate School of Public Health, Pittsburgh, Pennsylvania.