

Potassium Iodide (KI)

IMPORTANT PUBLIC HEALTH MEASURE FOLLOWING A NUCLEAR ACCIDENT

The devastating events at the Fukushima Daiichi nuclear power plant in March 2011 remind us of the potential gravity of a radiological accident at one of the nation's 104 operating nuclear reactors. With some 120 million Americans living within 50 miles of an aging nuclear reactor, it is critical that every necessary step is taken to ensure the health and safety of the public through comprehensive emergency planning and preparation.

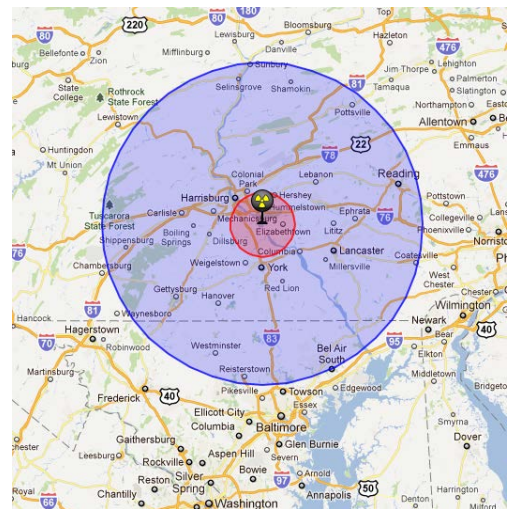
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The National Institutes of Health, the American Academy of Pediatrics, and the National Academy of Sciences agree that the administration of potassium iodide (KI) is a simple, cost-effective public health measure following a nuclear accident, especially for children.ⁱ Taken within a few hours of exposure to the radioactive plume released during the accident, it can block uptake of radioactive iodine by the thyroid gland, therefore reducing the radiation dose to the thyroid.

Three Mile Island and the Rush for KI

Though the National Council on Radiation Protection and Measurements recommended in 1977 that KI be considered as a thyroid blocking agent during radiological emergencies, the Nuclear Regulatory Commission (NRC) failed to implement this recommendation and did not require that KI be available for populations near reactors.ⁱⁱ The NRC's inaction put thousands at risk during the 1979 nuclear accident at the Three Mile Island nuclear plant in Pennsylvania. Shortly after the start of the incident, the Food and Drug Administration (FDA) sought to distribute KI pills in Pennsylvania, but soon found that pharmacies did not have enough KI on hand to meet the state's needs. Since the NRC had not required the distribution of KI to citizens within the 10-mile emergency planning zones, drug manufacturers had not produced a sufficient supply and bottles of KI had to be shipped via Air Force cargo jets from out of state.ⁱⁱⁱ

Emergency Planning Zones



This is an image of the emergency planning zones (EPZ) around the Three Mile Island nuclear power station in Pennsylvania. The 10 mile EPZ is represented in red and the 50 mile EPZ in purple. Source: Physicians for Social Responsibility, [Vacuation Zones for Nuclear Reactors](#), 2011.

Contrary to the lack of preparation in the case of Three Mile Island, the USSR was well stocked with KI during the Chernobyl accident in 1986, and distributed KI tablets to approximately 135,000 residents within a 19 mile radius of the reactor.^{iv} Reports on the incident indicate that the Soviet government was well prepared for large-scale

distribution of KI and suggest that the levels of radioiodine measured in thousands of thyroid glands following the incident was much lower than expected, thanks in large part to the prompt distribution of KI tablets.^v

The drug is most effective if taken one hour before exposure, so emergency preparation for quick distribution is essential. In the United States, the Nuclear Regulatory Commission (NRC) will pay for the pre-staging of KI for businesses and residents within a 10-mile emergency planning zone if requested by the governor of the state where the reactor is located. However, in the wake of an accident, the administration of KI could be useful beyond the 10 mile radius, since radioactive iodine could be carried downwind beyond this area. The aftermath of Fukushima has confirmed significant radiological impacts beyond the 10-mile radius and, for example, the United States urged Americans to stay at least 50 miles from the power plant following the accident.

Bioterrorism Act and Executive Waivers of KI distribution

A provision of the Bioterrorism Act of 2002 established a program to make KI free to state and local governments within the emergency planning zone and extended the federal distribution limits to 20 miles from each nuclear power plant. Previously, federally funded distribution was limited to a 10-mile radius from the plants, and KI was only distributed to states that requested the drug from the NRC.

However, Section 127(f) of the law contained a provision that allowed this requirement to be waived if the President determined that an alternative and more effective measure existed to prevent adverse impacts to the thyroid. Section 127(f) was included in the Act to account for the future development of drugs or methods that would offer superior radiation protection. However, in 2008, the White House Office of Science and Technology Policy (OSTP) issued this waiver on the grounds that evacuation of the 10-20 mile zone would be a more effective way to protect the thyroid from radioactive iodine than would the administration of KI tablets alone. However, the OSTP did not consider the case where the distribution of KI would occur in conjunction with evacuation. In issuing the waiver, John H. Marburger, director of the OSTP under the Bush Administration, stated that the evacuation of people within the 10 mile radius would be easier than distributing the pills in advance, and noted that the distribution of KI pills would have a “misleading psychological effect” on the population at risk.^{vi}

U.S. Representative Edward J. Markey (D-MA) has repeatedly called for the distribution of KI beyond the 10 mile limit, the enforcement of the 2002 law and the repeal of the Section 127(f) waiver. Nevertheless, the Obama administration has decided to implement the waiver of the former administration.

ⁱ The American Academy of Pediatrics. 2003. Radiation Disasters and Children. PEDIATRICS Vol. 111, No. 6, 1455-1466. Online at <http://pediatrics.aappublications.org/content/111/6/1455.full>

Tollerud, David J. Distribution and Administration of Potassium Iodide in the Event of a Nuclear Incident. National Research Council, Washington D.C.: National Academy Press, 2003. Online at <http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=10868>

ⁱⁱ Kemeny, John G. et al. 1980. Need for a Change: the Legacy of Three Mile Island. The President's Commission of Three Mile Island. 41-42.

ⁱⁱⁱ Ibid.

^{iv} U.S. Department of Energy, et al. 1987. Report on the Accident at the Chernobyl Nuclear Power Station, NUREG-1250. U.S. Nuclear Regulatory Commission. 5-9, 7-7.

^v Ibid.

^{vi} Wald, Matthew L. 2009. White House is urged to Help States with Nuclear Power Plants Stockpile Thyroid Drug. *The New York Times*. <http://www.nytimes.com/2009/12/07/health/policy/07tablets.html>

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