What is DDT?
- DDT is an organochlorine insecticide that was first synthesized in 1874 (1, 2).
- DDT was a commonly-used pesticide for insect control in the United States until it was canceled in 1972 by the United States Environmental Protection Agency (EPA).

Why was DDT used?
- DDT was initially used by the military in WW II to control malaria, typhus, body lice, and bubonic plague (1). Cases of malaria fell from 400,000 in 1946 to virtually none in 1950 (3). DDT is still used today in South America, Africa, and Asia for this purpose.
- Farmers used DDT on a variety of food crops in the United States and worldwide. DDT was also used in buildings for pest control.
- The reason why DDT was so widely used was because it is effective, relatively inexpensive to manufacture, and lasts a long time in the environment (2).

Is DDT still used?
- DDT can still legally be manufactured in the U.S., but it can only be sold to, or used by, foreign countries. In the U.S. the only exceptions for DDT use are for public health emergencies involving vector (insect) diseases and control of body lice (4).
- DDT was canceled because it persists in the environment, accumulates in fatty tissues, and can cause adverse health effects on wildlife (5). In addition, resistance occurs in some insects (like the house fly) who develop the ability to quickly metabolize the DDT (1).
How does DDT work?
• DDT affects the nervous system by interfering with normal nerve impulses (2).

How toxic is DDT?

Animals
• DDT is slightly to moderately acutely toxic to mammals, including people, if eaten. See box on Laboratory Testing.

• DDT is poorly absorbed through mammalian skin, but it is easily absorbed through an insect’s outer covering known as an exoskeleton (2).

• Laboratory animals exposed to DDT develop hyperexcitability, tremors, incoordination, and convulsions (1). See boxes on Toxicity Category and LD50/LC50.

• Animals given potentially fatal doses of DDT develop liver lesions and those given DDT over a long period of time develop liver changes (1).

Humans
• People exposed to DDT while working with the chemical or by accidental exposure report a prickling sensation of the mouth, nausea, dizziness, confusion, headache, lethargy, incoordination, vomiting, fatigue, and tremors (2).

Does DDT cause reproductive or birth effects?

Animals
• Dogs fed DDT in low doses do not have reproductive effects (1).

• Rats become sterile after being fed DDT (7).

• Mice fed low levels of DDT have embryos that fail to attach to the uterus and irregular reproductive cycles (7). The offspring of mice fed DDT have a higher mortality rate (1).

• One of the breakdown products of DDT, DDE³, causes thinning of eggshells in birds (8).

Humans
• Scientists have no data indicating DDT causes reproductive problems or birth defects in humans.
Does DDT cause cancer?

**Animals**
- Mammals exposed to DDT develop liver tumors and have an increased risk of liver tumors (1).
- In one study where female and male mice consumed doses of DDT for life, the males were twice as likely to develop liver tumors (1).

**Humans**
- The EPA has categorized DDT as a B2 carcinogen (9). This means that DDT has been shown to cause cancer in laboratory animals, but there is inadequate or no evidence which shows that it may cause cancer in humans (1). See box on Cancer.
- A group of workers studied for 19 years employed at a DDT manufacturing facility did not develop cancer (1).
- Studies have shown that there is no correlation between an increased risk of breast cancer in women exposed to DDT (10, 11, 12, 13, 14).

Does DDT accumulate in humans?

**Fat Stores**
- DDT tends to accumulate in the fatty tissues of insects, wildlife, and people, but produces no known toxic effects while it is stored in the fat (2).
- DDT is metabolized into various breakdown products in the body including DDE, DDD\(^4\), and DDA\(^5\).
- When fat stores are used during periods of starvation the breakdown products of DDT are released into the blood where they may be toxic to the liver and the nervous system (2).
- Once DDT has accumulated in the body, it is excreted in the urine, feces, or breast milk. Breast milk is often used to measure a population’s exposure to DDT.

**Biomagnification**
- Because of DDT’s chemical properties it has the tendency to accumulate in animals. As animals lower on the food chain are eaten by other animals higher up, DDT becomes concentrated in the fatty tissues of predators (8, 15). This continues until the primary predator of the food chain receives the highest dose, which may lead to adverse health effects. Once the use of DDT was discontinued in the U.S., its concentration in the environment and animals decreased.

What happens to DDT in the environment?

- DDT is highly persistent in the environment. The soil half-life for DDT is from 2 to 15 years (16). See box on Half-life.
The half-life of DDT in an aquatic environment is about 150 years (17).

What effects does DDT have on wildlife?

- DDT is slightly to moderately toxic to birds when eaten (16). DDE decreases the reproductive rate of birds by causing eggshell thinning and embryo deaths (15).

- DDT is highly toxic to aquatic animals (15). DDT affects various systems in aquatic animals including the heart and brain (15).

- DDT is highly toxic to fish (15). Fish have a poor ability to detect DDT in water (15).

- DDT moderately toxic to amphibians like frogs, toads, and salamanders. Immature amphibians are more sensitive to the effects of DDT than adults (15).

1 DDT is dichlorodiphenyltrichloroethane
2 Organochlorines are chemical compounds that contain hydrogen, carbon, chlorine, and, sometimes, other atoms.
3 DDD (TDE) is dichlorodiphenyltrichloroethane
4 DDA is 2,2-bis(4-chlorophenyl)-acetic acid

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References


