THE DISAPPEARING MALE

"We are conducting a vast toxicological experiment in which our children and our children's children are the experimental subjects"

–Dr. Herbert Needleman,

Winner of the National Wildlife Federation Conservation Science Award for his research on lead poisoning and child development, in the new award-winning documentary *The Disappearing Male,* which is **"about one of the most important, and least publicized, issues facing the human species: the toxic threat to the male reproductive system."**[1]

[1] For more information about the documentary, or to view it for free online, visit www.cbc.ca/documentaries/doczone/2008/disappearingmale/

The Disappearing Male

Website: http://www.cbc.ca/documentaries/doczone/2008/disappearingmale/
Documentary Can be view at:
http://www.cbc.ca/documentaries/docplayer2.html?playlistId=f21067aaabfdece3076458e7e035e69febe7cfe7&id=911913844

"We are conducting a vast toxicological experiment in which our children and our children's children are the experimental subjects." Dr. Herbert Needleman

The Disappearing Male is about one of the most important, and least publicized, issues facing the human species: the toxic threat to the male reproductive system.

The last few decades have seen steady and dramatic increases in the incidence of boys and young men suffering from genital deformities, low sperm count, sperm abnormalities and testicular cancer.
baby Some researchers say that declining male fertility rates could be the first sign of extinction.

At the same time, boys are now far more at risk of suffering from ADHD, autism, Tourette's syndrome, cerebral palsy, and dyslexia.

The Disappearing Male takes a close and disturbing look at what many doctors and researchers now suspect are responsible for many of these problems: a class of common chemicals that are ubiquitous in our world.

Found in everything from shampoo, sunglasses, meat and dairy products, carpet, cosmetics and baby bottles, they are called "hormone mimicking" or "endocrine disrupting" chemicals and they may be starting to damage the most basic building blocks of human development.

Factsheet: Male Infertility

* There are more than 20 heavily industrialized nations where the birth of baby boys has declined every year for the past 30 years - amounting to 3 million fewer baby boys.
* The number of boys born with penis abnormalities and genital defects has increased by 200% in the past two decades.
* Boys have a higher incidence of attention deficit hyperactivity disorder, learning disabilities, Tourett's syndrome, cerebral palsy and dyslexia.
* Boys are four times as likely to be autistic.
* The average sperm count of a North American college student today is less than half of what it was 50 years ago.

* The quality of sperm is declining. Eighty-five per cent of the sperm produced by a healthy male is DNA-damaged.

* Damaged sperm have been linked to a 300% increase in testicular cancer - a form of cancer that affects young men in their 20s and 30s.

* The chemical industry has developed more than 90,000 man-made chemicals in the last sixty years. Eighty-five percent of them have never undergone testing for their impact on the human body.

Backgrounder: Endocrine 101

The endocrine system is a set of glands, and the hormones they produce help guide and regulate the development, growth, reproduction and behavior of most living things.

"Endocrine disrupting compounds" (EDC) found in synthetic chemicals like phthalates mimic estrogen in the body and have the ability to interfere with hormonal systems. They can seriously impair development in the brain, pituitary, gonads, thyroid, and other components of the endocrine system. They have also shown to interfere with fertility and reproduction in hundreds of laboratory studies involving fish and animal species.

The fear is that they may also be playing havoc with the basic building blocks of human sexual development.
child in tub Our children are more susceptible to the adverse effects of chemicals.

These effects have been well documented for decades. DDT, DES, dioxins, and PCB's are all endocrine disrupting compounds, and all were banned after it become evident that they were harmful to both animal species and humans. In the years since these earlier chemicals were outlawed there has been a massive increase in our exposure to a whole new spectrum of EDC's that are every bit as deadly in laboratory studies as the earlier examples. Read more about the chemicals.

In May of 2007, 200 of the world's leading environmental scientists gathered in Norway. They issued a strongly worded declaration that warned that exposure to common chemicals makes babies more likely to develop an array of health problems later in life, including diabetes, attention deficit disorders, prostate cancer, fertility problems, thyroid disorders and even obesity.

"There's no question that when you show that the mother's milk has contaminants, and then you actually look at babies and show that those contaminants are not only in that child, but they stay in that child. It is revolutionary."Dr. Louis Giullette

Children are at greater risk from chemicals because of their greater biological sensitivity and greater exposure to environmental pollution relative to bodyweight. They have very immature systems for excreting toxicants, a highly permeable gastrointestinal tract and highly permeable skin. Infants also consume eight times more food per kilogram of body weight than adults, making this a more significant exposure pathway. This means that a

five year old child is likely to have 10 times the amount of certain toxins in its body than his or her parents. And for reasons we are only just beginning to understand - boys seem to be at a far greater risk.

Exposure in the Womb

The womb itself is certainly no safe haven. It is now known that many environmental contaminants cross the placenta and reach the fetus. In the past five years, "body burden" tests have shown that amniotic blood contains hundred of toxic chemicals that the mother has in her body. It is now known that at certain critical windows of vulnerability, maternal exposure to toxicants is enough to permanently harm the growing fetus, causing disease and disability in childhood and across the entire span of human life.

"There are more and more studies showing that before birth, between fertilization and birth, something's happening to boys. Basically, they die before they are born."Dr. Theo Colborn

Proponents of what is called 'fetal programming' have shown that babies are born not just with traits dictated by their parents' genes, such as brown eyes and olive skin. They may also be born with a tendency to develop all sort of illnesses and health problems based on what their mothers ate and were exposed to during pregnancy. And this damage to the child may not appear for many years, sometimes not until adulthood.

Parental Effects

sarnia A native community near Sarnia, a highly industrialized city, has seen an alarming drop in the birth of boys.

It is now known that fathers are as important as mothers in the period before conception. It has been known since the mid-1970s that occupational exposures to pesticides can diminish or destroy the fertility of workers. As well, certain occupations - rubber worker, petroleum worker, agricultural chemical worker, painter, welder, and janitor - have been particularly implicated as detrimental to the health of their offspring.

Paternal exposure to solvents, pesticides, and metals has now been associated in animals and humans with the occurrence of spontaneous abortion, low birth weight, birth defects, childhood leukemia, brain cancer, change in the male to female sex ratio of offspring.

And, as with mothers, some of the most damaging exposures are the most unexpected. Many golf courses use four times as many toxic pesticides per acre as the average farm, and men who play golf during the spring are exposing themselves to massive amount of pesticide vapors.

Exposure at Home

In the past few decades the profound threat of poisonous chemicals has come home. Literally. Its an astonishing fact - the latest chemical hot spot is not a oozing swamp of toxic effluent: its our bathrooms, kitchens, living and bedrooms.

Recent studies by scientists working in the new field of "exposure analysis" have concluded that our homes expose us to more severe pollution than we get from landfills, hazardous waste sites or smokestacks. In fact, our homes are now so chemically saturated that the health risks from these indoor pollutants are far greater than the risks in the outdoor world.

"Pollution isn't something that's coming out of a smokestack. It's in us. It's become part of the background chemistry in our bodies. And it's accumulating. And it's accumulating quickly."Dr. John Peterson

We clean with them. We build them into our walls and cabinets. We spray them on bugs, weeds and gardens. We drag them into the house on our shoes and we stir them up when we walk on our carpets. They're in our toys, our shower curtains, our clothes, the water bottles we use for hiking and the baby bottles we use for breast milk and formula. They're in the televisions we watch and some of the computers that entertain us.

The net result is that the environment of the family home has become a rich soup of contaminants all swirling together inside our tightly built personal spaces. Visit The Toxic House to find out more.

Backgrounder: The Chemicals

It is a deeply disturbing fact of modern life that we inhabit a world that has become increasingly toxic. Sixty years ago, only a few synthetic chemicals (laboratory-made compounds that do not exist in nature) had been invented. The explosion of modern chemistry began in the era of the military build up during the late 1930's and early 1940's.

Chemists eager to help their countries achieve victory began inventing plastics, pesticides, solvents, degreasers, insulators, and other materials that could be used to make more effective weapons, increase crop yields, and feed more soldiers. These early chemical scientists unleashed a flood of laboratory ingenuity. More than 54 million chemical sequences have now been identified, and in the 60 years since the end of World War 2 more than 85,000 synthetic chemical compounds have been commercially developed and released into the environment.
boy in maze Our children are exposed to an array of chemicals throughout their lives.

Synthetic chemicals are now ubiquitous in our lives and widely dispersed in virtually everything we consume and touch. They are in the water we drink and the air we breathe. They saturate our food and clothing, our homes, schools and workplaces. Increasingly, there are real concerns about the torrent of chemicals that are flooding our world.

There are countless studies which document the ability of certain chemicals to cause disease in laboratory animals; chemicals that continue to be produced in the millions of tonnes for human consumption. Very few of these chemicals have been evaluated for their effects on the human body.

There are now literally hundreds of toxic chemicals that are either known to contribute, or are suspected of contributing, to serious health problems. These include cancers of the breast, prostate, brain and testicles; lowered sperm counts, early puberty, miscarriages and other defects of the reproductive system; diabetes; attention deficit disorder, asthma and autism. The chemical deluge also means that every generation of human beings is now more polluted than the last.

Here some information about two of the chemicals talked about in The Disappearing Male.

BISPHENOL-A

Amongst the chemicals most under the microscope for its negative health effects is a compound first synthesized in the 1890's: Bisphenol A.

"I had three different naturopaths at the time, and I had a midwife, I had a doula, and a doctor. And I was told about what herbs to avoid and certain foods to avoid, but no one mentioned anything about containers to avoid." Tosca Gardino, mom

It languished until the 1930's, when it was discovered that it could be used as a synthetic estrogen. In the 1950's it was discovered that bisphenol-A had the remarkable ability to make plastics more pliable and less prone to crack. Between 1980 and 2000, U.S. production of bisphenol-A grew nearly five times. And it is now a ubiquitous component of clear polycarbonate plastic and it is very big business.

It is used to make compact discs, sunglasses, bicycle helmets, water and milk bottles, baby bottles, drinking cups, pacifiers, food storage containers, dental sealants, tableware, window frames, cell phones, car parts, toys, and some medical devices such as incubators, dialysis machines, and blood oxygenators. It is the de facto lining used in food cans to prevent corrosion. More than seven billion pounds of bisphenol A are produced each year worldwide.

The chemical is so common that over 95% of us have elevated levels of it in our bodies, and the younger you are the higher the level is likely to be. The problem is, even very low doses of bisphenol-A have been repeatedly linked to increased incidence of low sperm counts, the earlier onset of puberty, insulin resistance and diabetes, prostate and testicular abnormalities, among other effects.

In 2008, Canada announced it intends to ban the import and sale of polycarbonate baby bottles containing bisphenol A, making it the first country in the world to limit exposure to the controversial chemical. The ban would affect only baby bottles and not other food containers made with bisphenol A (BPA).

Read more facts about Bishphenol-A (Attached at the End)

PHTHALATES

Phthalates are a class of widely-used compounds that soften plastic and hold scents and colors. They are found in products ranging from consumer electronics like the iPod and iPhone, food packaging, detergents, vinyl floor coverings, plastic toys and medical equipment. They are commonly found in products that are supposed to make us look good, and amongst the worst offenders are a wide variety of cosmetics, shampoos, and fragrances. Three quarters of personal care products contain them.

"It looks clean, it smells clean, it feels clean. We've been marketed that this product is clean. So it's difficult to think of it as dirty, as polluted, as toxic." Dr. Aaron Freeman

A study last year analyzed the phthalate concentration in common makeup products. Research that shows that boys born to mothers exposed to phthalates had smaller penises, and a whole host of problems which are now referred to as "testicular dysgenesis syndrome". These include reproductive abnormalities that are strongly linked to the later development of testicular and prostate cancer.

One of the most commen plastics in the world - PVC or polyvinyl chloride - contains a Phthalate called DEHP. It's been classified as toxic by several agencies around the world. baby in hospital Infant males may be especially susceptible to the effects of DEHP.

Ironically, PVC is used to make medical devices such as iv tubing, catheters and blood bags. In a hospital setting, an infant or child can be exposed to 200 times what is considered a safe amount in one single exposure. Studies have shown that the chemical can leach from the plastic and end up in the bodies to vulnerable children - especially male infants.

In Europe, the controversy over phthalates is over. In 2006, the European Union determined that they posed health risks and banned them from all products flowing to the 27 countries that make up the union over 1200 chemicals in all were outlawed. The governments of Canada and the United States have been much slower to act and North Americans continue to be exposed to them in massive quantities. U.S. chemical companies still produce more than 2 billion pounds of these compounds a year.

Profiles: Scientists

Jim Brophy, PhD
Jim Brophy is Executive Director for the Occupational Health Clinic for Ontario Workers.

He has been instrumental in studying and warning about the dangers of pollution to the residents of Aamjiwnaang First Nation in Sarnia, Ontario including how chemical pollution has skewed the birth ratio on the reserve where more girls are born than boys.

Dr. Theo Colborn, PhD
Theo Colborne has a PhD in zoology and has been the senior scientist and director of the Wildlife Contaminants program of the World Wildlife Fund. As director of the Wildlife

and Contaminants Program, she was the first researcher to prove the "endocrine disrupting hypothesis" by compiling information from many scientific disciplines that demonstrated how synthetic chemicals in the environment were mimicking or disrupting the body's natural hormonal system, the very system that controls development from the moment the sperm enters the egg until an individual is born.

In 1996 she co-authored a book for the general public called, Our Stolen Future. In the book, Dr. Colborn discusses about the urgency of this problem, and suggests what needs to be done. Today she is still a leading spokesperson on this subject and continues to compile data from scientific studies.

Elizabeth A. Guillette, PhD
Dr. Guillette is known for her anthropological interpretations regarding the interplay between contaminants, human health, and society.

One of her groundbreaking research studies was the children of the people of the Yaqui Valley in Mexico who were exposed to insecticides, herbicides, and other agricultural chemicals. She found that the pesticide-exposed children were less proficient at catching a ball, reflective of poor eye-hand coordination. They had lower stamina levels. Most striking were their drawings of people. The pesticide-exposed four-year-olds of the valley made scribbles and the five-year-olds frequently made a circle at the bottom of the paper and a line upward to represent the body. Others drew odd shapes with abstract divisions, where dots represented eyes and enclosed areas were body parts.

Louis Guillette, PhD
Louis Guillette Jr. is Distinguished Professor of Zoology at The University of Florida in Gainesville - The Howard Hughes Medical Institute. His studies centre on how environmental factors influence the development and functioning of the reproduction system in vertebrates including:

* The influence of contaminants on the developmental and reproductive biology of wildlife and humans,
* endangered species reproduction and
* the evolution of maternal-fetal chemical communication.

He has focused on the ability of environmental contaminants, like pesticides, industrial chemicals and detergent products to mimic chemical messengers. (hormones) and alter the reproductive systems. He has studied the effects of these chemicals on alligators and fish. He has edited, and contributed to hundreds of scientific articles.

David R. Helton, Toxicologist, President and Chief Scientific Officer of Cenomed BioSciences LLC and Cenomed, Inc.
David has over twenty-five years of drug development experience and has a diversified research and development background. He is highly published and recognized with over 120 scientific papers and 100 patents worldwide. In 2002, David founded Cenomed, Inc., a pharmaceutical discovery and development company with research areas focused on cognition, psychosis and chemical defense.

Margaret Keith, PhD
Margaret Keith is employed as the Research coordinator at the Occupational Health Clinic for Ontario Workers in Sarnia, Ontario.

She undertook a number of community-based studies, uncovering asbestos disease in Sarnia at the Holmes Foundry and other workplaces. She has also co-authored along with James Brophy and Matthew Firth the book Workplace Roulette: Gambling with Cancer.

David Michaels, PhD
Dr. David Michaels is a Research Professor and Associate Chairman in the Department of Environmental and Occupational Health (EOH) at the George Washington University School of Public Health and Health Services.

He is the author of Doubt Is Their Product, a criticism of how public relations has blocked one public health protection after another. He draws comparisons between the techniques first used to reassure the public about tobacco and those used by other industries to reassure the public about asbestos, lead, vinyl chloride and other chemicals.

John Peterson Myers, PhD
John Peterson Myers is founder, CEO and Chief Scientist of Environmental Health Sciences. Along with co-authors Dr. Theo Colborn and Dianne Dumanoski, Myers wrote Our Stolen Future, a book (1996) that explores the scientific basis of concern for how contamination threatens fetal development.

Shanna H. Swan, Ph.D.
Dr. Swan is an epidemiologist and biostatistician. She is a Professor in the Department of Obstetrics and Gynecology and Director of the Center for Reproductive Epidemiology at the University of Rochester School of Medicine and Dentistry.

She has focused her research on identifying reproductive risks from environmental exposures. She is also known for her work on the impact of environmental exposures on male and female reproductive health and has served on the National Academy of Science's Committee on Hormone-Related Toxicants.

Since 1998, Dr. Swan has been Principal Investigator of the Study for Future Families, a multi-center pregnancy cohort study examining environmental causes of geographic variation in reproductive health endpoints in men, women and children. Dr. Swan was elected Chair of the 2008 Gordon Research Conference on Environmental Endocrine Disruptors.

Sarah A. Vogel
Dr. Vogel's research examines political, economic, and scientific changes in the United States in the last four decades of the twentieth century through the story of one chemical, bisphenol A. The research begins in the 1960s with the establishment of regulations affecting plastics' contact with food and bisphenol A's introduction into plastics

production. It then traces the intersecting histories of scientific research, environmentalism, regulation, and plastics production up to the present. Through this case history, this project provides unique insight into the making of our environment, economy, and health.

Suggested Links:

Alternet: The Toxic Chemistry of Everyday Products
http://www.alternet.org/healthwellness/59714/

CBC News: Bisphenol A
http://www.cbc.ca/health/story/2009/01/28/f-health-bisphenol.html

CBC News: Phthalates
http://www.cbc.ca/health/story/2008/06/04/f-phthalates.html

The Collabrative on Health and the Environment: Birth Defects and the Environment
http://www.protectingourhealth.org/newscience/birthdefects/2004-0501birthdefectspreview.htm

The Collabrative on Health and the Environment: Vallombrosa Documents
http://www.healthandenvironment.org/infertility/vallombrosa_documents

Natural Resources Defense Council, On Earth Magazine: Bad Chemistry
http://www.nrdc.org/OnEarth/06win/chem1.asp

Our Stolen Future, Book by Theo Colburn, Dianne Dumanoski, and John Peterson Myers
http://www.ourstolenfuture.org/aboutOSF.htm

Reproductive Health Technologies Project: Environmental Toxins and Fertility
http://www.rhtp.org/fertility/vallombrosa/default.asp

Smithsonian National Zoological Park, Zoogoer Magazine: What Cautionary Tales can Lake Apopka Tell?
http://nationalzoo.si.edu/Publications/ZooGoer/1995/4/cautionarytales.cfm