

Environmental Contaminants May Contribute to Fertility Compromise

Responding to the fact that a growing number (now 12%) of American couples report experiencing difficulty in conceiving and/or carrying a pregnancy to term, a group of multidisciplinary experts gathered in 2005 to assess



Linda Giudice, MD

what was known about environmental contaminants that may affect human fertility. The gathering (Understanding Environmental Contaminants and Human Fertility Compromise: Science and Strategy) marked the first time infertility, women's health, and reproductive rights advocates met with researchers in reproductive epidemiology, biology, toxicology, and clinical medicine to assess the state of environmental health science in relation to human infertility. In the resulting Vallombrosa Consensus Statement, the experts state that, whereas environmental contaminants are unlikely to be "the sole etiologic factor underlying human infertility," there is enough evidence from a variety of disciplines to confirm that some chemical exposures do cause adverse reproductive health outcomes.

The ability to reproduce is fundamental to the survival of any species, which is why

data from the US National Center for Health Statistics 2002 National Survey of Family Growth is so disquieting. The survey reveals that close to 7.3 million women reported experiencing impaired fecundity (the biological capacity to have children) compared with 6.1 million in 1995 and 4.9 million in 1988. The most dramatic increase in self-reported problems (42%) came from women under the age of 25 years. This increased incidence of infertility in humans coupled with the fact that a wide range of wildlife populations (birds, fish, shellfish, and mammals) exposed to endocrine-disrupting contaminants also show decreased fertility and increased reproductive abnormalities sparked the concern that certain chemicals in our environment are more harmful to humans than previously thought.

"Our scientific understanding of the relationship between environment and human health is advancing," says Alison Carlson, facilitator of the Fertility/Early Pregnancy Compromise Working Group at the Collaborative on Health & the Environment (CHE) and coconvener of the Vallombrosa Conference. "It reveals that it is biologically plausible that a large portion of health problems, including some fertility and reproductive health compromise, could be caused by environmental exposures."

Conference coconvener, Dr. Linda Giudice, chair of OB-GYN at the University of California, San Francisco, explains that, whereas proximate causes for the infertility (such as a lowered sperm count or hormone imbalance) can be identified in most cases, the ultimate cause for the conditions (why is the sperm count low or why does a hormone imbalance exist?) remains largely unknown. These often hidden "whys" are what scientists believe may be linked to exposure to environment contaminants.

In addition to lead and dibromochloropropane (a fumigant), which were proven to impair human fertility years ago, the Consensus Statement points to cigarette

smoke and the pharmaceutical drug diethylstilbestrol (DES). In addition, the report states that, "Considerable data support that exposure to certain agricultural pesticides at moderate or environmentally relevant exposure levels are associated with adverse reproductive outcomes in men and women working on or living near farms." The adverse outcomes include male subfertility and sperm damage, menstrual alterations, increased time to pregnancy, and spontaneous miscarriage rates.

Scientists are currently studying the pathway from adverse exposure to disease or impairment. It is well documented that single contaminants can affect multiple end points in the human body. The report also points out that, "Some contaminants have been shown to alter the expression of hundreds of genes and these effects can vary with timing and dose. In addition, different contaminants can also affect the same physiological end point by acting on the same signaling pathway."

Up until now, most research has focused on these single chemical contaminants, but humans are exposed to hundreds of chemicals simultaneously, not just one chemical in single doses. Consequently, the Consensus Statement calls for research that looks at the effects of multiple chemicals because "experiments with single chemicals can significantly underestimate the effects of the same chemicals in mixtures." In addition, it is now known that chemical exposures during different stages of life have different impacts and that individuals may have different susceptibility to contaminants because of genetic variations.

John Peterson Myers, PhD, a major contributor to the Consensus Statement and coauthor of *Our Stolen Future!*, explains that, "Research in laboratories on animals over the last two decades has revealed that if they want to be able to detect effects, epidemiologists have to be more sophisticated and guided by biology in the ways they design their research. For example, the animal studies tell us that what hap-



Shanna Swan, PhD

pens in the womb . . . on a specific day . . . can alter adult fertility. How many epidemiological assessments of infertility in people have had information of that quality? Virtually none. Instead, almost all human studies of infertility have looked for links to exposures during adulthood. From the animal studies, we know that fetal development is far more vulnerable to disruption by contamination than are adult hormonal processes.

“Yet we do the studies in adult people, find no effects, and conclude that contamination isn’t involved. This makes no biological sense. One of the few human studies to look at adult fertility in relation to fetal exposure took advantage of umbilical cord blood that had been stored at birth. It found that elevated levels of DDT were tied to increased time to pregnancy in women, three decades after birth,” Myers says. “And unfortunately, this—development exposure leading to adult impact—is only one way that new biology is challenging epidemiological research.”

To date, few, if any, epidemiological studies have successfully incorporated the full complement of considerations into study design, explains Shanna Swan, PhD, cochair of the conference and professor and director of the Center for Reproductive Epidemiology at the University of Rochester School of Medicine and Dentistry in Rochester, New York. “Data from the Centers for Disease Control show that the US population is now exposed to ten

and even hundreds of chemicals at measurable levels. Many of these chemicals are known or suspected reproductive toxins. Therefore, we are all exposed to an unknown mixture of chemicals whose risks are not well understood but may be substantial.”

In addition to the need for additional funding, an expanded research agenda and new study designs, the Consensus Statement reaffirms that gene-environment interactions are likely to be involved in the etiology of many reproductive problems including impaired sperm quality, endometriosis, uterine fibroids, premature puberty, ovarian failure, and reproductive cancers.

The Vallombrosa Conference was convened by Stanford University School of Medicine, Women’s Health @ Stanford Program, and the Collaborative on Health and the Environment (CHE). It was funded by CHE, the Compton Foundation, and the Mitchell Kapor Foundation. Both the consensus statement, *Vallombrosa Consensus Statement on Environmental Contaminants and Human Fertility Compromise*, and its lay companion monograph, *Challenged Conceptions: Environmental Chemicals and Fertility*, are available in downloadable PDF format at www.healthandenvironment.org/working_groups/fertility. The scientific proceedings of the workshop are soon to be published in *Seminars in Reproductive Medicine*.

A follow-up conference, the CHE and UCSF-sponsored “Summit on Environmental Challenges to Reproductive Health and Fertility,” is being organized for January 2007. The conference can accommodate up to 300 attendees and will include reproductive clinicians, clinical researchers, and scientists (including those in training), fertility patient advocacy leaders, women’s health and reproductive advocacy groups, community health groups, environmental reproductive justice advocates, policy makers, and environmental health funders. The hope is to increase the number of informed voices working collaboratively to advance the understanding of environmental reproductive health issues. For more information on this upcoming summit, please contact Mary Wade at the Program on Reproductive Health and the Environment at UCSF at (415) 476-2563 or e-mail at: wadem@obgyn.ucsf.edu.

The Continuum Center for Health and Healing Receives \$325,000 Grant

The Continuum Center for Health and Healing (CCHH) at Beth Israel Medical Center in New York City has received a one-of-a-kind grant for \$325,000 from the National Library of Medicine to develop an online Web site for patients on the integrative approach to chronic disease.

“Our primary goal in this project is to educate consumers about the benefits of an integrative, multidisciplinary approach to three chronic diseases—diabetes/obesity, chronic pain, and cardiovascular disease,” says Marsha Handel, MLS, the information and education coordinator at CCHH, who developed the grant. “Increasingly, patients are interested in learning about the full range of treatment strategies available, including evidence-based complementary and alternative approaches and effective self-care strategies.”

More and more, patients are becoming active participants in their own healthcare and are seeking medical information via the Internet. This trend underscores an important issue: patients often do not find high quality information on the Internet or do not have the skills to evaluate the information they find. The Web site will provide evidence-based health information in both English and Spanish, using text, audio, and Macromedia Flash technology, a format that is motivational, user friendly and attractive. The site will also train consumers to locate credible and reliable health information through online tutorials on Medline searches and Web site evaluation.

“This grant is a wonderful opportunity to expand on the Web-based patient education already available on the CCHH Web site, which currently receives over 500,000 hits monthly, by adding a focus for patients with specific chronic illnesses,” says Dr. Ben Kligler, research director of the CCHH. “We are particularly excited about the opportunity to provide access to this information for Spanish-speaking patients as well because this has been a community largely overlooked to date by educational efforts in integrative medicine.”

“A large aging population, lack of widespread success in current chronic disease

management and the burgeoning costs associated with these chronic diseases highlight the critical need to find more effective ways to manage chronic illness," says Woodson Merrell, MD, founding director of the Continuum Center for Health and Healing. "We are thrilled that the National Library of Medicine and the NIH chose to partner with us to help address these needs."

The launch is expected within two years and will be part of www.healthandhealingny.org. For more information, please contact Marsha J. Handel at the Continuum Center for Health and Healing in New York City, NY. Telephone: 646 935-2246.

Healthcare's Environmental Leaders Receive H2E Award

Hospitals for a Healthy Environment (H2E) recognized 190 hospitals, health systems, and healthcare organizations for their achievements in reducing waste, eliminating mercury, and improving environmental performance at the recent CleanMed 2006 conference in Seattle, WA. Those being recognized demonstrated that improved environmental performance makes sound business sense.

From maintaining a phenomenal 46% recycling rate to eliminating 5,000 pounds of waste by reprocessing single-use devices to saving \$200,000 by switching to energy-efficient lighting, the 2006 Environmental Leadership Award winners were as follows:

- Affinity Health System, Appleton, WI;
- Baystate Health, Springfield, MA;
- Borgess Medical Center, Kalamazoo, MI;
- Boulder Community Hospital, Boulder, CO;
- Bronson Methodist Hospital, Kalamazoo, MI;
- Dominican Hospital CHW, Santa Cruz, CA;
- Kaiser Permanente Colorado Region, Aurora, CO;
- Legacy Health System, Portland, OR;
- Mercy Hospital-Mercy Health System, Janesville, WI;
- Mills-Peninsula Health Services, Burlingame, CA;
- Sparrow Health System, Lansing, MI;
- St. Joseph's Medical Center, Stockton, CA;



Marsha Handel, MLS, is the information and education coordinator at The Continuum Center for Health and Healing at Beth Israel Medical Center in New York City.

- University of Michigan Hospitals & Health Centers, Ann Arbor, MI; and
- W.A. Foote Health System, Jackson, MI.

In addition, 176 healthcare institutions received awards for their efforts to improve their environmental performance. Just a few of the outstanding achievements include the following:

- Doubling a facility's recycling rate in one year;
- saving two to five million gallons of water each month by using recycled water for landscaping;
- collecting 465 pounds of batteries for recycling;
- distilling and recycling xylene, formalin, and ethanol used in the hospital's laboratory;
- switching to the use of DEHP-free IV bags and tubing;
- using Green Seal certified cleaning products;
- reducing regulated medical waste by 40 tons per year by instituting a reusable pharmaceutical bin collection program; and
- providing environmentally preferable products through group purchasing organization contracts.

A nonprofit organization jointly founded by the American Hospital Association, the US Environmental Protection Agency, Health Care Without Harm, and the American Nurses Association, H2E educates healthcare professionals about pollution prevention opportunities, rewards the sector's best performers, and provides practical tools

and resources to facilitate the healthcare industry's movement toward environmental sustainability. For more information, please visit www.h2e-online.org.

American Botanical Council Announces Award Winners

The American Botanical Council (ABC), a nonprofit international organization working to educate consumers, healthcare professionals, researchers, educators, and industry on the safe and effective use of herbs and medicinal plant products, recently announced the recipients of the James A. Duke Botanical Literature Award and the Norman R. Farnsworth Botanical Research Award.

The Essential Guide to Herbal Safety by Simon Mills and Kerry Bone (Elsevier Churchill Livingstone, 2005) is the recipient of the Duke Award, and Dr. Joseph M. Betz, director of the Dietary Supplements Methods and Reference Materials Program at the Office of Dietary Supplements, is the recipient of the Farnsworth Award. The awards were presented at the American Botanical Celebration banquet held in March 2006 in Anaheim, California.

The James A. Duke Botanical Literature Award honors the singular, outstanding contribution by a book to the knowledge and understanding of medicinal and aromatic plants. The award is made in the name of James A. Duke, PhD, Economic Botanist (USDA, ret.), botanical consultant, author, and a founding member of the ABC Board of Trustees.

The Norman R. Farnsworth Botanical Research Award honors the outstanding effort of an individual or research group that has made a significant contribution to or advancement of knowledge of medicinal plants or other natural products. The award is made in the name of Prof. Norman R. Farnsworth, PhD, research professor of Pharmacognosy and Senior University Scholar at the University of Illinois at Chicago and a founding member of the ABC Board of Trustees.

"Dr. James Duke and Prof. Norman Farnsworth are two of the most respected medicinal plant scientists in the world," said ABC founder and executive director Mark Blumenthal. "They have contributed immeasurably to the existing knowledge about herbs and medicinal plants.

We at ABC considered it most appropriate to establish these new achievement awards in their names. Our congratulations to the recipients for their excellent work in the world of botanical science.”

About the Award Recipients

The issue of herb safety has become increasingly important to healthcare providers. Although only a few notable herbs have received widespread publicity, the prevailing evidence supports the relative safety of most of the herbs sold in North America as teas and dietary supplements. However, even the safest herbs must be used responsibly. Because herbs and their preparations are pharmacologically active, there are certain instances when their use should be restricted or altogether avoided by people with certain medical conditions or those who are taking specific pharmaceutical drugs.

“*The Essential Guide to Herb Safety* provides a rational and well-referenced approach to determining the relative safety of many of the botanicals in the marketplace and how these herbs can be used responsibly by consumers. As such, this book meets a compelling need of health professionals, is an excellent resource for those in the herb and dietary supplement industry, and provides an important public service to the consumer,” explains Blumenthal.

Another major challenge facing medicinal plant scientists and health professionals is how to interpret information in the scientific and medical literature related to herbs and medicinal plant preparations. All too often, published papers fail to identify accurately and adequately the botanical material used in a study or referenced in a case report. In addition, within the herb industry, determining the proper identity and qualities of botanical materials is of primary importance in issues of quality control, good manufacturing practices, herb safety, and clinical efficacy. To help ensure proper identity, validated analytical methods must be established for each botanical and/or botanical preparation.

“As the volunteer General Referee for Plant Toxins and, later, the General Referee for Dietary Supplements at the Association of Official Analytical Chemists (AOAC), Dr. Joseph M. Betz helped



Mark Blumenthal, executive director of the American Botanical Council, received an unexpected award from Rory Mahony, COO of Nature's Way, Inc. for Mark's contribution to the industry. © 2006 Steven Foster

establish the framework for the development of validating the analytical methods to be used for botanicals,” explains Blumenthal. “Now in his role at the Office of Dietary Supplements, where he is the director of the Dietary Supplements Methods and Reference Materials Program, he is the point man in the government's attempts to foster and fund efforts to validate analytical methods and reference materials so that the analyses used by various parties are accurate, consistent, and meaningful.”

For more information, please contact Nancy Moon at the American Botanical Council at PO Box 144345, Austin, TX 78714-4345. Phone: 512-926-4900 or e-mail: nancy@herbalgram.org.

New E-Newsletter Addresses Environment and Health

Environmental Health Sciences (EHS), a not-for-profit organization founded in 2002 to help increase public understanding of emerging scientific links between environmental exposures and human health, is now publishing a free daily e-newsletter. *Above the Fold* aggregates links to articles in the world press about

environmental health. Topics carried include a broad array of issues in environmental health, including chemical contamination, water quantity and quality, air pollution, sewage, Mad Cow disease, genetic engineering, and others, as well as climate change and biodiversity stories with a health dimension. You can sign up for *Above the Fold* at <http://www.environmentalhealthnews.org/>.

EHS also publishes three Web sites:

- www.EnvironmentalHealthNews.org;
- www.OurStolenFuture.org; and
- www.ProtectingOurHealth.org (produced in partnership with the Collaborative for Health and the Environment).

For more information, please contact Environmental Health Sciences, 619 B. East High Street, Charlottesville, Virginia 22902.

Kenny Ausubel and Nina Simons Receive Prestigious Global Green Award

Kenny Ausubel and Nina Simons, the founders and coproducers of Bioneers, recently received Global Green's 2006 Green Cross Millennium Award for Community Environmental Leadership at an awards dinner in April 2006 at the Beverly Hills Hotel.

The Global Green Millennium Awards recognize those individuals whose lives and livelihood embody the mission of fostering a global value shift toward a safer, more sustainable world. Part of the awards' goal is to further humanity's collective commitment to make these accomplishments the norm rather than the exception. Global Green USA, which works with governments, industry, and individuals, is addressing three great challenges facing humanity: climate change, weapons of mass destruction, and need for clean water.

Ausubel, who serves on *EXPLORE's* editorial board, and Simons founded the Bioneers Conference in 1990 in Santa Fe, New Mexico, to highlight practical and visionary solutions for restoring the Earth and people. The conference moved to the Bay Area in 1993. In 2005, well over 3,000 people attended the California gathering, and an additional 8,000 people attended 17 live simulta-

neous satellite conferences across the United States and Canada. Bioneers also conducts numerous other programs, including an award-winning radio series, a television broadcast series, book series, Web site, youth program, and food and farming program.

“Nina and I are deeply honored and moved by this award,” said Ausubel. “At this dangerous moment in human history when we face the ongoing collapse of the planet’s life-support systems, it is imperative that we all focus on solutions and roll up our sleeves to solve problems together. The solutions residing in nature consistently surpass our conception of what’s even possible. A huge global movement is today arising to restore the Earth and our human communities. We are honored to be a part of it.”

ACTCM Offers Clinical Doctorate Program in Acupuncture and Oriental Medicine

The American College of Traditional Chinese Medicine (ACTCM) recently

announced its first clinical doctoral program in acupuncture and Oriental medicine. The program has been approved by the California Bureau for Private Postsecondary and Vocational Education (BPPVE) and the Accreditation Commission for Acupuncture and Oriental Medicine (ACAOM). Set to begin at the college’s San Francisco campus in October of 2006, the doctoral program will emphasize integrated medicine and offer two tracks of specialization: pain management and women’s health.

For more information on ACTCM’s doctoral program and admissions requirements, please contact the college by telephone at (415) 282-7600 x14, by e-mail at admissions@actcm.edu, or visit the college online at www.actcm.edu.

Natural Foods Industry Continues to Grow

More than 45,000 people visited 3,000 exhibits at the recent Natural Products Expo West in Anaheim, California. Produced by New Hope Natural Media, a

division of Penton Media, Inc., the Natural Products Expo West is the nation’s largest natural, organic, and healthy products trade show. Thomas Aarts, co-founder and executive editor of *Nutrition Business Journal*, provided a forecast of the top healthy food and lifestyle products to an audience of retailer buyers and media and industry members. Sales of natural and organic foods grew by 13.2% in 2004, he said. Natural personal care products grew by 11.3% and functional foods by 7.0%. Supplements only saw an increase of 2.6%, which was the lowest growth rate in the last decade.

The *Nutrition Business Journal* surveys showed that the categories with the strongest growth in 2005 were fish/animal oils (37%) and plant oils (16%). Homeopathics showed a 16% increase and coenzyme Q10 grew at 10%. Among herbs, green tea shot up 94% in 2005 and cranberry up 17% the same year. Negative research findings drove sales of vitamin E down 42% in 2005. For more information on this and other aspects of the natural foods industry, please visit <http://www.nutritionbusiness.com/>.