

## Ethical Guidelines Proposed for Reproductive Technology

The American Fertility Society has released ethical guidelines that, it hopes, will aid physicians and their patients in assessing new—and often controversial—ways of having babies. While ruling out virtually nothing, the society's ethics committee nonetheless places methods, such as surrogate motherhood, that are highly emotionally charged, under the category "suitable for clinical investigation," meaning that they are not approved for general use. The committee's guidelines, which were released on 8 September, appear as a supplement to the September 1986 issue of the journal *Fertility and Sterility*.

According to committee member Edward Wallach, who is also president of the fertility society, the 12-member committee\* came into being because the society leaders "felt that [reproductive] technology was getting ahead of us. No one in the United States was taking a stand and establishing guidelines."

This contrasts with the situation in the United Kingdom, Australia, and Ontario, where the governments have issued reports that are primarily directed toward legislation and regulation. The United Kingdom, in its Warnock Commission report of July 1984, outlawed paid surrogate motherhood, for example.

In this country, there is a moratorium on federally sponsored research on new reproductive technologies and there are no plans for government regulations. The fertility society views its report as an appeal to physicians and researchers. "The majority of practitioners will look on the report with a sense of relief," Wallach predicts.

Until now, there has been no published stance on the ethics of such methods as freezing human embryos or washing an embryo out of the uterus of one woman and introducing it into the uterus of another. In addition, there are no good data on the success of these highly controversial methods. Even in vitro fertilization, by far the

most widely used of the newer methods, can be difficult to assess.

Committee member Richard Marrs, an obstetrician and gynecologist from the University of Southern California, surveyed clinics offering the technique and found that as many as one-third had never had a patient successfully complete a pregnancy. Yet IVF typically costs \$4000 to \$6000 per attempt. Except in the state of Maryland, which allows infertile couples to purchase an insurance rider covering their expenses for up to four IVF attempts, the procedure is not included in medical insurance, notes Gary Hodgen, scientific director of the Jones Institute for Reproductive Medicine at Eastern Virginia Medical School in Norfolk.

A good IVF program should enable a woman to become pregnant with a 25% chance with each attempt, according to committee chairman Howard Jones, founder of the Jones Institute. This is about the same as the chance that a pregnancy will occur after normal intercourse, Jones points out.

Among the committee's recommendations, Marrs states, is that "clinics give out their actual success rates rather than giving out the national average." The committee also classified the newer reproductive technology as follows:

- Ethically acceptable technologies include the patenting of instruments, products, and devices, basic IVF, artificial insemination with the husband's sperm in cases in which the husband cannot ejaculate into his wife's vagina, artificial insemination with donor sperm in cases in which the husband is infertile, the use of donor sperm for IVF, the use of donor pre-embryos (fertilized eggs that have not yet reached the stage at which they implant in the uterine wall) for IVF, and the use of frozen sperm for IVF or artificial insemination.

- Suitable for clinical trials is artificial insemination using the husband's sperm "for uncertain reasons." This means using artificial insemination in cases in which the man has too few sperm or sperm that move improperly or are coated with anti-sperm antibodies. The committee's reservation is that there are essentially no data demonstrating whether this method works.

- Suitable for clinical investigation—meaning that the techniques should be carried out at institutions with human subjects review boards and the results should be published in peer-reviewed journals—are transferring pre-embryos from one woman to another, using frozen eggs or frozen pre-embryos, using a surrogate to gestate a genetically unrelated embryo, surrogate motherhood, and experiments on pre-embryos.

- Ethically unacceptable are the patenting of

medical procedure and the use of surrogate motherhood for non-medical reasons. "That means convenience or vanity—someone who may have a career and wishes someone else to carry her baby," Jones says.

Committee member Richard McCormick, a Jesuit priest and ethicist at Notre Dame University, dissented on the use of third parties—donor sperm, donor eggs, and surrogate wombs. "My dissent is based on my own personal opinion and analysis," he remarks. Basically, he believes that the introduction of third parties "infringes on conjugal exclusivity" and raises "risks to marriage and the family that I regard as unjustified." Individual members of the committee also disagreed on particular points, such as whether surrogate mothers should be paid. But, all in all, says Jones, "I was amazed that we came out so unanimously." ■

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## NASA to Cancel Majority Of Spacelab Flights

As a result of launch delays following the Challenger disaster, officials of the National Aeronautics and Space Administration (NASA) have decided to cancel more than half the planned flights of Spacelab, a system of pressurized modules and open pallets that allows the space shuttle to function as an orbital laboratory.

"We've had to face reality," says Jeffrey D. Rosendhal, assistant associate administrator of the agency's Office of Space Science and Applications. Before the Challenger explosion on 28 January, he explains, his office was planning to fly the equivalent of 4½ to 5 shuttle payload bays full of Spacelab components every year. But that was also at a time when NASA was planning 24 flights of the shuttle itself every year. Now, with the remaining three shuttle orbiters grounded until 1988 at the earliest, and with a much reduced flight rate after that, the Spacelab program will have to make do with at most 1½ payload bay equivalents per year.

"So we had to ask ourselves," says Rosendhal, "Does it make any sense to spend lots of money on missions that won't even fly for 5 to 7 years? Or should we look for better uses of the money?" The answer, he says, was as clear as the arithmetic. He and his colleagues discussed the possibility of canceling the Spacelab flights during several meetings with scientists this past summer; the response was a melancholy resignation. "It was hard to see any way around it," Thomas M. Donahue of the University of Michigan, head of the Na-

\*Other members of the ethics committee are Lori Andrews of the American Bar Foundation in Chicago, Ceslo-Ramon Garcia of the University of Pennsylvania School of Medicine, Clifford Grobstein of the University of California in San Diego, C. Alvin Paulsen of the University of Washington in Seattle, John Robertson of the University of Texas in Austin, and LeRoy Walters of Georgetown University.

tional Research Council's Space Science Board, later told *Science*.

The agency has not yet decided precisely which experiments will be canceled, says Rosendhal. Some preference will be given to those disciplines, such as life sciences, that are uniquely tied to the manned capability of the shuttle. "But it's a very, very cruel choice," he says. "By January, we were finally ready to start delivering on promises we made years ago [about doing science aboard the shuttle]. Now it's inevitable that some experiments that have been well planned and that are well under way will have to be dropped."

The Spacelab decision comes only a few months after the Ulysses solar polar mission and the Galileo mission to Jupiter were thrown into limbo by NASA's cancellation of the Centaur upper stage, which was to launch the spacecraft from the shuttle's payload bay (*Science*, 4 July, p. 21). Coupled with launch delays of 30 to 40 months even for missions that do fly, these actions guarantee that post-Challenger space science is in for a painful period of retrenchment.

On the other hand, the news is not all bad. During the period of stand-down, for example, Rosendhal and his colleagues in the space science office hope to divert a substantial amount of money into what they call a "vitality package." This would include more development money for new instruments and small payloads, enhanced funding of inexpensive suborbital flights, enhanced funding for data analysis, and several similar efforts, all designed to help investigators produce scientific results in the near term. "Somehow," says Rosendhal, "we have to sustain the vitality of the program over the next few years."

This vitality initiative should be of some comfort to the community, since many space scientists have been calling for an increase in these areas for years. "It's clear that [the Spacelab decision] is very depressing," says Louis Lanzerotti of Bell Laboratories, chairman of NASA's Space and Earth Science Advisory Committee. "But if this situation allows us to recognize that the basic underpinnings are important, then in a perverse way it could be good for space science."

Meanwhile, Burton I. Edelson, NASA's associate administrator for space science and applications, has been getting high marks from the scientific community for his role as an activist in the agency's post-Challenger planning efforts. "I can't say in any way that we're better off than we were before," he says. "But given that we're here, I'm using the situation as an opportunity to reassert that the prime goals of NASA are science and exploration. In recent years we've fo-

cused on making the shuttle cost effective. But that's not the end goal. And the same thing goes for the space station: it shouldn't be just 'the logical next step,' or 'a permanent manned presence in space.' It should be a tool to help us do useful things."

In particular, Edelson has argued vigorously for retaining at least one third of the available payloads for space science and applications once the shuttle starts flying again. He has also lobbied for major new space science initiatives beginning in fiscal year 1988—"if we want missions in the 1990's, we have to start now," he says—and for expendable rockets to launch scientific payloads that do not require the shuttle.

It remains to be seen whether these efforts will produce any concrete results in the agency's fiscal year 1988 budget, which is now being negotiated with the White House. From all reports, however, NASA Administrator James C. Fletcher has been very receptive. ■ **M. MITCHELL WALDROP**

## Underground Tests Used In Laser Fusion Effort

For the first time, it has been officially disclosed that underground nuclear explosions are being used to support research in inertial confinement fusion (ICF). This laser-based technology has been pursued since the early 1960's primarily as a defense research program aimed at developing a method of modeling thermonuclear reactions on a tiny scale. The drive to successfully ignite a deuterium-tritium pellet with a laser also has been supported because of its potential application in generating electricity.

The House Science and Technology Committee, in its report on the fiscal year 1987 authorization bill for civilian energy programs,\* states that explosions at the Nevada test site have provided data for the laser fusion program. This admission goes a long way in explaining how some advances in the research program have been achieved. The laser fusion research effort received high marks in a recent National Academy of Sciences review† chaired by William Happer, Jr., a physicist at Princeton University. Conducted under contract for the Office of Science and Technology Policy, which was

reacting to a request by Congress, the publicly released version of the report left much unexplained. This is not surprising, since many program activities are classified.

In particular, the Academy report, issued in March, did not specify how some data were being obtained on the behavior of targets—deuterium-tritium pellets—subject to bombardment by x-rays. The Happer report did make it clear that no above-ground laser or particle-beam research facility in the United States is currently capable of delivering anything close to the 1 to 10 megajoules of short-wavelength power needed to ignite a capsule.

How, then, are program scientists making so much progress in understanding such critical issues as target fabrication, uniform illumination of capsules within black body shells (hohlraums), or controlling hydrodynamic instabilities in a target? A large body of data has indeed been obtained by facilities such as the Nova laser at Lawrence Livermore National Laboratory (LLNL). But some of the most significant results, according to the Happer report, have been gathered under the classified Centurion-Halite programs conducted by Los Alamos National Laboratory and LLNL, respectively.

These results are being produced with bomb-driven, raw radiation that is transformed into x-rays with hohlraums that contain deuterium-tritium targets. X-ray lasers produced with nuclear explosions are not being used to ignite targets directly at this time. The Academy review suggests that target ignition and thermonuclear burn can be reached within 5 years.

While the Happer report recommends that the Centurion-Halite research should be aggressively pursued and that budgets should stay level at around \$150 million annually, some researchers are worried that progress could be slowed by a test-ban agreement with the Soviet government. The Soviets have called for a complete suspension in the detonation of nuclear devices. Researchers say they are under pressure to accelerate their experiments. If they cannot be completed in the event of a full test ban, then the government may have to build a costly next generation laser or particle-beam machine sooner than anticipated, if laser fusion research is to be pursued.

As for Congress' admission that underground nuclear explosions at the Nevada test site are a key tool for data acquisition in the research effort, a Department of Energy program official declined to discuss it. Scientists working in the field, however, hope it will prod government classifiers to strip away unnecessary secrecy related to the broader ICF research program. ■

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\*Department of Energy Civilian Energy Programs Authorization Act for Fiscal Year 1987, House of Representatives Report 99-719, Part I. Requests for copies should be submitted to the Senate Document Room, Hart Senate Office Building, Room B-04, Washington, DC 20510-7106.

†Review of the Department of Energy's Inertial Confinement Fusion Program, National Academy Press, 2101 Constitution Ave., N.W., Washington, DC 20418.