

Potassium Iodide

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Chernobyl has shown, and continues to reveal, that the greatest danger from radioiodine is to the tiny thyroid glands of children.

Health experts now estimate that the greatest health concerns affecting the largest number of people from a nuclear accident, or nuclear bomb explosion(s) anywhere in the world, will likely be from the release of radioiodine that is then carried downwind for hundreds of miles. While there will also be many other dangerous radioisotopes released along with radioiodine, if they are inhaled or ingested they are normally dispersed throughout a body and pose less of a risk than if they were to be concentrated into one small specific area of the body, like radioiodine is in the thyroid gland. So, as a plume or cloud of radioactive isotopes disperses with the wind its danger also diminishes, but much less quickly so for radioiodine because whatever little there is that's inhaled will always then be concentrated into that small space of the thyroid gland.

Taking either Potassium Iodide (KI) or Potassium Iodate (KIO₃) before exposure will saturate (fill up) a person's thyroid gland with safe stable iodine to where there is no room for later uptake of radioactive iodine. Once the thyroid is saturated, then any additional iodine (radioactive or stable) that is later inhaled or ingested is quickly eliminated via the kidneys.

RDD (Radiological Dispersal Device). Radioactive Iodine is only produced by a fission or fusion weapon detonation or in a Nuclear Power Plant as a byproduct of that process. An RDD simply spreads around existing radioactive material and it's not very likely to have been composed of the relatively short half-life radioactive iodine. We'd more likely see used in an RDD a commercially abundant, and more easily obtained, isotope like Cobalt-60, Cesium-137 or uranium fuel rods, etc.

Potassium Iodide

Q: Quick Summary of FAQ.

A: Documentation and details of the following (and much more) are below in the FAQ:

- Radioactive Iodine (Radioiodine) is a major radioisotope constituent of both nuclear power plant accidents and nuclear bomb explosions and can travel hundreds of miles on the winds. Thyroid cancer attributable to Chernobyl "*...has been documented up to 500 km from the accident site.*"
- Even very small amounts of inhaled or ingested radioiodine can do grave damage as it will always concentrate, and be retained, in the small space of the thyroid gland. Eventually giving such a large radiation dose to thyroid cells there that abnormalities are likely to result, such as loss of thyroid function, nodules in the thyroid, or thyroid cancer. (Each year 12,000 Americans discover they have thyroid cancer, though from various assorted causes, and about 1000 die from it.)
- Chernobyl has shown, and continues to reveal, that the greatest danger from radioiodine is to the tiny thyroid glands of children. Researchers have found that in certain parts of Belarus, for example, 36.4 per cent of children, who were under the age of four at the time of the accident, can expect to develop thyroid cancer.
- Health experts now estimate that the greatest health concerns affecting the largest number of people from a nuclear accident, or nuclear bomb explosion(s) anywhere in the world, will likely be from the release of radioiodine that is then carried downwind for hundreds of miles. While there will also be many other dangerous radioisotopes released along with radioiodine, if they are inhaled or ingested they are normally dispersed throughout a body and pose less of a risk than if they were to be concentrated into one small specific area of the body, like radioiodine is in the thyroid gland. So, as a plume or cloud of radioactive isotopes disperses with the wind its danger also diminishes, but much less quickly so for radioiodine because whatever little there is that's inhaled will always then be concentrated into that small space of the thyroid gland. The *good news* is that taking either Potassium Iodide (KI) or Potassium Iodate (KIO₃) before exposure will saturate (fill up) a persons thyroid gland with safe stable iodine to where there is no room for later uptake of radioactive iodine. Once the thyroid is saturated, then any additional iodine (radioactive or stable) that is later inhaled or ingested is quickly eliminated via the kidneys.
- The *bad news* is that after Three Mile Island and Chernobyl all available KI and KIO₃ supplies disappeared for months, almost overnight! The KI and KIO₃ market is very thin and current limited inventory will be quickly depleted in any nuclear emergency occurring anywhere in the world.
- Potassium Iodide (KI) and/or Potassium Iodate (KIO₃) has already been stockpiled by most developed countries for future nuclear emergencies, they figured it out after

Chernobyl, but here in the USA they've only just begun. (We just sold 300,000 doses to HHS Office of Emergency Preparedness.) However, very limited quantities are available for individual purchase in the USA by the public. (Potassium Iodide (KI) has long been recognized and approved by the FDA for sale for this purpose without a prescription. Unfortunately, it is an over-the-counter (OTC) drug that's to be found on too few counters here in the USA!)

Q: What is Potassium Iodide (KI)?

A: Potassium Iodide (chemical name 'KI') is much more familiar to most than they might first expect. It is the ingredient added to your table salt to make it *iodized* salt.

Potassium Iodide (KI) is approximately 76.5% iodine.

For purposes of radiation protection the Nuclear Regulatory Commission (NRC) states in **COMSECY-98-016 - FEDERAL REGISTER NOTICE ON POTASSIUM IODIDE:**

"In 1978, the U.S. Food and Drug Administration found KI "safe and effective" for use in radiological emergencies and approved its over-the-counter sale."

Most recently (November, 2001) the FDA states in **Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies:**

"FDA maintains that KI is a safe and effective means by which to prevent radioiodine uptake by the thyroid gland, under certain specified conditions of use, and thereby obviate the risk of thyroid cancer in the event of a radiation emergency."

Q: How Does Potassium Iodide (KI) Pill Provide Anti-Radiation Protection?

A: Going back to June 23, 1966, the **New England Journal of Medicine. Vol. 274** on Page 1442 states:

"The thyroid gland is especially vulnerable to atomic injury since radioactive isotopes of iodine are a major component of fallout."

Cresson H. Kearny, the author of **Nuclear War Survival Skills**, Original Edition Published September, 1979, by Oak Ridge National Laboratory, a Facility of the U.S. Department of Energy (Updated and Expanded 1987 Edition) states on **page 111**:

"There is no medicine that will effectively prevent nuclear radiations from damaging the human body cells that they strike."

However, a salt of the elements potassium and iodine, taken orally even in very small quantities 1/2 hour to 1 day before radioactive iodines are swallowed or inhaled, prevents about 99% of the damage to the thyroid gland that otherwise would result. The thyroid gland readily absorbs both non-radioactive and radioactive iodine, and normally it retains much of this element in either or both forms.

When ordinary, non-radioactive iodine is made available in the blood for absorption by the thyroid gland before any radioactive iodine is made available, the gland will absorb and retain so much that it becomes saturated with non-radioactive iodine. When saturated, the thyroid can absorb only about 1% as much additional iodine, including radioactive forms that later may become available in the blood: then it is said to be blocked. (Excess iodine in the blood is rapidly eliminated by the action of the kidneys.)"

The Nuclear Regulatory Commission (NRC) stated July 1, 1998 in **USE OF POTASSIUM IODIDE IN EMERGENCY RESPONSE:**

"Potassium iodide, if taken in time, blocks the thyroid gland's uptake of radioactive iodine and thus could help prevent thyroid cancers and other diseases that might otherwise be caused by exposure to airborne radioactive iodine that could be dispersed in a nuclear accident."

Federal Register. Vol. 43 Friday, December 15, 1978, states in Potassium Iodide as a Thyroid Blocking Agent in a Radiation Emergency:

"Almost complete (greater than 90%) blocking of peak radioactive iodine uptake by the thyroid gland can be obtained by the oral administration of ... iodide ..."

National Council on Radiation Protection and Measurements. NCRP Report NO. 55. Protection of the Thyroid Gland in the Event of Releases of Radioiodine. August, 1979, Page 32:

"A major protective action to be considered after a serious accident at a nuclear power facility involving the release of radioiodine is the use of stable iodide as a thyroid blocking agent to prevent thyroid uptake of radioiodines."

The recently updated (1999) World Health Organization (WHO) **Guidelines for Iodine Prophylaxis following Nuclear Accidents** states:

"Stable iodine administered before, or promptly after, intake of radioactive iodine can block or reduce the accumulation of radioactive iodine in the thyroid."

And, finally, the recently (November, 2001) released FDA [document Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies](#) states:

"The effectiveness of KI as a specific blocker of thyroid radioiodine uptake is well established (Il'in LA, et al., 1972) as are the doses necessary for blocking uptake. As such, it is reasonable to conclude that KI will likewise be effective in reducing the risk of thyroid cancer in individuals or populations at risk for inhalation or ingestion of radioiodines."

Q: Is this the *Magic Anti-Radiation Protection Pill*?

A: Sorry, but there is no *magic pill* or medicine that will protect you from all radiation sources. In fact, as already stated above [here](#):

"There is no medicine that will effectively prevent nuclear radiations from damaging the human body cells that they strike."

Also, the recently (November, 2001) released FDA document

[Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies](#) states:

"KI provides protection only for the thyroid from radioiodines. It has no impact on the uptake by the body of other radioactive materials and provides no protection against external irradiation of any kind. FDA emphasizes that the use of KI should be as an adjunct to evacuation (itself not always feasible), sheltering, and control of foodstuffs."

Potassium Iodide (and Potassium Iodate, KIO₃) will provide a very high level of thyroid protection, taken in time, for the specific radio-isotopes of iodine, which is expected by many to cause the majority of health concerns downwind from a nuclear emergency. (And, is the reason most all developed countries have stockpiled it.)

However, there are numerous other, and very dangerous, radioactive noble gases and/or radioactive fallouts that can be associated with nuclear emergencies. You are still exposed to inhale, ingest, or be radiated externally from any number of dangerous non-radioiodine sources.

If you are ever directed to evacuate in a nuclear emergency, do so immediately, regardless of whether you have taken Potassium Iodide (KI) or KIO₃, or not.

Q: Radioactive Iodine: Bad News / Good News!?!

A: The "**bad news**" first:

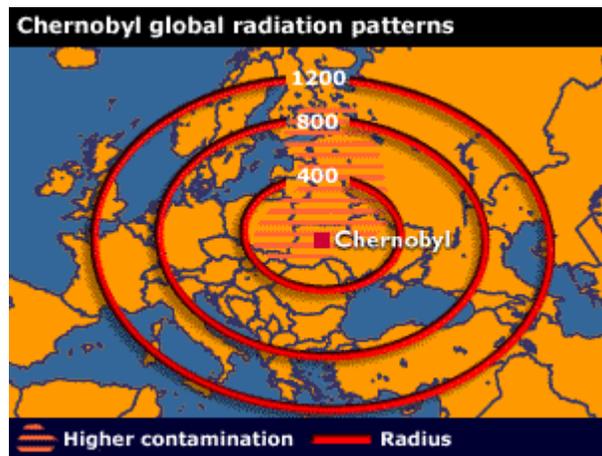
#1 - Radioactive iodine (predominantly iodine-131) is a major radioisotope constituent in nuclear power plants.

#2 - There are 103 currently active commercial nuclear reactors and 39 operating nonpower reactors in the United States. (434 worldwide as of 1998.) Additionally, there are numerous other nuclear processing and storage facilities worldwide with the potential for accidents, too.

The, September 29, 1999, Tokaimura, Japan nuclear accident took place, not in a nuclear reactor power plant, but in an uranium processing plant.

#3 - Radioactive iodine (predominantly iodine-131) is also a major constituent of detonated nuclear weapons.

#4 - Radioactive iodine can not only travel hundreds of miles on the winds, but also still remain health threatening even as other radioisotopes are becoming dispersed and diluted along with it and their likelihood of causing harm diminishes. It is often overlooked that while there will also be many other dangerous radioisotopes released along with radioiodine, if they are inhaled or ingested they are normally dispersed throughout a body and pose less of a risk than if they were to be concentrated into one small specific area of the body, like radioiodine is in the thyroid gland. As a plume or cloud of radioactive isotopes disperses with the wind its danger also diminishes, but always much less quickly so for radioiodine because whatever little there is that's inhaled will always be concentrated into that small space of the thyroid gland.



"...was detected in Belarus, Russia, and Ukraine. Notably, this increase, seen in areas more than 150 miles (300 km) from the site, continues to this day and primarily affects children who were 0-14 years old at the time of the accident...the vast majority of the thyroid cancers were diagnosed among those living more than 50 km (31 miles) from the site."

NUREG-1633 points out an increase in thyroid cancer caused by radioiodine from Chernobyl...

The recently updated (1999) World Health Organization (WHO) [Guidelines for Iodine Prophylaxis following Nuclear Accidents](#) states in its abstract regarding thyroid cancer caused by the Chernobyl disaster:

"This increase in incidence has been documented up to 500 km from the accident site."

...and therefore...

"...that stockpiling (KI or KIO3) is warranted, when feasible, over much wider areas than normally encompassed by emergency planning zones, and that the opportunity for voluntary purchase be part of national plans."

Many are coming to see now that relying on the current U.S. policy of public safety contingency plans focused on only protecting the populations inside a small "Emergency Planning Zone" (EPZ) of 5 to 10 miles around U.S. nuclear power plants is "overly optimistic", to put it very mildly.

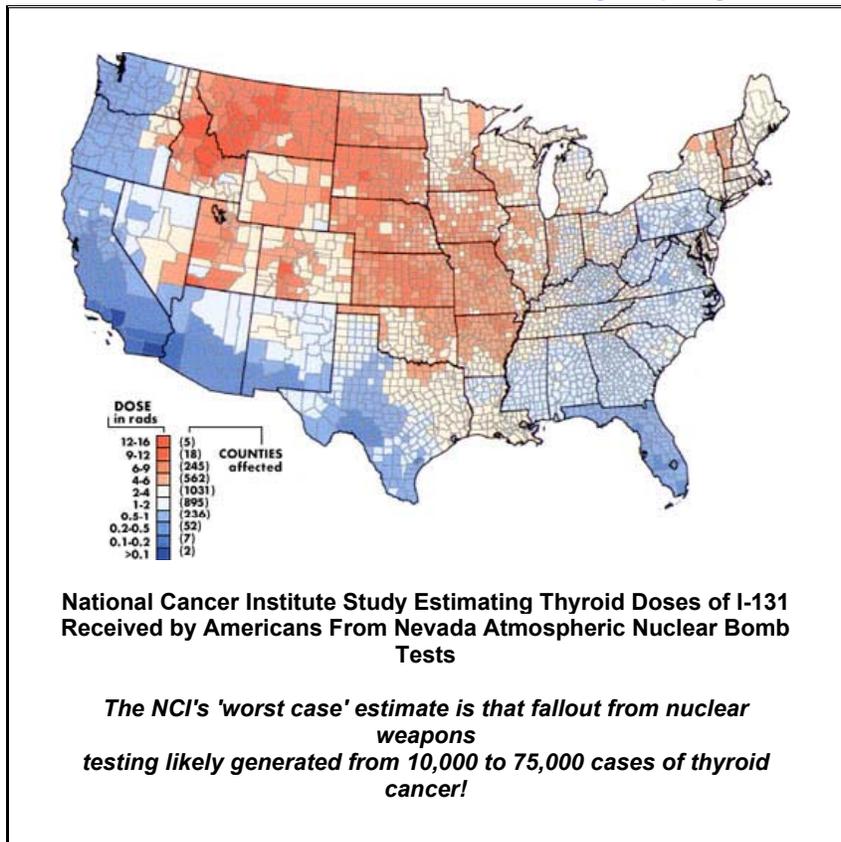
Undoubtably, US nuclear power plants are much better designed, operated, and safer than many others elsewhere in the world, and certainly many magnitudes safer than the Chernobyl operation ever was.

Without anyone debating here how likely anything is to ever go wrong, it must still be accepted by all that the logic of even having any EPZ's established is to effectively provide for the public safety in that rarest of events if/when anything did go wrong. If that's why we've even bothered with having any EPZ's at all, then shouldn't they be effective ones, if/when it's ever really needed to protect the public downwind? Reality is, the wind just won't know to stop blowing when it comes up against the currently tiny 5-10 mile EPZ 'barriers'.

Also, read the fascinating **Three Mile Island: The Rest of the Story... (Why current EPZ's are much too small.)**

The wind, of course, doesn't respect state boundaries either as our own Nevada atomic bomb testing program in the 1950s and early 1960s made it possible that *"...everyone living in the contiguous 48 states was exposed to low levels of 131Iodine (radioiodine) for several months following each nuclear bomb test."*

(Radiation Exposure and Thyroid Cancer - Memorial Sloan-Kettering Cancer Center) Even more importantly; *"The report also estimates that children aged three to five years probably received doses of radiation*



three to seven times higher than average during the 90 nuclear tests that were carried out."

Remember, it's always the children who are at the highest risk of injury from radioactive iodine and eventually developing thyroid cancer from that exposure. Each year, more than 12,000 Americans find out they have thyroid cancer, though from various causes. About 1000 here in the U.S. die from it yearly.

And, of course, the wind also doesn't respect international boundaries either, nor even continents and oceans, as fallout from a single above ground Chinese nuclear test explosion ("a few hundred kilotons") on December 28, 1966 resulted in the fallout cloud covering most of the United States.

From Cresson H. Kearny's [Nuclear War Survival Skills](#):

"It produced fallout that by January 1, 1967 resulted in the fallout cloud covering most of the United States. This one Chinese explosion produced about 15 million curies of iodine- 131 - roughly the same amount as the total release of iodine- 131 into the atmosphere from the Chernobyl nuclear power plant disaster."

"Fallout from the approximately 300 kiloton Chinese test explosion shown in Fig. 1 caused milk from cows that fed on pastures near Oak Ridge, Tennessee and elsewhere to be contaminated with radioiodine, although not with enough to be hazardous to health. However, this milk contamination (up to 900 picocuries of radioactive iodine per liter) and the measured dose rates from the gamma rays emitted from fallout particles deposited in different parts of the United States indicate that trans-Pacific fallout from even an overseas nuclear war in which "only" two or three hundred megatons would be exploded could result in tens of thousands of unprepared Americans suffering thyroid injury."

Getting Back To The Future...

Commenting on the world health effects a nuclear exchange between India and Pakistan would create, for example, Dr. Henry Kendall of the Union of Concerned Scientists said in October of 1999: *"It would be very similar to Cherynobl. But it could be on a substantially larger scale."*

Accordingly, you also have to assess the probable threat from nuclear war, either directed at the U.S. or fallout contamination originating from elsewhere in the world. Russia, China, North Korea, Pakistan, India, Middle East, etc., where any of them are exchanging nuclear blasts with any of their neighbors, could have the prevailing west-to-east trade winds carrying the resultant radioactive fallout to our shores, too.

You'll have to decide whether that's an impossible scenario in your families lifetime, or not. And, then prepare accordingly.

#5 - Radioactive iodine (radioiodine) persists in the environment for a month or more.

#6 - Most importantly, ingested or inhaled radioactive iodine (radioiodine) persists in the body and concentrates in the thyroid. (Excess iodine in the blood, either radioiodine or stable iodine, is quickly eliminated from the body, but only after the thyroid has become saturated with one or the other type of iodine.) Even very small amounts of radioactive iodine, because it is retained in the small space of the thyroid, eventually will give such a large radiation dose to thyroid cells there that abnormalities are likely to result. These would include loss of thyroid function, nodules in the thyroid, or thyroid cancer. The most likely to see the worst effects, in later life, are the youngest children. (Many of the Chernobyl thyroid cancers appearing in the former Soviet Union among young people today were just children less than five years old at the time of the accident. Experts now contend that as high as 40% of the nodules are cancerous with 5 to 10 percent of the cancers fatal.)

Every year researchers are discovering more from Chernobyl as its legacy continues to reveal itself. According to the World Health Organization, that disaster will cause 50,000 new cases of thyroid cancer among young people living in the areas most affected by the nuclear disaster. Researchers have also found that in certain parts of Belarus, for example, 36.4 per cent of children, who were under the age of four at the time of the accident, can expect to develop thyroid cancer.

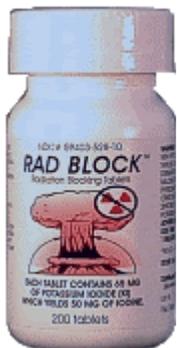
For all of the above reasons, health experts estimate that the greatest health concerns affecting the largest number of people from a nuclear accident, or nuclear bomb explosion(s) anywhere in the world, will likely be from the release of radioactive iodine then carried downwind.

However, there really is some Good News amongst all this!

This deadly cancer agent, especially to our children, is easily, cheaply, and effectively blocked!

As mentioned [above](#);

"...a salt of the elements potassium and iodine, taken orally even in very small quantities 1/2 hour to 1 day before radioactive iodines are swallowed or inhaled, prevents about 99% of the damage to the thyroid gland that otherwise would result."



The Nuclear Regulatory Commission (NRC) states in **COMSECY-98-016 - FEDERAL REGISTER NOTICE ON POTASSIUM IODIDE**:

The Chernobyl accident demonstrated that thyroid cancer can indeed be a major result of a large reactor accident. Moreover, although the Food and Drug Administration declared KI "safe and effective" as long ago as 1978, the drug had never been deployed on a large scale until Chernobyl. The experience of Polish health authorities during the accident has provided confirmation that large scale deployment of KI is safe.

Additionally, it goes on to say:

The revised policy also reflects wide scale change in international practice following the Chernobyl disaster, specifically 1989 World Health Organization recommendations (updated in 1995) and 1996 and 1997 International Atomic Energy Agency standards and guidance, which have led to use of KI as a supplementary protective measure in much of Europe, as well as in Canada and Japan.

Also, the newly released (November, 2001) FDA document entitled: **Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies** states:

"Thus, the studies following the Chernobyl accident support the etiologic role of relatively small doses of radioiodine in the dramatic increase in thyroid cancer among exposed children. Furthermore, it appears that the increased risk occurs with a relatively short latency. Finally, the Polish experience supports the use of KI as a safe and effective means by which to protect against thyroid cancer caused by internal thyroid irradiation from inhalation of contaminated air or ingestion of contaminated food and drink when exposure cannot be prevented by evacuation, sheltering, or food and milk control."

What they learned was that children, with their thyroid glands being the most sensitive to radioactive iodine uptake, have today grown up to be the most frequent victims of thyroid cancers there. The children in Russia, the Ukraine and Belarus, where potassium iodide (KI) was not widely distributed, are now experiencing high levels of thyroid cancer. However, in Poland, where over 18 million doses of Potassium Iodide (KI) were administered, and to 97 percent of the children, there has been no similar increase in thyroid cancer. Also, key to Poland's radioiodine protective strategy, was their aggressive interdiction of radioiodine contaminated food stuffs and milk.

Bottom Line: For all its serious potential for widespread damage to populations (and especially among our youngest), far downwind from the site of a nuclear event, radioiodine health concerns can be largely neutralized by inexpensive thyroid blocking via prompt prophylactic use of potassium iodide (KI). This, in addition to successful evacuation, when indicated, and vigilance that food and milk are not also radioiodine contaminated, has proven itself the best combination strategy.