

Thimerosal Frequent Asked Questions

What is Thimerosal?

Thimerosal is an organic compound that contains mercury (organomercurial). Since the 1930's, it has been widely used as a preservative in many biological and drug products. Thimerosal is used in vaccines to prevent the growth of potentially life-threatening bacteria.

How Much Thimerosal is used in Vaccines?

The concentration of thimerosal found in vaccines meets the requirements for it to be considered a preservative, according to the *United States Pharmacopeia*. Preservatives are defined as having the ability to kill and prevent the growth of specified challenge organisms (bacteria and fungi that could potentially grow in the product). Thimerosal is effective as a preservative in concentrations of 0.001% (1 part in 100,000) to 0.01% (1 part in 10,000). If a vaccine has a 0.01% concentration of thimerosal, it means that it contains 50 micrograms of thimerosal per 0.5 mL dose or 25 micrograms of mercury per 0.5 mL dose.

There are several vaccines manufactured that do not contain any thimerosal or only trace amounts of the preservative. A table displaying the thimerosal content of US childhood vaccines can be found at: www.vaccinesafety.edu/thi-table.htm.

How is Thimerosal broken down in the Body?

After entering the body, thimerosal is broken down into ethyl mercury and thiosalicylate. Ethyl mercury is an organomercurial that is different from methyl mercury (the mercury commonly found in seafood).

What is Methyl mercury?

Mercury is an element that is dispersed widely around the earth. Most of the mercury in water, soil, plants, and animals is inorganic mercury salts. Methyl mercury is an **organic** form of mercury (organomercurial) that people are most commonly exposed to by eating seafood. Methyl mercury and other forms of organic mercury are more easily absorbed by the body and harder for the body to get rid of.

How Does Methyl mercury affect the Body?

Methyl mercury is toxic to the nervous system. The toxic effects of methyl mercury have been studied in communities accidentally exposed through eating mercury-contaminated fish, and using seed grain treated with methyl mercury to make bread. In these studies, fetuses were more sensitive to methyl mercury than adults. Pregnant women exposed to high levels of methyl mercury had infants with severe neurological problems, but the mothers showed little or no symptoms. Some infants who were prenatally exposed to lower levels of methyl mercury experienced sensory and motor problems and developmental delays.

Are there Guidelines for Acceptable Thimerosal (ethyl mercury) Exposure?

The many guidelines that set acceptable mercury exposure limits are based on studies of **methyl** mercury, not **ethyl** mercury. Ethyl and methyl mercury are different chemical structures, so different toxic limits and effects on the body are expected. Currently, methyl mercury-based toxicity guidelines are used as the acceptable exposure limits for thimerosal. The Food and Drug Administration (FDA) considers ethyl and methyl mercury to be equal in risk because of a lack of definitive data on thimerosal toxicity.

How does the toxicity of Thimerosal (ethyl mercury) compare to methyl mercury?

The majority of thimerosal toxicity studies have been conducted using animals. A study by Magos et al. directly compared the toxicity of ethyl and methyl mercury in adult male and female rats. This study concluded that ethyl mercury (one of the end products of thimerosal) is less toxic to the nervous system than methyl mercury.

A more recent study conducted by the University of Rochester and the National Naval Medical Center looked at levels of mercury in blood and other samples from infants who received routine immunizations with vaccines containing thimerosal [Pichichero ME, et al. Lancet 360: 1737-1741 (2002)]. This study found that the blood levels of mercury did not exceed the methyl mercury safety guidelines for all infants included in the study. Mercury was cleared from the blood of infants exposed to thimerosal faster than would be predicted for methyl mercury. These results suggest that there are differences in the way that thimerosal and methyl mercury are distributed, broken down, and excreted by the body. It appears that thimerosal is removed from the blood and body faster than methyl mercury. A larger follow-up study is being conducted in Buenos-Aires; where infants and children still receive vaccines containing thimerosal.

Why are People Concerned about Thimerosal?

Concern has been expressed because of the theoretical risk for toxic effects on the nervous system, which can be produced even by low levels of organomercurials. Due to lack of definitive data on thimerosal toxicity, the FDA has been working with vaccine manufacturers to reduce or eliminate thimerosal from vaccines. Vaccine manufacturers have been able to make changes in the manufacturing process that has decreased the need for preservatives; including thimerosal.

The information above is a summary of information on Thimerosal in Vaccines from the FDA website. For more information on ethyl mercury and methyl mercury on the FDA website go to: www.fda.gov/cber/vaccine/thimerosal.htm.