

A Fact Sheet on Potassium Iodide (KI)

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Fact Sheet on Potassium Iodide (KI)

What is potassium iodide (KI)?

Potassium iodide is a salt, similar to sodium chloride (NaCl), normal table salt. Its chemical symbol is KI, representing a compound of potassium (K) and iodine (I).

Iodine is used by the thyroid gland to produce hormones. Iodine normally enters the bloodstream from the food we eat. The thyroid is designed to absorb and store iodine, but it can hold only so much, so it is constantly removing iodine from the bloodstream. KI is added to table salt ("iodized salt") to provide a source of dietary iodine.

KI has another important use. The U.S. Food and Drug Administration (FDA) classifies KI as a non-prescription drug approved for over-the-counter sale as a safe and effective method to block exposure to one product of a nuclear release – radioactive iodine (radioiodine).

What is the benefit of taking KI during a radiological emergency?

Radioiodines are by-products of nuclear fission. An accident involving a nuclear reactor or nuclear weapon could release potentially harmful amounts of radioactive iodine into the environment.

Inhalation of radioiodine, or ingestion through contaminated food or milk increases the radiation dose to the thyroid gland and to the rest of the body. Radiation to the thyroid gland of children increases their risk of developing thyroid cancer later in life. Large amounts of radioiodine in the adult thyroid gland can lead to a reduced functioning of the gland and additional radiation dose to the rest of the body.

Taking KI is a method of blocking the thyroid's absorption of radioiodine. KI provides a "loading dose" of stable iodine that saturates the bloodstream. If an appropriate dose of KI is taken before exposure to

radioactive iodine occurs, the thyroid's demand for iodine will have been satisfied, absorption of radioiodine from the bloodstream will be limited, and the risk of thyroid effects will be reduced. The body will then eliminate the radioactive iodine, primarily through the urine, over a period of a week or two.

New treatment guidance from the FDA (Nov. 2001) confirms that the benefits of KI far outweigh the rare risks of serious side effects. This is especially true for children, who are more likely than adults to develop thyroid cancer following exposure to radioactive iodine. The FDA's position is based on a comprehensive review of studies conducted after the Chernobyl nuclear reactor accident in 1986.

What are the limitations to taking KI during a radiological emergency?

KI is not a "magic bullet" that will provide protection from any type of radiation exposure. It serves a very specialized function – it protects one organ (thyroid gland) from one type of radiation (radioactive iodine). KI does not offer protection against the many other types of radioactive material that can be released into the environment in the event of a radiological incident. For example, KI would offer no protection from a "dirty bomb." A dirty bomb is a conventional explosive device incorporating radioactive material. It is designed to produce contamination with the radioactive material and instill fear and panic in people near the explosion. It is extremely unlikely for radioiodine to be used in a dirty bomb due to its short half-life and low radiotoxicity compared to other radioactive materials.

KI should not be taken simply because there is a public notification of a radiological emergency. State and local authorities will advise the public when it is appropriate to consume the drug based on whether a radioiodine hazard exists.

Taking KI is *not* a substitute for evacuation or sheltering in place when state and local authorities recommend those actions. The most effective means of preventing unnecessary exposure is to follow the broadcast recommendations provided by local officials. KI is also not a substitute for avoiding consumption of contaminated food, milk and water following a radiological incident.

What is Florida's KI policy?

The state, in cooperation with county and local officials, has stockpiled KI pills in strategic locations for distribution to members of the general public located near the state's nuclear power plants in the event of a radiological emergency with the risk of exposure to radioiodine. Distribution of KI will occur at selected reception centers that are currently part of local plans for nuclear power plant emergencies. These reception centers will be located outside of the evacuated areas, thereby ensuring that residents and the community will not be delayed from evacuating a contaminated area.

Strategically stockpiling KI allows the greatest flexibility in distributing it to the populations at greatest risk of exposure to radioiodine. In the case of a radiological emergency, the locations of the centers will be broadcast on local emergency broadcast systems.

Florida also maintains regional stockpiles of KI that can be used in the event of a radioiodine release that occurs outside the vicinity of the state's nuclear power plants. In the event of such an emergency, the public should listen to the local emergency broadcast messages where all protective action recommendations will be communicated regarding evacuation, sheltering and the distribution of KI to the general public.

When should KI be taken?

The effectiveness of KI as a thyroid-blocking agent depends on when it is consumed. Ideally, it should be taken no more than four hours *before* exposure occurs so there is time for the drug to be absorbed into the bloodstream and made available to the thyroid prior to any exposure. The drug's effectiveness is diminished once radioiodine has been ingested or inhaled, but significant benefits are obtained even if KI is taken several hours after radioiodine exposure occurs. The protective effect of KI lasts approximately 24 hours.

KI should *not* be taken simply because there is a public notification of a radiological emergency. State and local authorities will advise the public when it is appropriate to consume the drug based on whether a radioiodine hazard exists.

Can I have KI on hand for my personal use?

The FDA has approved KI as an over-the-counter medication. As with any medication, individuals should check with their doctor or pharmacist before using it. KI is commercially available from a number of suppliers that can be readily located through an Internet search.

Is KI safe for everyone?

The KI available to Florida residents is in pill form; each tablet contains a daily adult dosage of 130 milligrams (mg). The FDA has issued age-related guidelines on the amount of KI that can be safely consumed. These guidelines are important to follow, particularly for children and infants whose thyroid glands are more active than adult thyroids and thus more sensitive to iodine levels. The complete FDA guidance may be found on the Internet at <http://www.fda.gov/cder/guidance/index.htm>.

While there have been minimal side effects observed in large populations administered KI (such as after the Chernobyl accident), KI is a pharmaceutical that should be taken only on the advice of health-care advisers.

Those who have a known allergy to iodine, such as those who must avoid certain seafood and other foods with high natural iodine content, should *not* consume KI. Severe allergic reactions could result. Those suffering certain thyroid disorders or taking thyroid medications, as well as pregnant women, nursing mothers, and individuals taking certain heart medications or antipsychotic drugs should consult their physicians before deciding to use KI.

Do not substitute other sources of iodine (such as iodine tablets for water purification or Tincture of Iodine drops) for KI. These products contain a different form of iodine that can be poisonous if misused.

In some instances, those who consume KI, particularly for prolonged periods or in larger than recommended doses, may encounter side effects such as skin rashes, swollen neck glands, stomach upsets, or diarrhea. More serious allergic reactions may produce fever, joint pain, facial swelling or shortness of breath. Should any adverse reaction occur, stop taking the drug and seek immediate medical attention.

As with any medication, you should consult your physician to determine if KI is safe for you. Keep KI and all drugs out of the reach of children.

Is there an alternative to taking KI pills?

The absolute best protection is to not get exposed to ANY unjustified radiation. This includes radiation from radioiodine and the many other radionuclides that could be released from a nuclear accident. The primary protective action in State emergency response plans is evacuation and sheltering. Administration of KI is a supplemental action when it is warranted. If advised by State Health Officials to evacuate or shelter, this should be done immediately.

Where can I get more information?

The following links provide additional information on KI:

- Federal Emergency Management Agency: “Federal Policy on the Use of Potassium Iodide” http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2002_register&docid=02-637-filed.pdf
- U.S. Food and Drug Administration (FDA): Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies” <http://www.fda.gov/cder/guidance/4825f1.htm>
- U.S. FDA: Home Preparation Procedure for Emergency Administration of Potassium Iodide Tablets to Infants and Small Children” <http://www.fda.gov/cder/drugprepare/kiprep.htm>
- U.S. Nuclear Regulatory Commission: “Frequently Asked Questions About Potassium Iodide” <http://www.nrc.gov/what-we-do/regulatory/emer-resp/emer-prep/ki-faq.html>
- Health Physics Society: “HPS Fact Sheet – Potassium Iodide” <http://hps.org/documents/kifactsheetdetail.pdf>

- HPS: “Is Potassium Iodide a “Magic Bullet” for Radiation Exposure?”
<http://hps.org/documents/kifactsheetbrief.pdf>

If you have any questions regarding Florida’s KI policy or the state’s radiological emergency response plans, contact:

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