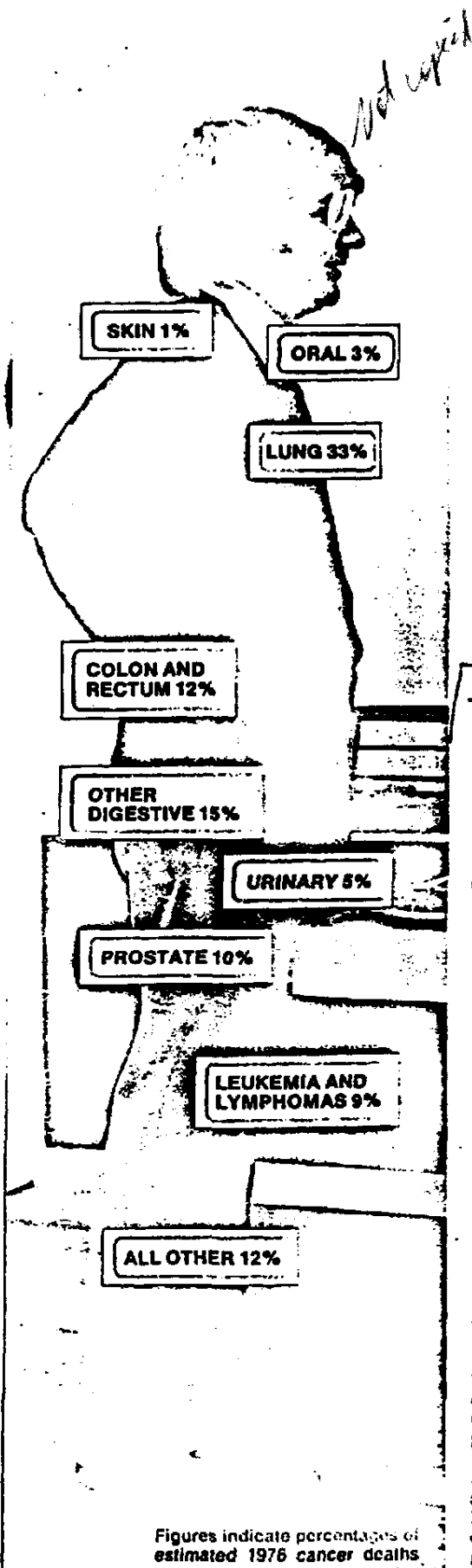




Figures indicate percentages of estimated 1976 cancer deaths

Americans used to think of cancer—when they permitted themselves to think of it at all—as one of those roll-of-the-dice diseases: mysterious, unpredictable and, if your number came up, unavoidably fatal. But recently, they have been learning something new and, in a sense, far more frightening about cancer. In the vast majority of cases, cancer may be a man-made disease.

To judge from newspapers, magazines and television, even the simple acts of eating, drinking, breathing and touching may expose Americans to some possible cause of cancer. Women have been warned not to eat beef liver because it may produce cancer of the vagina. Several of the nation's major sources of water have been found to contain an industrial chemical that causes cancer in laboratory rats. Polyvinyl chloride (PVC), a plastic used in food wrapping, is also under suspicion. Some housewives began to shun bacon and ham after they were told these products contain dangerous

"the introduction into the universe of potent chemical agents which are largely untested for adverse public-health effects." Epstein notes that cancer rate have nearly tripled since 1900 (partly because of increased life expectancy, partly because of better diagnostic techniques), and that they have gone up 1 per cent a year since 1933—not to mention the mysterious but still tentative 3.8 per cent increase indicated for 1975. "There is no question," he says, "that cancer is a major epidemic."

Though a number of Epstein's colleagues might choose to state the case less dramatically, few disagree that the environment and what man has done to it loom increasingly as the major sources of the second greatest killer (after heart attacks) in the nation. In coincidental support of this thesis, Academic Press this week will publish a massive, 544-page report entitled "Persons at High Risk of Cancer." Based on a symposium sponsored by the National Cancer Institute and the American Cancer Society,

WHAT CAUSES

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chemicals. Perhaps most worrisome of all is the fact that the latest statistics show a cancer-death rise of 3.8 per cent for 1975—though this may be revised when all the figures are in.

Small wonder, then, that many scientific experts have begun to regard the environment—everything we come into contact with—as a far more significant source of cancer than aberrant cellular mutation. Even if the headlines tend sometimes to overstate the case, there seems little doubt that the newest frontier in cancer research has now become the environment itself. Already the World Health Organization estimates that up to 85 per cent of all cancer cases are the direct result of exposure to environmental factors of one kind or another—in many instances almost fatalistically self-inflicted by such habits as overeating, smoking, overdrinking and excessive exposure to sunlight and dangerous chemicals in the factories.

Some scientists, like Dr. Samuel S. Epstein, an environmental toxicologist at Case Western Reserve University Medical School, think that the past two or three decades have witnessed a phenomenon unique in the history of man—

the report offers a sweeping and meticulously documented appraisal of the most recent research on the epidemiology of cancer in man—with special emphasis on the possible roles of diet, drugs, radiation and the workplace.

Already, the concern about the role of the environment in cancer seems to presage a major shift in the application of cancer research funds. Critics charge that the NCI has so far failed to devote an appropriate slice of its \$690 million budget to research on cancer control and prevention and on the identification of carcinogens in the environment. They say that NCI researchers are spending an inordinate amount on basic research, including \$90 million on a virus program that has yet to uncover a human-cancer virus. The critics charge that even if such a virus is found, it would account for only a small number of cancer cases.

Of the remaining \$600 million in the NCI budget, only \$45 million will go this year into research on carcinogens. But even this sum represents a new emphasis on cancer prevention. Only \$7 milli

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was devoted to such projects a few years ago. And eventually, NCI plans to spend an additional \$30 million on a program to study the role of diet alone in cancer. Last summer, NCI published a "Cancer Atlas" based on a survey of cancer deaths in the 3,056 counties of the contiguous 48 states. "It's generating a lot of ideas of where to look and what to do," says Marvin Schneiderman of NCI. Among the patterns emerging from the cancer map (page 67) were the high rates of bladder cancer in the industrialized Northeast as well as excessive lung and liver cancer rates in smelting-industry communities.

In recent months, the search for cancer-causing substances in the environment has stirred a welter of controversy, involving environmentalists, industry and the scientists themselves. Even the experts disagree somewhat on what substances are hazardous and what ought to be done about them when they are found. Of more than 1,400 chemicals, drugs and pollutants now suspected of causing cancer—mostly on the basis of animal tests—only about 22 are now widely held to be carcinogenic to man.

amounts in the last 30 years to make polyvinyl chloride, a plastic found in a vast array of items, including food containers and phonograph records. In 1973, Italian researchers found that VC produced liver tumors in rats. The findings were largely ignored until it was learned that the same kind of tumor—exceedingly rare under ordinary circumstances—had taken the lives of three workers at the B.F. Goodrich plant in Louisville, Ky. Only then were revised standards on exposure put into effect.

For the scientists, there are two major problems in uncovering cancer-causing substances. The first is the long "latent" period—often twenty to 35 years—between the beginning of exposure to a carcinogenic substance and the appearance of malignant disease. In addition, scientists find themselves in disagreement on how big a dose of a substance is enough to trigger cancer. Some researchers point out that almost anything, including sugar and salt, will cause trouble if given in a large enough

NCER?

Responsibility for protecting the public from carcinogens is shared by a bureaucratic web of government agencies that includes the Environmental Protection Agency, the National Institute for Occupational Safety and Health, the Occupational Safety and Health Administration and the U.S. Food and Drug Administration. Not surprisingly, their responsibilities not only overlap but are often in direct conflict, with different agencies setting different standards for regulating suspect chemicals.

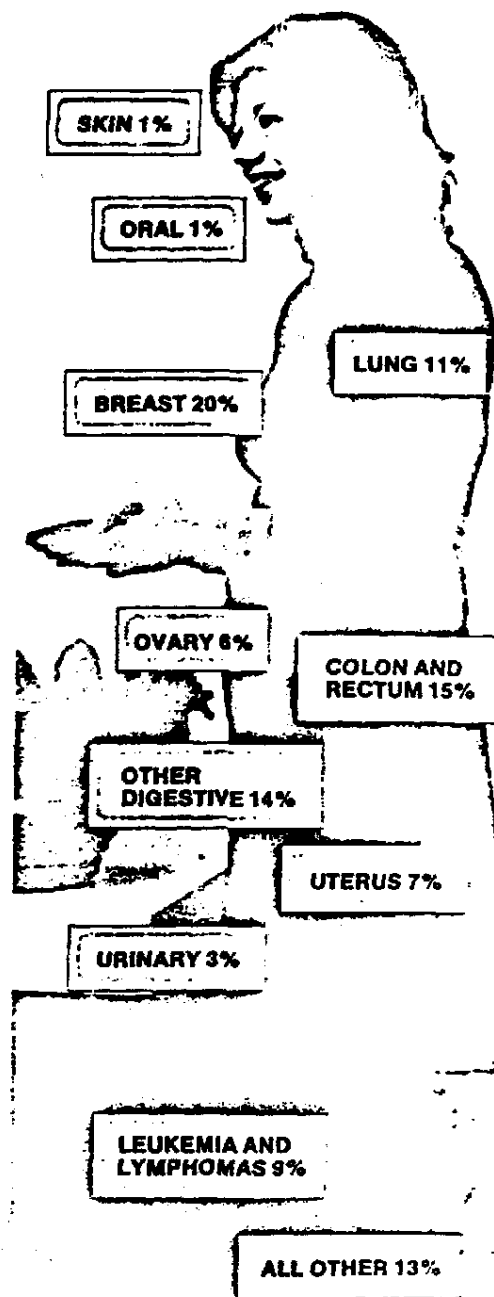
Most experts agree on the need for a law that would mandate testing of all new chemicals and drugs for toxicity—including the tendency to cause cancer—before, not after, they enter the environment. "If you wait till people are hit by the epidemic," says the NCI's Dr. Umberto Saffiotti, "it's too late." Such a bill has lain before Congress for five years, and many critics charge it has been blocked by industry pressure.

The consumerists point to the recent vinyl-chloride episode as a stark example of the failure of the present system to catch a dangerous chemical before it causes trouble. Vinyl chloride is a gas that has been used in ever-increasing

dose. Most regulations are based on the idea that there is a "threshold" of exposure, below which there is no risk. But many experts insist there is no such thing as a safe level. "Lower concentrations simply mean lower incidence," says Epstein. "There is no threshold."

The second and equally controversial question is whether testing in animals is a reliable indicator of what a substance will do to man. The amount of a substance required to cause cancer in an animal may not realistically reflect the amount that humans can safely be exposed to. But toxicologist Epstein insists that animal results are applicable to man. "Information in tests from well-designed and valid animal systems," he says, "constitutes very strong evidence for a cancer hazard in humans."

Some manufacturers have been suspected of hiding or falsifying test results indicating a cancer hazard. Last week, NEWSWEEK learned, the EPA and the Department of Health, Education and Welfare were thinking of taking criminal action against several corporations and commercial testing labs for just such fraud. The agencies are also planning to look into conflict-of-interest charges in-



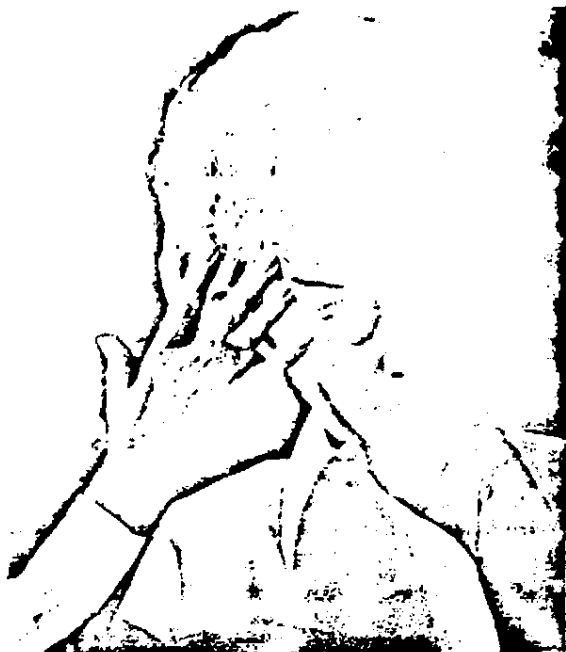
Source: The American Cancer Society

Photo by Frances McLoughlin-Gall

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Mrs. Malloy and Marilyn: A drug with a deadly delayed reaction

DAUGHTERS OF DES

For Grace Malloy, childbearing did not come easily. Although her first daughter was born in 1946 without complications, a subsequent pregnancy ended in miscarriage. When during her next pregnancy she also showed signs of miscarrying, her doctor prescribed diethylstilbestrol (DES), a synthetic estrogen widely used in such cases at the time. A second daughter, Patti, was delivered in 1951. After yet another miscarriage, Mrs. Malloy became pregnant a fifth time and was again given DES. Another daughter, Marilyn, was born in 1956.

It was not until Patti and Marilyn were 19 and 14 that Grace Malloy read a newspaper report linking DES to a rare but deadly form of vaginal cancer in young women whose mothers had taken the hormone during pregnancy. Alarmed, Mrs. Malloy asked her doctor if there was anything to this "scare." "You bet your life there is," he replied. "You'd better get those girls in for an examination right away." The result was bad news: Marilyn had vaginal cancer.

Malignancy: In an operation lasting more than twelve hours, Marilyn's vagina and nearby lymph glands were removed; an artificial vagina was constructed using skin grafts from her legs. The doctors were hopeful that they had excised the entire malignancy, but a year later they discovered that the cancer had spread to one lung, the esophagus and the lining of the heart. Following another operation, Marilyn recovered sufficiently to resume her passion—horseback riding.

A short time later Marilyn's condition worsened. She lost her appetite, suffered from nausea and severe headaches. Tests revealed that the cancer

had reached her pituitary gland, and Marilyn underwent a grueling six-week regimen of "whole head" radiation. When all her hair fell out as a result, she still refused to give in to self-pity and kept up an active social life, wearing a bright scarf over her head. But at night Mrs. Malloy could hear her daughter moaning in pain with the cancer that was continuing its lethal spread through her arms, legs, spine and brain. Soon she was blind and confined to a wheelchair. Marilyn died on May 26, 1974, two weeks before her high-school class's graduation.

Guilt: Today, sitting in her elegant, sun-filled La Jolla, Calif., living room, Grace Malloy tells Marilyn's story with self-control. She does not savor pathos. Nor does she feel any personal guilt over her daughter's tragic death. "I had no way of knowing what those pills would do," she says. "Thousands of women took them, but we all did it in the best of faith, because our doctors prescribed them."

Nonetheless, Grace Malloy is not without bitterness about what happened to her family—and what still may lie ahead. Her older daughter, Patti, now 25, has been diagnosed as having vaginal adenosis, a lesion that appears benign but could be the precursor of cancer. In spite of long-standing reservations, Patti recently decided to get married, and her doctors claim her prospects for a healthy future are good. But there is no guarantee; for the time being, Patti can only wait—like thousands of other young women with the same history—and pray that the killer that claimed her sister may pass her by.

—JEAN SELIGMANN with LAWRENCE SHOOK
in La Jolla, Calif.

been shown to cause breast cancer. One recent study suggested that the risk of breast cancer was increased for women who took the Pill before having their first child and for those with a history of benign breast tumors. But at least three other surveys failed to show a connection between oral contraceptives and breast cancer.

Drugs used to prevent rejection of organ transplants by suppressing the immune response have also been found to cause cancer. Among more than 6,000 kidney-transplant recipients, the risk of lymphatic cancer was found to be 35 times greater than normal. Of concern to some experts is the fact that one such drug, methotrexate, is being prescribed for the treatment of severe psoriasis.

3. RADIATION

There is no question that X-rays and similar forms of radiation can cause leukemia and other forms of cancer if received in high doses. Survivors of the Hiroshima and Nagasaki atomic blasts have shown a significantly higher than average incidence of leukemia, as well as of cancers of the breast, bowel and brain. Recently, it has been found that those treated with radiation in childhood for tonsillitis, enlarged thymus glands and other conditions during the 1940s and 1950s have an increased risk of thyroid cancers. What is not clear, is how much risk there may be from exposure to conventional diagnostic X-rays.

According to Lorne Houten of Roswell Park Memorial Institute, Buffalo, N.Y., the amount of radiation from a single abdominal X-ray increases the risk of leukemia. One rad (the standard unit of dosage) of radiation, says Houten, ages the cells it strikes by one year. Thus, a 50-year-old man who has received 10 rads has the susceptibility of nonlymphatic leukemia—a form of the disease that strikes adults—of a 60-year-old. In addition, irradiation of men and women during their reproductive years increases the likelihood that their offspring will develop leukemia. On the basis of these observations, Houten thinks that no one should undergo routine screening X-rays—including mammography to detect breast cancer—below the age of 50. An exception, in his view, would be a woman with a family history of breast cancer.

But other cancer experts disagree. Dr. Luther Brady of Hahnemann Medical College, for one, disputes Houten's correlation between diagnostic X-rays and leukemia. "I don't think anybody has confirmed that 1 rad increases the risk of leukemia," he says. E. Cuyler Hammond also disagrees with Houten's feeling about mammography. "The benefit exceeds the risk," says Hammond, "if it is a risk at all."

Ultraviolet radiation from the sun increases the risk of skin cancer. A committee of the National Academy of Science recently estimated that among white persons living along the 40th parallel