

LOS ANGELES — In its extensive coverage of the environmental situation at Love Canal, Three Mile Island, and numerous other places, the press often seems intent on showing how modern technology, including the chemical industry and nuclear-power plants, is poisoning Americans with the introduction of carcinogens and other unhealthy pollutants into the environment.

These assessments are usually based on studies of either animals, bacteria or highly exposed nontypical human populations. Risks extrapolated from these studies are then presumed to apply to the general population. Often only one specific disease is considered and no attention is given to understanding how a carcinogen or other poison affects overall human health. Furthermore, these substances are almost always evaluated from the point of view of risks and not benefits.

In 1964, the United States Surgeon General's Advisory Committee on Smoking and Health said that it is necessary to look at five criteria in establishing a "causal" association between some environmental factor and resulting disease: consistency, strength, specificity, temporal relationships, and coherence. The committee used these criteria to conclude that cigarette smoking causes lung cancer. Unfortunately, this same reasoning is not being applied in many other situations.

For example, let us examine some important health trends during the last 40 years, a period of dramatic growth in the use of new chemicals and nuclear power. From 1940 to 1979, the average life expectancy for the entire United States population increased from 63.6 to 73.6 years and the total age-adjusted death rate declined by 45 percent from 10.8 to 5.9 deaths per 1,000 persons per year, including major declines in every age, sex and racial group. (Since death rates increase greatly with age, it is neces-

# The 'Poisoning' Of America

By James E. Enstrom

sary to use the age-adjusted death rate, an overall weighted average of the death rate at each age.) This is a phenomenal decline in the death rates when you consider that a 100 percent decline would mean that people have achieved immortality. Much of this change is due to a greatly reduced cardiovascular-disease death rate, but most other causes of death have declined as well, including several major forms of cancer such as stomach and uterine cancer. In fact, the only major causes of deaths that have increased substantially since 1940 are lung cancer and, to a lesser extent, cirrhosis of the liver and homicide.

This means that many widely publicized environmental factors, such as chemical contaminants in the water supply, smog and other pollutants in the air, low-level radiation from nuclear-weapons testing and nuclear-power plants, saccharine in soft drinks, menopausal estrogens, hair dyes, and food additives are most likely associated with specific diseases for which the death rates have declined or, at most, remained about constant over the last 40 years. Furthermore, diseases such as cancer existed long before introduction of this modern technology.

It is important to understand the magnitude of the mortality decline since 1940. The age-adjusted decline from 10.8 to 5.9 deaths per 1,000 persons per year is equal to about four

times the average total cancer death rate during this period. In other words, based on the 1940 death rates, about 3.5 million deaths should have occurred in the United States in 1979. However, only about 1.9 million have actually occurred, of which about 400,000 were due to cancer. This means that there was a net savings of about 1.6 million deaths because of improvements in overall health since 1940.

Relatively few factors have been shown to have a consistent, strong adverse effect on overall health. They include: cigarette smoking, chronic alcoholism, severe malnutrition, low socioeconomic status. Most factors that affect the general population either have a weak relationship to total mortality or have been assessed only relative to a few specific diseases. Many "high-risk" persons exposed to various chemicals and drugs also turn out to be heavy cigarette smokers. Many others are actually "healthy workers" who are healthier overall than the general population, even though some causes of death may be elevated. Except for cigarette smoking, most identified carcinogens have not been clearly related to an increased death rate in the general population.

Because of the lack of relevant research, we can only speculate about which factors have contributed to improving health: better personal health habits, better medical procedures, better access to medical care, higher standard of living. It is important to address the issue of improving health and to understand the reasons for this situation. This knowledge should make possible future improvement. Focus should be on those factors that are having the greatest overall impact on health, and a positive role for modern-day chemicals, drugs, and technology should not be a *priori* ruled out.

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