From Pam Wenzel:

This comes directly from the CDC's Agency for Toxic Substance & Disease Registry
http://www.atsdr.cdc.gov/toxprofiles/tp11-c1.pdf

1. PUBLIC HEALTH STATEMENT

When a substance is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment. This release does not always lead to exposure. You are exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking the substance, or by skin contact. If you are exposed to fluorides, hydrogen fluoride, and fluorine, many factors determine whether you'll be harmed. These factors include the dose (how much), the duration (how long), and how you come in contact with it/them. You must also consider the other chemicals you're exposed to and your age, sex, diet, family traits, lifestyle, and state of health.

1.1 WHAT ARE FLUORIDES, HYDROGEN FLUORIDE, AND FLUORINE?

Fluorine is a naturally occurring, widely distributed element and a member of the halogen family, which includes chlorine, bromine, and iodine. ***However, the elemental form of fluorine, a pale yellow-green, irritating gas with a sharp odor, is so chemically reactive that it rarely occurs naturally in the elemental state.*** Fluorine occurs in ionic forms, *or combined with other chemicals in minerals like fluorspar, fluorapatite, and cryolite, and other compounds*. (Ions are atoms, collections of atoms, or molecules containing a positive or negative electric charge.) ***Fluorine gas reacts with most organic and inorganic substances; with metals, it forms fluorides and with water, it forms hydrofluoric acid. Fluorine gas is primarily used to make certain chemical compounds, the most important of which is uranium hexafluoride, used in separating isotopes of uranium for use in nuclear reactors and nuclear weapons.***

Hydrogen fluoride is a colorless, corrosive gas or liquid (it boils at 19.5 °C) that is made up of a hydrogen atom and a fluorine atom. It fumes strongly, readily dissolves in water, and both the liquid and vapor will cause severe burns upon contact. The dissolved form is called hydrofluoric acid. It is known for its ability to etch glass. Commercially, hydrogen fluoride is the most important fluorine compound. Its largest use is in the manufacture of fluorocarbons, which are used as refrigerants, solvents, and aerosols.

Other fluoride compounds that are commonly used for water fluoridation are fluorosilicic acid and sodium fluorosilicate . Calcium fluoride is the compound in the common minerals fluorite and fluorspar. Fluorspar is the mineral from which hydrogen fluoride is produced. It is also used in the production of glass and enamel and in the steel industry. ***In this profile, we will often use the term "fluoride" to include substances that contain the element fluorine. The reason for this is that we generally measure the amount of fluorine in a substance rather than the amount of a particular fluorine compound.***

1.4 HOW CAN FLUORIDES, HYDROGEN FLUORIDE, AND FLUORINE ENTER AND LEAVE MY BODY?

When hydrofluoric acid touches skin, *most of it can quickly pass through the skin into the blood*. How much of it enters your bloodstream depends on how concentrated the hydrofluoric acid is

and how long it stays on your skin. Almost all of the fluoride that enters the body in these ways is quickly removed from the body in the urine, but *some is stored in your bones and teeth*.

1.5 HOW CAN FLUORIDES, HYDROGEN FLUORIDE, AND FLUORINE AFFECT MY HEALTH?

Hydrofluoric acid is dangerous to humans because it can burn the eyes and skin. The initial exposure to hydrofluoric acid may not look like a typical acid burn. Skin may only appear red and may not be painful at first. Damage to skin may happen over several hours or days, and deep, painful wounds may develop. When not treated properly, serious skin damage and tissue loss can occur. In the worst cases, getting a large amount of hydrofluoric acid on your skin can lead to death caused by the fluoride affecting your lungs or heart.