

who share the benefits of the undesirable facility provide compensation to those who host the facility. The compensation could be in the form of direct payment to individuals in the community, or through investments to improve the community. Boerner and Lambert also detailed benefits that communities could reap by supporting the construction of polluting and waste facilities in their areas. Among these are the economic benefits a facility could bring to a disadvantaged neighborhood, such as the creation of jobs. This type of compensation approach would allow communities to be involved in the negotiating process.

Early results of an ongoing empirical study at the University of Massachusetts also cast doubt on claims that hazardous waste facilities are more likely to be located in low-income and minority neighborhoods. The researchers, Douglas Anderton and Andy Anderson, both sociology professors, released a preliminary study revealing that commercial, off-site treatment, storage, and disposal facilities (TSDFs) are actually more likely to be located in white, working-class, industrial neighborhoods. The two-year study examined census bureau tracts, groupings of 4,000 people, rather than ZIP-code data, which had been used in many of the previous studies. Tracts containing commercial hazardous waste TSDFs were compared to tracts without TSDFs.

The researchers had expected to find results similar to previous studies on environmental justice. “We were all pretty surprised, including the waste industry,” Anderton said. “In retrospect we shouldn’t have been, because what we found was that these facilities were not much different than any other industrial facilities.” They found that the neighborhoods surrounding TSDFs were made up of white, working-class people, similar to most communities located around other types of industrial facilities.

The study has been criticized by environmental justice advocates because the pre-1990 census tract data that was analyzed excludes rural areas. They claim that if rural areas were assessed, the results could be different. However, Anderton says ongoing research involves 1990 census data that includes rural areas, and the results appear to be similar.

Anderton and Anderson do admit that there are limitations to this study. For example, only commercial, off-site TSDFs were studied; Superfund sites, closed TSDFs, and on-site storage were excluded. They also cited other sources of environmental risk not studied that could unfairly burden minority and poor populations, including lead paint, soil contamination, and air pollution.

“Some of the limitations of this

research should be noted so the results of this particular study will not be used to undermine the general cause of environmental justice and equity,” the authors said. They summarized the study by saying, “a great deal of work remains to be done.”

Anderton said they will continue to research the issue, and future studies will include Toxic Release Inventory data, Superfund sites, comparisons of public and private facilities, and analyses of how sites change over time.

A Nice Cup of Tea

Animal studies prove it. Folklore heralds it. And now the first large human study shows that green tea may be more than just an aromatic brew loved by millions of Asians who claim it purifies the body.

A report published in the June issue of the *Journal of the National Cancer Institute* concluded that green tea is associated with a reduced rate of esophageal cancer in residents of Shanghai. Studying 1552 healthy people and 902 others who had esophageal cancer, NCI researchers found the risk of contracting this cancer was reduced by 57% for men and 60% for women who didn’t smoke or drink alcohol but who consumed lots of green tea.

The researchers undertook the study because of compelling animal experiments that demonstrated green tea reduces the incidence of cancer and even the growth rate of tumors. Tea is among the most widely consumed beverages in the world, and a finding that 20% of that tea, an unfermented green, naturally protects

against cancer would be good public health news.

The report comes on the heels of a smattering of studies worldwide that suggest green tea has a myriad of benefits. In Japan, scientists have found that green tea lowers rates of cancers of the lung, skin, and stomach, and even reduces cholesterol.

But no one is yet ready to say that green tea protects humans against any disease, including cancer. The NCI’s lead tea investigator, epidemiologist Joseph McLaughlin, cautions that no conclusions can yet be made. “This is the first study that shows an association, but as to whether green tea does definitively protect against esophageal cancer, I can’t say.”

The problem is that although at least 100 studies have been published in the last two years, mostly in Asia, there are too few substantive case-control studies, says McLaughlin. The NCI survey is the largest to date, “but further investigations are definitely needed,” he said.

Chung Yang, a biochemist and professor at Rutgers University, said that recent reports of the effect of tea on human health have been “mixed; innately controversial.” Yang said that one-fourth of the studies argue for a protective effect, one-fourth find tea increases health risks, and one-half of the studies found no correlation between consumption and disease. And although the Shanghai study “is interesting and encouraging,” Yang said that it did not present any clear conclusions.

On the other hand, animal data testing the effect of both black and green tea on cancer has shown a consistent benefit, said Yang, who has had a role in many of those



Reading tea leaves. Scientists studying green tea believe it may help ensure a healthier future.

Joseph Tart

studies, collaborating with investigators from Cornell University and Case Western Reserve University.

In these experiments, Yang gave a group of mice only tea to drink, and he also gave them, as well as a control group, chemicals known to produce different cancers. Among the animal "tea" models he has developed are those for lung, esophageal, and forestomach. He found that mice fed tea developed fewer tumors than the control group and that their tumors were smaller. His latest study on tea's protective effect on skin cancer was published in July in *Cancer Research*.

Although there are numerous theories as to why tea may offer protection, most scientists think it is due to polyphenols, such as flavanols, which make up 30% of the dry weight of the tea. These chemicals not only possess strong antioxidant activities, but they can also inhibit nitrosation reactions, modulate carcinogen-metabolizing enzymes, trap carcinogens, and inhibit cell proliferation.

Yang said that he can demonstrate that tea scavenges free radicals produced by oxidation reactions in the body, "but whether that is at the heart of the anticancer action remains to be studied." He co-authored a major review discussing the contradictions in the study of tea and cancer, published last July in the *Journal of the National Cancer Institute*. "It will be very difficult to pinpoint how it works in humans," said Yang. "The protective effects may be small in humans; it may just get lost in a host of other mechanisms."

To help point to an answer, Yang is working with the Beijing Cancer Institute to design an intervention study in China. It will follow thousands of people who will take capsules of tea powder daily to see if the rate of stomach cancer that develops in this population is reduced.

Bernard Goldstein, director of the Environmental and Occupational Health Sciences Center in New Jersey, welcomed a renewed interest in tea, which he first studied 20 years ago. "The studies in animals are very encouraging," he said, "and there is enough information about the effect of tea in humans that it makes one want to do careful and thorough epidemiological evaluation."

A Breath of Fresh Air

Flight attendants and passengers may soon be breathing easier if a bill called the Safe Cabin Air Quality Act is passed. The bill (HR 2985), introduced in August 1993 by Congressman Jerrold Nadler (D-New York) in response to health complaints associated with reduced fresh air, would increase the amount of fresh air pumped

Browner v. Bush

In July, EPA Administrator Carol M. Browner proposed to overturn a decision by the Bush administration which eased regulations on industries under the 1990 Clean Air Act in the name of industrial growth. Browner's proposal would grant environmentalists a rule that would require a period of public comment on potential increases in emissions when industries attempt to gain permits to expand their operations.

In 1992, Bush handed down a decision that allowed industries to expand their operations even if the expansion would cause higher levels of emissions than allowed by the permits they had obtained. Environmentalists protested, fighting for a provision that would allow public input on changes in emissions before expansion could take place, but the White House Competitiveness Council argued that such a provision would slow the permitting process and restrict attempts to bring the country out of recession.

The proposed rule is to take effect after a 90-day comment period. Browner's decision stems from negotiations with environmentalists mobilized by the Natural Resources Defense Council, who sued the EPA following Bush's decision. The environmentalists and EPA officials have agreed to reach an out-of-court compromise.

into airline cabins.

In response to concerns over anticipated increases in the cost of fuel in the late 1970s, airlines studied ways to conserve fuel. It was discovered that energy could be saved by reducing the amounts of fresh air pumped into airplane cabins. For example, a McDonnell-Douglas study in 1980 found that if the amount of fresh air was cut by 50% on a DC-10 trip of 1,050 miles, the airline could save 0.8%, or 42 gallons, of fuel. Since the 1980s, the volume of fresh air circulated in most airline cabins has been cut by about half from 100% fresh air pumped in every 3 minutes to half fresh and half recirculated air every 6-7 minutes. This drastic reduction has been blamed for headaches, nausea, dizziness, and other health problems experienced by flight attendants and passengers. Chris Witkowski, director of air safety and health for the Association of Flight Attendants, says that there are some asthmatics who will not fly now because of difficulties with breathing. "It's going to be a growing health problem," he said.

In 1993, using the current domestic cost of \$0.59 per gallon for jet fuel, Witkowski divided the average number of passengers on a 1,050 mile trip on a DC-10 into the price per gallon, multiplied by 42, the number of estimated gallons of fuel saved, and found that the airlines were saving \$0.13 per passenger. "The average passenger would pay that much to double the amount of fresh air they get on a flight," Witkowski said.

At such a small percentage of savings, many wonder why airlines would reduce the amounts of fresh air. Because the Federal Aviation Administration has failed to impose guidelines on cabin air quality standards, airlines have had no disincentive to save some money. "There is a tendency for airlines to want to reduce fresh air as much as possible to squeeze every nickel out of the cost of fuel," Witkowski said.

The FAA does regulate the maximum amount of carbon dioxide in airline cabins at a standard of 30,000 parts per million. But Witkowski called the figure "absurd," and said it is "virtually meaningless at that level." The level that the American Society of Heating, Refrigeration, and Air Conditioning Engineers associates with satisfaction or comfort is 1,000 ppm. And the Occupational Safety and Health Association is considering setting a standard of 800 ppm in workplaces.

Several studies have been done that link recirculated air to transmission of viruses and bacteria. Studies by the U.S. Centers for Disease Control have not been able to rule out the possibility that tuberculosis could be transmitted among passengers. Last year a report said that a flight attendant with active tuberculosis infected 13 fellow workers before being diagnosed and treated. Airlines argue that their filtration systems mitigate potential exposures, but a recent study conducted by researchers at the Harvard University School of Public Health questioned the adequacy and effectiveness of strategies used by airlines. The researchers recommended further studies be done before conclusions are made.

Despite these findings, the Air Transport Association recently concluded that reducing fresh air in cabins is safe for passengers and airline crews, outraging airline flight attendants who want the levels of fresh air raised. "We feel it is critical for the federal government to set some standards for cabin air quality. Until this is done, the quality of air is going to get worse," Witkowski said.

Flight attendants are also urging the government to take into account the range of people that travel. Not all airplane passengers are able-bodied workers; among those who fly are asthmatics, the elderly, people with allergies, and people whose immune systems have been impaired by