

# The Vicissitudes of Sex

Prebirth demographics reveal that the probability of finding one sex over another changes with time

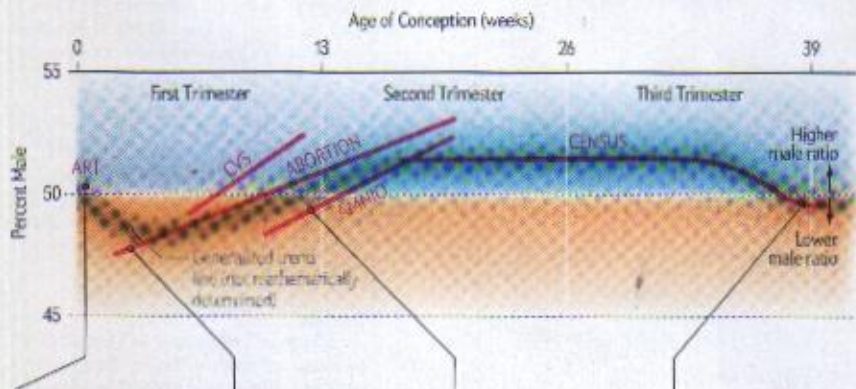
In the delivery room, the (slight) odds are that a newborn is a baby boy, not a girl. Males make up 51.3 percent of live births in the U.S., a rate that has remained about constant for the past seven decades. Experts assumed that this male-skewed sex ratio began at conception, but a new analysis of fetal records shows that the chances overall of finding a boy or a girl start out at 50-50 and change over the course of pregnancy—leaning female, then male, then female again as nine months pass.

In the most comprehensive study of its kind to date, biologist Steven Hecht Orzack of the Fresh Pond Research Institute in Massachusetts and his collaborators analyzed



roughly 36 million fertility treatment records, prenatal tests, induced abortions and U.S. Census data points. They discovered several nodes at which the sex ratio wavered from 50-50. Those vacillations most likely arise because of genetic and chromosomal abnormalities that cause natural abortions at various stages of gestation, write the study's authors in the *Proceedings of the National Academy of Sciences USA*.

"This is basic knowledge about human pregnancy that we didn't have before," Orzack says. "Demographers, developmental biologists, and many more can all get something out of this study." —Kat Long



At conception, the chances of finding a male or female embryo are equal—a conclusion drawn from an analysis of records of three- to six-day-old embryos derived from assisted reproductive technology (ART), which includes in vitro fertilization, fertility medication and surrogacy.

One to two weeks after conception, embryos that bear abnormalities on the sex chromosomes or the 15th and 17th chromosomes are aborted naturally. Data from medically induced abortions and a prenatal test called chorionic villus sampling (CVS) indicated that more males had these chromosomal problems than females, resulting in a female-biased ratio at this point in pregnancy.

More females than males die during the first trimester and at the beginning of the second, the researchers found after looking at records from the prenatal diagnostic test amniocentesis. They attribute the deaths to developmental abnormalities with one of the two X chromosomes, but the underlying cause is unclear.

At about the 38th week of pregnancy, boys reach their critical fetal weight, which triggers birth. Thus, the sex ratio of unborn fetuses for the 39th and 40th weeks of pregnancy skews slightly female. For all live births, Census records show that males account for a little more than half, demonstrating that more females than males die overall for the duration of gestation.



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