Study Frays Abortion, Cancer Link

A study of unprecedented scope indicates that abortion does not increase a woman's risk of breast cancer—except, perhaps, for a small group of women who have abortions in the second trimester of pregnancy.

Danish investigators arrived at this finding through an analysis encompassing all of the 1.5 million women born in Denmark between 1935 and 1978. Of these women, 280,965 had abortions and 10,246 developed breast cancer. Most of the abortions were performed between the 7th and 14th weeks of pregnancy, as they are in the United States.

The researchers say the study wields enough statistical power to dispel any lingering scientific uncertainties about abortion's impact on breast cancer risk. "There simply is no risk for the majority of women," asserts team member Mads Melbye of Statens Serum Institute in Copenhagen.

For the almost 5,000 women who had an abortion less than 7 weeks into a pregnancy, the breast cancer risk was 20 percent lower than that for the group as a whole. For the nearly 850 women who had abortions after 18 weeks, however, the risk increased significantly. Fourteen of these women developed breast cancer—nearly twice as many as would have been expected. Melbye says this detail, which his team is now trying to explain, is the most intriguing to emerge from the study.

The finding may represent a statistical anomaly, or the women in this group may have some factor in common, other than abortion, that raises their cancer risk. Or the heightened risk in this cluster of women may lend limited support to the general hypothesis that women who interrupt their pregnancies are more prone to breast cancer.

That hypothesis, which originally led scientists to study abortion and breast cancer, was based on two observations. The first is that women who have had a baby have a lower risk of breast cancer. The second is that the flood of estrogen early in pregnancy causes a proliferation of breast cells that do not mature until late in pregnancy. This suggests that the breasts of women who have had abortions remain laden with immature cells that may be vulnerable to cancer-causing influences.

Efforts to test the theory yielded a cascade of studies, all with inconclusive results. Chief among these is a combined analysis, or metanalysis, of 23 studies suggesting that women who had abortions increased their risk of breast cancer by 90 percent (SN: 10/19/96, p. 244).

Many earlier studies were hampered by their small size. The rest, including those used in the metanalysis, calculated breast cancer risk by comparing women who said they had had abortions with those who said they had not.

Studies have shown, however, that many women do not accurately reveal such sensitive information. This was the fatal flaw in the metanalysis, Melbye says. "A metanalysis can never be better than the quality of the individual studies."

The Danish researchers relied solely on doctors' reports. This was possible because, for half a century, Danish doctors have been required to report both the abortions they perform and the breast cancer cases they diagnose. This requirement solved another problem—population size. The study includes five times as many women who have had abortions or breast cancer as any similar study done in the United States, notes Patricia Hartge of the National Cancer Institute in Bethesda, Md.

By creating subgroups of women based on such factors as the week of pregnancy during which an abortion was performed, the researchers could draw fine distinctions between relative breast cancer risks.

Hartge says the study's size and detail "strengthen the credibility of the new findings. The study thus provides important new evidence to resolve a controversy that previous investigations have been unable to settle."

— S. Sternberg

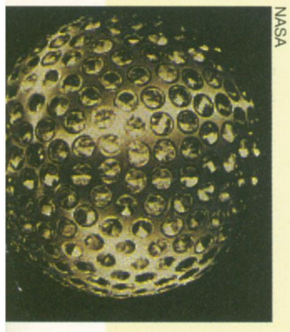
Satellite gets a kick out of sun's photons

In 1989, a NASA satellite began to drift subtly from its expected orbit, confounding researchers who used the spacecraft to measure the movement of Earth's crust. Now, a team of physicists has developed an explanation for the drift, a finding expected to keep the spacecraft useful for many more decades.

"Suddenly, there was this mysterious force acting on the satellite," says David P. Rubincam of NASA's Goddard Space Flight Center in Greenbelt, Md., who has worked with the satellite since its launch in 1976.

LAGEOS I, the Laser Geodynamic satellite, looks something like a spinning disco ball orbiting 5,900 kilometers above Earth. By reflecting laser beams off its mirrored surface, geophysicists can make precise measurements of tiny displacements in Earth's surface.

"To get really accurate measurements, though, you need to know the satellite's orbit well," says Douglas G. Currie of the University of Maryland in College Park. He, Rubincam, and John W. Robbins of the Hughes STX Corp. in Greenbelt describe LAGEOS in the Jan. 5 JOURNAL OF GEOPHYSICAL RESEARCH.



NASA

The wayward LAGEOS satellite bears 426 prism-shaped mirrors.

The researchers suspect that the satellite's drifting stems from sunlight, which falls more heavily on one side of the craft than on the other. The heated side of the satellite radiates this excess energy as infrared photons. The photons' energy provides a small, but persistent, rocket effect, pushing on the spacecraft as the photons spring from its surface. "The net force would be away from the hot end," says Rubincam.

As an additional complication, LAGEOS has developed a wobble, causing the direction of its spin axis to change over the years. The researchers compared their model to a painstakingly constructed record of the spacecraft's decades-long voyage. The results match very well, says Currie.

"[Solar photon force is] a well-known effect but very complicated to measure," says Byron Tapley of the University of Texas at Austin. Gravity is 100 billion times stronger than the force that the photons exert on LAGEOS, but over decades, the light quanta have cumulatively kicked the craft thousands of kilometers off course.

Although the effect influences all spacecraft, it is more noticeable in LAGEOS. The craft orbits far above Earth's atmosphere, which acts as a drag on lower satellites. Moreover, most other satellites have propulsion systems to maintain their positions.

Currie hopes to refine the group's analysis by engaging small telescopes around the world in observing LAGEOS' wobble. "We have an extremely good [explanation]; now we want to improve the model," he says. With a better understanding of the satellite's orbit, NASA expects LAGEOS to be useful to geophysicists for another 50 years.

— D. Vergano