Being a woman isn't always enough. But it's a start.
Sascha Gabizon, Women in Europe for a Common Future
2002

WOMEN'S HEALTH

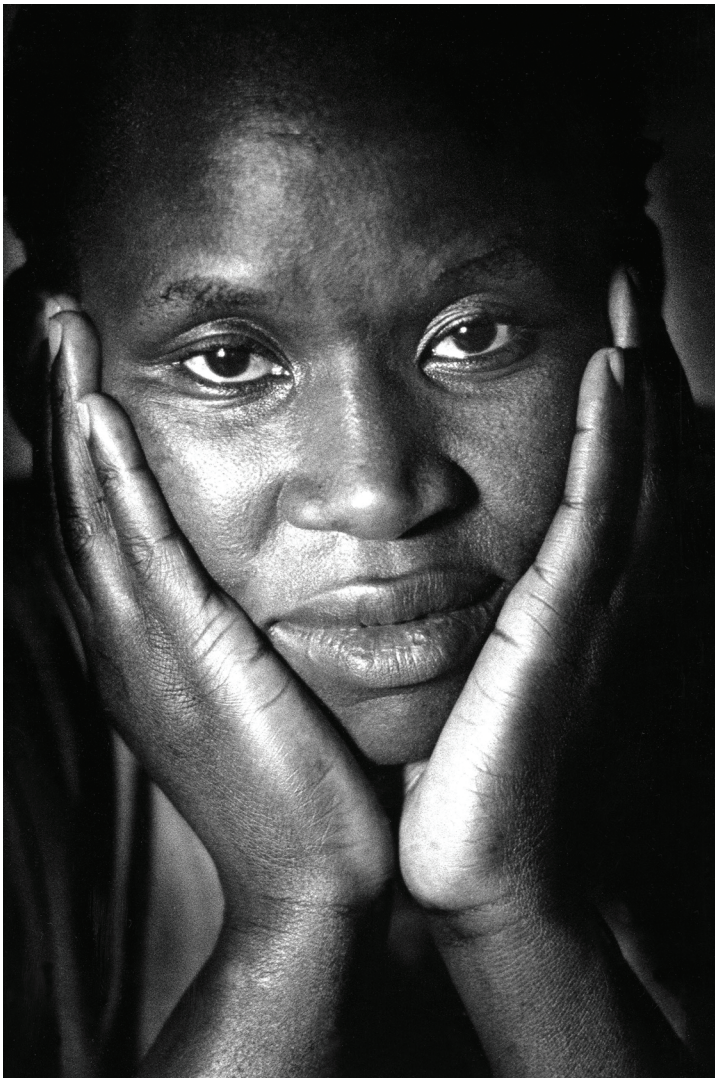
The Women's Tent

All people suffer from exposure to unsafe levels of pollution, but men and women may experience substantially different effects. Female sensitivity to pollutants can be heightened by both physiological and socioeconomic factors. For example, hormonal changes in puberty and menopause increase women's risk of autoimmune diseases linked to pollution. And more than 70% of the world's poorest 1.3 billion people are women, according to the World Health Organization. Experts acknowledge that poverty and environmental health problems are closely related.

Women from around the world gathered recently in Johannesburg, South Africa, for the United Nations World Summit on Sustainable Development (WSSD), held 26 August–4 September 2002. This conference was attended by 22,000 people concerned with issues related to the environment, poverty, and health. Much of the gender-specific dialogue occurred at the "Women's Tent," a week-long series of meetings that took place outside the official United Nations–sponsored delegations. Organized by the Women's Environment and Development Organization, an advocacy group based in New York City, and Ilitha Labantu, a South African women's advocacy group based in Cape Town, the Women's Tent featured day-long sessions based on five themes: peace and human rights, globalization, environmental security and health, access to and control of resources, and governance.

The environmental security and health session was organized by Sascha Gabizon, international director of Women in Europe for a Common Future, an advocacy group based in Munich, Germany. Following a morning agenda dominated by the problems of HIV/AIDS in southern Africa, speakers addressed several key pollution-related health problems that affect women, including breast cancer (potentially linked to a number of environmental compounds, including DDT) and endometriosis (from dioxin exposure), among others.

According to Gabizon, environmental health discussions at the Women's Tent had little bearing on official negotiations in Johannesburg. This is because the WSSD's environmental health provisions had already been drafted during preconference preparatory meetings convened in Bali, Indonesia, earlier in the year. Nonetheless, she adds, speakers conveyed their message to a receptive and influential audience that included the Dutch minister of environment, the South African minister of energy, and representatives from over 150 women's groups from several countries. "Many of the traditional women's groups don't deal with environmental health issues specifically," Gabizon says, "so their exposure to these concepts is really important."



Out in the cold? A week-long series of meetings on women's issues at the United Nations World Summit on Sustainable Development raised more issues than they resolved.

Dieter Telemans/Panos Pictures

Activists who attended the Women's Tent tend to support the health recommendations contained in the WSSD's Plan of Implementation, which contains the final conference conclusions and recommended action plans. These include commitments to halve the proportion of people without access to sanitation and safe drinking water by 2015 and to use and produce chemicals only in ways that don't harm human health or the environment by 2020.

But in a critique titled *Gender Analysis of the WSSD Plan of Implementation*, the Women's Environment and Development Organization decries the lack of gender-specific language, noting a "considerable gap in [both] gender-disaggregated data and reports on health risks to women." Says Devra Davis, a visiting professor of public policy at Carnegie Mellon University's Heinz School, who spoke at the Women's Tent on the issue of breast cancer, "Things are better than they have been, but it's clear that as women we have a long way to go."

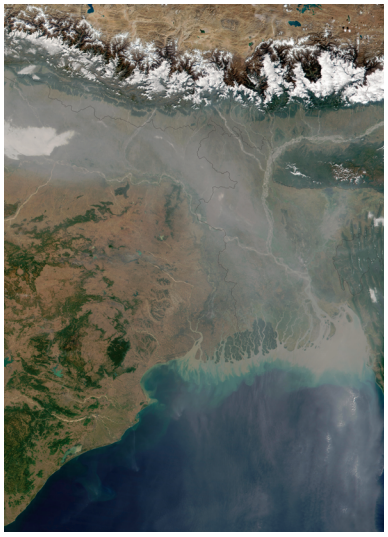
Gabizon emphasizes the need for public participation and input from women, particularly on multinational trade agreements that she says "give preference to economic benefits over environmental protection." As caregivers and mothers, she explains, women often wind up with a disproportionate share of the environmental health burden. "In many places around the world it's the women who look after ill people. You have to consider how environmental pollution adds to the stress they already experience in their lives."
–Charles W. Schmidt

AIR POLLUTION

The ABCs of Haze

Haze and airborne dust—the visible portions of air pollution—were once seen as minor irritants, but they are gathering force like a coming storm. In August 2002, the United Nations Environment Programme (UNEP) released *The Asian Brown Cloud: Climate and Other Environmental Impacts*, which describes a "new scenario" of air pollution in South Asia, involving haze, smog, ozone, and global warming. In September 2002, the CBS MarketWatch news website ranked the Asian Brown Cloud among 10 "mega-trends for 2003" in terms of its implications for health, business, and politics.

The term "Asian Brown Cloud" originally referred to a brownish soup of pollutants and particles over India, from forest fires, the burning of farm wastes, and huge increases in emissions from vehicles, industries, and wood-burning cookstoves. But new satellite data from the National Aeronautics and Space Administration show that the Asian Brown Cloud is part of a much larger-scale pollution event encompassing most of East and Southeast Asia. The haze is heaviest between December and May, the main home-heating season, but is getting worse year-round.



How now, brown cloud? Researchers are coming to understand the far-reaching effects of haze on the environment.

The UNEP report was based largely on the Indian Ocean Experiment (INDOEX), conducted by scientists in the United States, India, and Europe (for more information on this project, visit **http://www-indoex.ucsd.edu/**). INDOEX examined the movement of aerosols specifically over South Asia (comprising India, Pakistan, Bangladesh, and Sri Lanka). An INDOEX report in the 7 December 2001 issue of *Science* suggested that aerosols in the haze could seriously disrupt the Earth's cycle of evaporation and precipitation. By interfering with sunlight's breakdown of hydroxyl radicals, the haze could affect water availability and crop production.

The UNEP report draws preliminary conclusions about air pollution's effect on the South Asian environment and the implications for human health, agriculture, and climate change. For example, the report states that the haze reduces natural solar energy levels by about 10%, with significant consequences for farm yields—for rice planted in Hyderabad, India, shortly before the haze starts, the report estimates a 10% cut in rice yield. The report also cites figures for deaths worldwide related to air pollution: from a global estimate of 2.7–3 million deaths per year in 2001, the number could rise to 8 million by 2020.

The report spurred discussion of transboundary haze at the August 2002 World Summit on Sustainable Development held in Johannesburg, South Africa. In Asia, the report has kicked up dust of a different sort. Indian scientists take issue with the notion—implied, they said, by the phenomenon's name—that Asians are to blame for pollution, while Western countries have polluted the air for decades at far higher rates. Sulochana Gadgil, a professor at the Centre for Atmospheric and Oceanic Studies in Bangalore, also expresses doubts about the model used by UNEP. Gadgil considers the model unreliable, citing faults such as poor simulation of the rainfall patterns over Pakistan and Afghanistan.

V. Ramanathan, an atmospheric physicist at the University of California at San Diego and report coauthor, says the report does not seek to assign blame, but to raise awareness of the problem and its implications. Russell Schnell, director of observatories for the National Oceanic and Atmospheric Administration's Climate Monitoring and Diagnostics Laboratory in Boulder, Colorado, agrees that the report's importance lies in the public recognition that it has stimulated, and says the problem of transboundary pollution is likely to grow.

Schnell likens the phenomenon to a railway encircling the globe, with freight cars of pollutants that load and unload at points along the way: "When you get a trainload, you don't know exactly where all the pollution came from. It's an international, integrated problem." **–David A. Taylor**

Japan's Babies at Risk

Some 62% of pregnant women in Japan are at a higher risk of miscarriage and of giving birth to babies with low birth weights due to environmental tobacco smoke exposure, according to a nationwide survey conducted by the Japanese National Institute of Public Health. About 64% of respondents reported daily contact with a smoker, in 82% of cases the respondent's husband. Over half of the women reported taking measures to distance themselves from tobacco smoke, but only 14% said they asked people around them to quit smoking.

Survey leader Takashi Oida is urging public health officials and medical institutions to increase public education programs on the risks of smoking.

India Acts for Ozone

Four of India's largest chlorofluorocarbon (CFC) manufacturers voluntarily agreed on 2 May 2002 to use cleaner production technologies to help reduce "rogue" CFC emissions—those emitted during manufacturing—as well as emissions of other chemicals that can harm the ozone layer or local air quality. The manufacturers, whose combined 1998 output accounted for 16% of the world's total production of CFCs, are working toward completely phasing out their production by 2010.

This agreement is part of an initiative sponsored by the Indian government and UNEP that also includes a campaign to help medium and small manufacturers of items including refrigerators, air conditioners, and aerosol products find cleaner alternatives to CFCs and to help curb smuggling and illicit sales of CFCs across South and Southeast Asia.

Better Battery Recycling

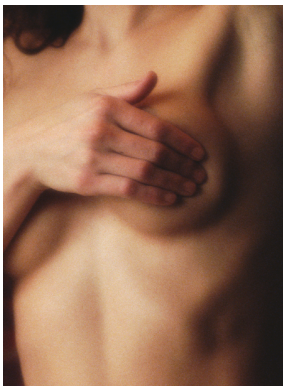
The Basel Convention on Hazardous Wastes adopted new guidelines in December 2002 for recycling lead-acid batteries, the world's main source of secondary lead. The guidelines will reduce the global risk of lead exposure, which is linked with impaired neurodevelopment, paralysis, and convulsions. In developing countries, used batteries are disassembled manually by workers wearing no gear to protect them from the potentially toxic lead dust and vapors.

The new guidelines establish a blueprint for the regulations and facilities necessary for managing the waste. A framework of controls, economic incentives, technologies, and market conditions also is provided to help governments and industry foster cleaner, more efficient battery recycling.

Clockwise from left: Jacques Descloitres, MODIS Land Rapid Response Team, NASA/GSFC; Goodshoot; Digital Vision; Ingram Publishing

CANCER

Long-Awaited Results from Long Island Study



Exposure to polycyclic aromatic hydrocarbons (PAHs; combustion by-products) raises women's risk of breast cancer by only a statistically insignificant amount, whereas exposure to several organochlorine chemicals has no link to breast cancer, according to two long-awaited papers published in the August 2002 issue of *Cancer Epidemiology, Biomarkers & Prevention*. The papers report results of the two primary hypotheses of the Long Island Breast Cancer Study Project (LIBCSP), a population-based study conducted in New York's Nassau and Suffolk Counties among more than 3,000 women.

The study is unusual in having been mandated by Congress after women's activist groups such as the Baldwin, New York–based 1 in 9: The Long Island Breast Cancer Action Coalition pressured local politicians for an investigation into why area rates of breast cancer were going up. In 1993, Congress passed a bill for the National Cancer Institute to study the possible environmental causes of breast cancer on Long Island.

The first paper reports on PAH-DNA adducts (chemicals attached to the genetic material) as a measure of exposure among 646 breast cancer patients and 429 controls, and found no evidence of a dose–response relationship, nor of any association with the main sources of PAHs, cigarettes and grilled and smoked foods. Principal investigator Marilie D. Gammon, an epidemiologist at the University of North Carolina at Chapel Hill, says these results may be due to a threshold effect, or that the relationship between PAHs and breast cancer may not be causal. Breast cancer, however, correlated strongly with nonenvironmental factors such as age, alcohol consumption, number of pregnancies, and weight.

The second paper reports on blood serum levels of several organochlorine compounds among the same group of women. No dose–response relations were apparent, nor was organochlorine-related risk noted among women with several other breast cancer risk factors.

The results disappointed the activists whose lobbying spawned the LIBCSP. Many believe the studys should have looked at currently used pesticides rather than the long-banned organochlorines. Ruth Allen, former program director for the LIBCSP at the U.S. Environmental Protection Agency and now an agency environmental epidemiologist, says the study's focus was logical at the time it was funded (1993) because a series of papers had implicated organochlorines in excess breast cancers in New York State.

Many media outlets have taken the results as evidence that pollutants contribute little to the Long Island breast cancer rate, which is only slightly above the national average of 114.3 cases per 100,000 women. Allen counters, "It's an epidemic any way you look at it." The rate of breast cancer incidence on Long Island and in many other communities throughout the Northeast has doubled over the past 50 years.

It is premature to absolve pollutants of blame, says Allen; negative results on a few chemicals do not constitute a not-guilty verdict. Three million people live above the aquifers that supply Long Island's drinking water, and, she says, "whatever they put in the soil goes right into the groundwater." Seventy-eight air strippers run continuously to strip volatile organics from the water supply aquifer as a precautionary step to reduce human exposure to chemical residue from past polluting activities.

The studies themselves are first steps—not final results—in the effort to pinpoint causes of breast cancer. An earlier study published in the March 2000 issue of the *Journal of Clinical Epidemiology* implicated organochlorine pesticides, especially dieldrin, in breast cancer. Gammon plans to test for this association among the Long Island cohort. Women with defective detoxifying genes may be highly susceptible to breast cancer, and the Long Island researchers are investigating this and other possibilities.

Geri Barish, president of 1 in 9, says a geographical information system would enable the correlation of cancer prevalence with exposure to pesticides and other pollutants as documented by various agencies. The National Cancer Institute developed such a system specifically for this study to integrate air pollution, water pollution, hazardous and municipal wastes, electromagnetic fields, and other factors into the study. The system will soon be available for further studies of cancers on Long Island. **–David C. Holzman**

REPRODUCTIVE HEALTH

Kill the Cancer, Save the Eggs

When young women are diagnosed with cancer and undergo radiation or chemotherapy to save their lives, they must contend with the devastating knowledge that the anticancer therapy could leave them infertile. Now researchers say their experiments with animal models suggest that a pharmaceutical agent could preserve the integrity of these patients' ovaries, allowing them to continue developing viable eggs.

"At radiation doses that sterilize ninety-five percent of mice, we were able to protect virtually all the female mouse eggs with the natural compound sphingosine 1-phosphate," says Richard Kolesnick, head of the Laboratory of Signal Transduction at Memorial Sloan-Kettering Cancer Center in New York City and principal investigator of the study, reported in a letter in the September 2002 issue of *Nature Medicine*. Not only were the eggs protected, but Kolesnick says that two generations of offspring produced by the protected females appeared normal by numerous biologic and genetic criteria.

"Right now there is no proven therapy that will preserve fertility in women undergoing radiotherapy or chemotherapy," says Kolesnick. "What this research suggests is that, when using a sphingosine 1-phosphate–based pharmaceutical approach, it might be possible to one day preserve ovarian function without propagating genetic damage."

"Nothing to date has provided protection," says Sanford Rosenberg, cofounder of the Richmond (Virginia) Center for Fertility and Endocrinology. He says attempts to preserve fertility by freezing ovarian tissue remains experimental. With the help of fertility specialists, some couples create embryos prior to chemotherapy that can be implanted at a later date after successful cancer treatment. Rosenberg says any development that could preserve fertility in women would be welcomed.

Kolesnick and his team observed that ceramide, a natural lipid, controls the apoptosis—programmed cell death—of eggs. Although scientists currently believe that egg loss after anticancer therapy occurs to preserve the integrity of the genome, he says, recent research suggests that the ceramide cascade works to eliminate eggs based on activation of membrane-based signaling pathways independent of DNA damage. So there may in fact be

PhotoDisc

ehpnet Society for Women's Health Research

Women's health activists, researchers, and practitioners formed what is now known as the Society for Women's Health Research (SWHR) in the late 1980s to advocate for women's inclusion as subjects in clinical drug trials. Today, with the help of its website at http://www.womens-health.org/, the group promotes research on sex-based biology, lobbies for more women's health research funding, and educates women on the importance of medical research.

The site's Our Activities page links to information on society-sponsored conferences, clinical research workshops, and scientific advisory meetings developed in response to the Institute of Medicine's April 2001 report *Exploring the Biological Contributions to Human Health: Does Sex Matter?* These meetings have covered such topics as sex differences in immunity and autoimmunity, and understanding the biology of sex and gender.

SOCIETY FOR WOMEN'S HEALTH RESEARCH
Changing the Face of Medicine

The What Is Sex-Based Bio? page offers fact lists, educator resources, and links to web-based tools such as the online version of the Institute of Medicine report. Outreach projects, such as the Women Can Do campaign to encourage women to make proactive health-related decisions and participate in medical research, are described on the Understanding Research page. Materials for specific minority communities address culturally relevant health concerns and beliefs.

The Advocating Policy page posts government news on women's health and upcoming actions. This page links to an outline of the society's legislative priorities, and a Health Issues in Washington page links to information on the society's main areas of advocacy: research, clinical trials, and access to health care and drugs. A fourth area covers sex differences and smoking, and genetic testing for women with inherited breast and ovarian cancer susceptibility. The Advocating Policy page also links to the Women's Health Research Coalition, founded by the SWHC in 1999 to promote development and funding for women's health research. The coalition has a congressional advisory committee composed of some of Capitol Hill's leading advocates for women's health research, and publishes a monthly newsletter.

The SWHR oversees two funding mechanisms, outlined on the Funding Research page. The Isis Fund sponsors collaborative interdisciplinary research to study sex differences in pharmacology and the influence of women's reproductive life cycle on health and disease susceptibility. The Pfizer/SWHR Scholars Grants for Faculty Development in Women's Health fund research and training for physician researchers for basic studies on the biologic mechanisms of women's diseases. Other funding sources are listed by type of disease. **–Erin E. Dooley**

some other reason for the loss of the eggs. Sphingosine 1-phosphate, which is a metabolite of ceramide, functions to prevent initiation of the apoptotic cycle, and preserves eggs without evidence of DNA damage.

The researchers injected 8 female mice with the compound and then exposed them to radiation. Another group of 8 mice were injected with a placebo and also irradiated. In the first mating trial after these procedures, 50% of the mice given the placebo produced litters, compared with all of the mice given sphingosine 1-phosphate. By the fourth mating trial, just 1 mouse not protected by sphingosine 1-phosphate was able to bear a litter, compared with 6 of the protected mice.

"This kind of approach to solving such a problem goes beyond the expertise of one single group," Kolesnick says, noting that the study required input from physicians, radiation oncologists, biochemists, and fertility, genomics, and genetics experts. Four institutions were involved in the project.

"While this approach holds promise, there is a lot more research that needs to be performed," Kolesnick says. "[But] we think we have established proof in principle that we can accomplish the protection of the [eggs] safely." **–Ed Susman**

Clockwise from left: SWHR; Southwest Environmental Health Sciences Center; PhotoDisc

The Beat

Toxicology *Por Favor*

Spanish-speaking environmental activists and educators have a new online resource for science-based toxicology information: *Toxicología Ambiental: Evaluación de Riesgos y Restauración Ambiental*, by Carlos E. Peña, Dean E. Carter, and Felix Ayala-Fierro. The text, located at **http://superfund.pharmacy.arizona.edu/toxamb/-index.html**, is made available by the NIEHS-funded Outreach to Mexico program at the University of Arizona in Tucson and covers such topics as cell biology, toxicology, risk assessment, remediation, and pollution prevention. The text will help hazardous waste managers, policy makers, and public health officials develop and implement environmental education and protection programs, and is written so that people with little formal scientific training can extract reliable, practical information on the human health effects and risks of hazardous waste.

SOUTHWEST ENVIRONMENTAL HEALTH SCIENCES CENTER

EISs for Southeast Asia

A Vietnamese pilot program on public disclosure of industrial wastewater discharge data concluded in July 2002. The Hanoi-based program monitored effluent releases at 50 factories, trained and developed environmental information systems for district staffs, and spread factory results to the general public. Within the first year many performers that were initially ranked as unsatisfactory or bad improved their discharge practices to a designation of excellent, good, or satisfactory. The program is part of a two-year $300,000 project funded by the World Bank for Vietnam's National Environmental Agency (NEA) to build information management capabilities within the agency. With funding from the Danish government, the Vietnamese Ministry of Natural Resources and Environment is working with the NEA to expand the program to other cities and sectors of industry.

Improving Air on Tribal Lands

Two new projects coordinated by the U.S. EPA Office of Indoor Air Quality seek to reduce the risk of asthma episodes for children on tribal lands. The projects will teach American Indian tribal leaders and health care providers about the risks of asthma associated with indoor air quality. The prevalence of asthma is greater among American Indians than white Americans. To encourage use of low-cost methods for attaining and maintaining good indoor air quality, the EPA has partnered with the Inter-Tribal Council of Arizona (a coalition of 21 Southwest tribes) and the Indian Health Service to develop educational materials specifically for American Indian audiences and to conduct on-site training, seminars, and indoor environmental asthma assessments.