A new danger from municipal landfills is emerging from scientific studies: cancer causing air pollution from asbestos, fiberglass and other synthetic mineral fibers. The problem has two parts: the health danger from the fibers, and the release of fibers from landfills.

Everyone agrees that asbestos causes cancer in humans. An estimated 9,000 Americans now die prematurely each year from asbestos exposure and the number increases yearly. The federal government and many states now sponsor programs to remove asbestos from schools and public buildings. But where does the asbestos go after removal? It goes either into a hazardous waste landfill, or it goes into a municipal landfill, the town dump. In both cases, the effect is the same: the asbestos goes into the ground, not far below the surface.

As the dangers from asbestos have been recognized, it has been phased out in favor of fiberglass and so-called "mineral wool" (though fiberglass is much more popular than mineral wool). Such synthetic fibers are now used in more than 50,000 different consumer products -- building materials and insulation, cars, furniture, packaging, draperies, and many other products.

Industry spokespeople insist that these fibers are 100% safe, but studies have been appearing in the scientific literature for at least 19 years indicating that some synthetic fibers cause cancer and other diseases in laboratory animals. While searching for the mechanism by which asbestos causes cancer, scientists in the late 1960s discovered that the size of the fiber (and not its chemical composition) is the key to the carcinogenicity of fibers. In a series of papers published from 1969 to 1977, Dr. Mearl F. Stanton of the National Cancer Institute (Bethesda, MD) reported that glass fibers less than 3 microns in diameter and greater than 20 microns in length are "potent carcinogens" in rats; and, he said in 1974, "it is unlikely that different mechanisms are operative in man." A micron is a millionth of a meter (and a meter is about three feet). Since that time, studies have been appearing in the literature, showing that fibers of this size not only cause cancer in laboratory animals, but also cause changes in the activity and chemical composition of cells, leading to changes in the genetic structure and in the cellular immune system. Although these cell changes may be more common (and possibly more important) than cancer, it is the cancer-causing aspects of synthetic fibers that have received most attention.

The cancer alert hit the front page of the NEW YORK TIMES March 15, 1987: "Emerging evidence that fiberglass and other manufactured mineral fibers may cause lung cancer and other diseases is creating a sensitive, potentially farreaching public health issue." The TIMES went on to discuss several recent scientific studies showing that excessive lung cancer can be observed among workers exposed to mineral fibers on the job. At a meeting of the World Health Organization in Copenhagen in October, 1986, three studies of worker health reported significant increases in lung cancer among workers exposed to mineral fibers. Dr. Philip Enterline, professor of biostatistics at Pittsburgh University's School of Public Health, told the NEW YORK TIMES that the data he presented at Copenhagen were "surprising," given the low levels of exposure among the workers he studied. "It may yet turn out that these fibers have to be controlled the way asbestos is controlled," he said.

The federal EPA (U.S. Environmental Protection Agency) seems dimly aware that this problem is a sleeping giant. Dr. David L. Dull, acting director of the chemical control division of the EPA told the TIMES, "Some evidence suggests we ought to treat it as a serious problem and regulate it like asbestos." Dr. Dull also told the TIMES, "If I had a choice of being exposed to asbestos at current exposure levels and to respirable manmade fibers, I would breathe asbestos every time because the exposure limits are so much more stringent."

The U.S. now consumes more than a billion pounds of synthetic mineral fibers each year -- approximately the same as our consumption of asbestos was during peak years of use (the '70s). The vast majority of synthetic fibers are not small enough to fall within the dangerous size-range -- only a small fraction of the total mass of fiberglass, for example, consists of fibers thinner than 3 microns and longer than 20 microns. Nevertheless, a small fraction of a billion pounds represents a tremendous quantity of tiny, dangerous fibers dumped into the environment year after year. And consumption increases each year as these fibers replace asbestos. Furthermore, industry is constantly striving to make glass fibers smaller and smaller because the smallest fibers are most useful (they have the best insulating properties, for example). Three scientific researchers in 1970 summed up the outlook for fiberglass: "Recent advances in reducing the diameter of the fibers and the development of new coating materials will aid in the development of countless new products. The fibrous glass manufacturers believe that most homes will be constructed out of or decorated with some material made of fiberglass." Today, eighteen years later, this prediction has come true. Synthetic fibers are a $3 billion-a-year industry.

So far as we know, regulatory officials have never asked where asbestos and fiberglass go after they are dumped into a landfill. However, back in the early '70s, the National Insulation Manufacturers Association hired three scientists to evaluate contamination of the general environment by fiberglass. Their papers were never published, but were made available to us by one of the researchers himself.

The three researchers began by finding glass fibers in the air inside public buildings and they wanted to find the source. They discovered it was outdoor air that contains the fibers. They then began looking at outdoor pollution. They found that they could measure glass fibers in the air on a remote, rural mountain top in California. Where was it coming from?

"A point source of airborne glass and other fibers was found to be a disposal site (landfill of San Francisco Bay) where industrial waste containing fibrous materials had been disposed of for many years. A sample of the dust cloud generated by a moving passenger car driven in a circle approximately 100 yards in diameter over the compacted surface of this site gave a concentration of approximately 500 glass fibers [per liter].... A sample taken about 100 yards downwind from several earthmoving and compacting machines at work on the site.... showed concentrations of 300 glass fibers [per liter]...."

Our landfills are enormous repositories of asbestos and synthetic fibers. It is clear that, as time passes, natural erosion releases some of this material back into the atmosphere. In less than two generations, we have contaminated the entire atmosphere of the United States with glass fibers, even the most remote areas. Encasing fibers in epoxy-like blocks before disposal should reduce the problem substantially. An even better solution would be to stop using synthetic fibers. For the majority of uses, alternative materials already exist. What seems lacking is the will to switch.

(For citations to the unpublished work, see "Fiber Glass," ENVIRONMENT MAGAZINE, Sept., 1974, pgs. 6-9.)