

Rachel's Environment & Health News

#576 - 1997 Review -- Part 1: Something is Terribly Wrong

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During 1997, accumulating evidence indicated that something is disrupting normal sexual development and function in humans.

Baby Boys Disappearing

The year began with a report from Canadian researchers that an abnormal excess of baby girls were born in Canada and the U.S. during the period 1970 to 1990.[1] Normally, about 1057 males are born for every 1000 females[2] for a sex ratio of 0.514, but in Canada and the U.S. after 1970 the number of male babies declined, according to nationwide birth records in both countries. The reasons for the shifting sex ratio are not known.

In Canada, over the 20 years the cumulative loss was 2.2 males per 1000 live births; in the U.S., the cumulative loss was 1.0 males per 1000 live births. These losses were statistically significant. (In the U.S. the loss was greatest in the Atlantic coastal region where 5.6 males were lost for each 1000 live births.) Overall, in Canada during the period 1970 to 1990, 8639 liveborn males were lost. In the U.S., with its much larger population (250 million vs. 30 million), the total loss of liveborn males was 37,840 during the 20 years. The sex ratio can be affected by many factors including:[2] hormonally induced ovulation, which tends to produce more females; race (African-American couples tend to have more females); season of the year (more males born in summer, more females in winter); timing of fertilization in relation to the day of ovulation; social class has a small observable effect (in England, royalty tends to produce males and domestic servants tend to produce females); war, which tends to produce more males; smoking, which tends to produce more females; prostate cancer (tends to produce males); non-Hodgkin's lymphoma in either parent (tends to produce females); various drugs (some tend to produce males, others females); toxemia during pregnancy or pre-eclampsia (tends to be associated with male births); and DBCP (a pesticide used against nematodes) diminishes sperm count and strongly tends to produce females.

In 1986, William H. James of the Galton Laboratory (University College London) hypothesized that sex ratio was determined by hormone levels in the blood of the parents at the time of conception.[3,4] Sex ratio has been James's research specialty for many years, and he has presented considerable evidence to support his hypothesis.[5,6,7]

In 1996, a team of Italian and U.S. researchers provided additional evidence supporting James's hypothesis: the sex ratio of babies born after the explosion at Seveso, Italy, which spread dioxin over a large area on July 10, 1976. The researchers studied live births from April 1977 (9 months after the explosion) to December, 1984, among couples living in the most contaminated area. Of 74 births, only 26 were male and 48 were female, for a sex ratio of 0.35 instead of the normal 0.514. After 1984 the Seveso sex ratio returned to normal.[8]

Sperm Counts Have Declined

Toward the end of 1997, a re-analysis of sperm counts in the U.S., Europe, and the rest of the world concluded that sperm counts among men in the U.S. and Europe really have declined steadily for 50 years.[9] In 1992, Elisabeth Carlsen and co-workers had analyzed 61 separate studies of sperm counts and reported a 50% average decline in sperm count in Europe, the U.S., and elsewhere over the last 50 years. (See REHW #343, #369, #372, #432, #446, #448, and #492). Carlsen's study was criticized from various viewpoints (though not by anyone who had actually reviewed the 61 studies that formed the basis of the British report). In 1996 new studies revealed that enormous differences existed in sperm counts in geographic regions. After that, skeptics concluded that the whole decline in sperm counts was an artifact of statistical modeling and had no basis in reality. The NEW YORK TIMES favored the skeptics, leaving the impression that the whole dispute resulted from math errors.[10]

Now Shanna H. Swan, chief of the reproductive epidemiology section of the California Department of Health Services, has re-examined the original 61 studies. Swan conducted straightforward statistical analyses that took account of regional variations (which are, indeed, large -- sperm counts in New York are 131 million sperm per milliliter vs. 72 million per milliliter in California.) Swan's conclusion: AVERAGE sperm counts in the U.S. and Europe during the past 50 years have declined more steeply than the British first reported, but no decline was found in less-industrialized countries of Asia and Latin America. In the U.S., sperm counts have declined 1.5% each year and in Europe the annual decline has been twice as great. Dr. Swan's study was published in ENVIRONMENTAL HEALTH PERSPECTIVES (a U.S. government scientific journal) in November.[9] Swan told the LOS ANGELES DAILY NEWS, "My hope is, this study will change the question of concern from if there is a decline, to why there is a decline. I think it's time we looked at that." [11] (The NEW YORK TIMES has so far ignored Dr. Swan's new study.)

In the early 1980s, researchers with U.S. Environmental Protection Agency identified 16 industrial chemicals that reduce sperm counts.[12] In 1995, European researchers showed that common industrial chemicals widely present in U.S. foods (because of contact with plastics) cause reductions in size of testicles and diminished sperm counts in exposed mice.[13]

Male Genital Defects Increasing

In late 1997, researchers with the federal centers for Disease Control and Prevention in Atlanta reported that the occurrence of hypospadias doubled in the U.S. between 1968 and 1993.[14] Hypospadias is a birth defect of the penis. Nine to 12 weeks after conception, as a male grows inside the womb, the penis develops a channel for urine, called the urethra; hypospadias is a birth defect in which the urethra does not close but remains open for a certain distance on the underside of the penis, sometimes all the way to the scrotum. Typically, hypospadias is corrected surgically.

The new hypospadias data were gathered from two separate surveillance systems, the Metropolitan Atlanta Congenital Defects Program, and the Nationwide Birth Defects Monitoring Program. The researchers found that, not only did hypospadias double during the 25-year period, but the most serious forms of the defect increased faster than the average. They concluded that the increases are unlikely to result from improved sensitivity of the surveillance systems. They could not rule out the possibility that the increases resulted from better identification of mild cases by physicians; however, they noted that this explanation should have increased the number of mild cases compared to severe cases when, in fact, their data showed the opposite trend.

Hypospadias has been reported increasing in England and Wales, Hungary, Sweden, Norway, and Denmark, but most recently the trend has leveled off in England, Sweden, and Hungary.

Our good friend Pat Costner, a chemist with Greenpeace International, points out that hypospadias is considered a form of hermaphroditism -- a person having both male and female reproductive organs.

Consider these trends: cancers of the reproductive system (prostate, testicles, ovaries, endometrium and female breast) account for 30% of all cancers, and are increasing in many countries; [15] ectopic pregnancies increased nearly fourfold in the U.S., 1970-1987; [16] in many countries, the incidence of undescended testicles is increasing; [17] and now these 1997 studies reveal declining sperm, increasing hypospadias, and disappearing baby boys. Together, they suggest a picture of something going terribly wrong with human sexual development and function.

All of these aspects of human sexuality share one common feature: all are strongly influenced by hormones. Therefore, many

researchers have suggested that industrial chemicals that interfere with hormones may be responsible.[18]

One thing is certain: the chemical industry is conducting a large-scale experiment on humanity. Does this experiment --conducted without our informed consent --not violate the principles established at Nuremberg after World War II? Does this experiment not violate the Universal Declaration of Human Rights, which the United States signed in December, 1948?

Students of government, politics, administration, environmental studies, gender studies, racial studies, chemistry, engineering, philosophy, humanities, history, ethics, business, anthropology, sociology, and law (among other relevant fields of study) might do well to debate one question: where did the chemical industry obtain the right to put us in the position we all now find ourselves in: forced to wonder, "Is our children's health and future being taken from them as they are slowly poisoned?"

It seems reasonable and prudent to be asking, "Where did chemical corporations obtain the right to do these things?" A national debate on that subject seems long overdue. In 1997, we inched forward toward that debate.

--Peter Montague (National Writers Union, UAW Local 1981/AFL-CIO)

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[1] Bruce B. Allan and others, "Declining sex ratios in Canada," CANADIAN MEDICAL ASSOCIATION JOURNAL Vol. 156, No. 1 (January 1, 1997), pgs. 37-41.

[2] See, for example, William H. James, "The Human Sex Ratio. Part 1: A Review of the Literature," HUMAN BIOLOGY Vol. 59, No. 5 (October 1987), pgs. 721-752.

[3] William H. James, "Hormonal control of sex ratio," JOURNAL OF THEORETICAL BIOLOGY Vol. 118, No. 4 (February 21, 1986), pgs. 427-441.

[4] William H. James, "Male reproductive hazards and occupation," LANCET Vol. 347 (March 16, 1996), pg. 773.

[5] "Re: 'Total Serum Testosterone and Gonadotropins in Workers Exposed to Dioxin,'" AMERICAN JOURNAL OF EPIDEMIOLOGY Vol. 141, No. 5 (1995), pgs. 476-477.

[6] William H. James, "Parental hormone levels and mammalian sex ratio at birth," JOURNAL OF THEORETICAL BIOLOGY Vol. 139, No. 1 (July 10, 1989), pgs. 59-67.

[7] William H. James, "The hypothesized hormonal control of human sex ratio at birth--an update," JOURNAL OF THEORETICAL BIOLOGY Vol. 143, No. 4 (April 23, 1990), pgs. 555-564. And: William H. James, "The Hypothesized hormonal control of mammalian sex ratio at birth--a second update," JOURNAL OF THEORETICAL BIOLOGY Vol. 155, No. 1 (March 7, 1992), pgs. 121-128. And: William H. James, "Evidence that mammalian sex ratios at birth are partially controlled by parental hormone levels at the time of conception," JOURNAL OF THEORETICAL BIOLOGY Vol. 180, No. 4 (June 21, 1996), pgs. 271-286. And: William H. James, "Reproductive Effects of Male Dioxin Exposure," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 105, No. 2 (February 1997), pgs. 162-162.

[8] Paolo Mocarelli and others, "Change in sex ratio with exposure to dioxin," LANCET Vol. 348 (August 10, 1996), pg. 409.

[9] Shanna H. Swan and others, "Have sperm densities declined? A

reanalysis of global trend data," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 105 (1997), pgs. 1228-1232.

[10] Gina Kolata, "Sperm Counts: Some Experts See a Fall, Others Poor Data," NEW YORK TIMES March 19, 1996, pg. 10. And: Gina Kolata, "Are U.S. Men Less Fertile? Latest Research says No," NEW YORK TIMES April 29, 1996, pg. A-14. And: Gina Kolata, "How men measure Up, Sperm for Sperm," NEW YORK TIMES May 5, 1996, Section 4, pg. 4.

[11] Brigid Schulte, "Huge Drop in Sperm Count Reported," LOS ANGELES DAILY NEWS November 24, 1997, pg. N1.

[12] Andrew J. Wyrobek and others, "An evaluation of human sperm as indicators of chemically induced alterations of spermatogenic function," MUTATION RESEARCH Vol. 115 (1983), pgs. 73-148.

[13] Richard M. Sharpe and others, "Gestational and Lactational Exposure of Rats to Xenoestrogens Results in Reduced Testicular Size and Sperm Production," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 103, No. 12 (December, 1995), pgs. 1136-1143. The chemicals tested were 4-octylphenol (OP), butyl benzyl phthalate (BBP), and octylphenol polyethoxylate (OPP). BBP is a phthalate, many of which are common in the environment and in our food because they are widely used as plasticizers.

[14] Leonard J. Paulozzi and others, "Hypospadias Trends in Two US Surveillance Systems," PEDIATRICS Vol. 100, No. 5 (November 1997), pgs. 831-834.

[15] See REHW #562, #550, #547, #462, #447, and #412.

[16] Kees P. Nederlof and others, "Ectopic Pregnancy Surveillance, United States, 1970-1987," MMWR [Morbidity and Mortality Weekly Report] CDC Surveillance Summary Vol. 39, No. SS-4 (December 1990), pgs. 9-17.

[17] Jorma Toppari and others, "Male Reproductive Health and Environmental Xenoestrogens," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 104, Supplement 4 (August 1996), pgs. 741-803.

[18] For example, Tina Kold Jensen and others, "Do Environmental Estrogens Contribute to the Decline in Male Reproductive Health?" CLINICAL CHEMISTRY Vol. 41, No. 12 (1995), pgs. 1896-1901.

Descriptor terms: studies; sex ratio; canada; u.s.; seveso; italy; hormones; sperm count; elisabeth carlesen; shanna h. swan; hypospadias; prostate cancer; testicular cancer; ovarian cancer; endometrial cancer; breast cancer; ectopic pregnancy; undescended testicles; cryptorchidism; nuremberg principles; universal declaration of human rights; corporations;