OTA finds infertility a $1 billion problem

Ten years after the birth of the world's first "test tube baby," helping infertile couples make babies has become big business, says an Office of Technology Assessment (OTA) report released this week. In the United States, infertile couples spent about $1 billion last year on medical treatments aimed at conception. But half may remain childless, says the report, which calls for greater emphasis on prevention of infertility and better evaluation of the latest reproduction technologies. The report also criticizes the Department of Health and Human Services (HHS) for what OTA calls a failure to address some of the more emotional issues involved, including funding for research on fertilization in the laboratory.

An estimated 2.4 million U.S. couples suffer from infertility – the inability to conceive after one year of intercourse without contraception. Not all seek treatment, and more than half already have at least one biological child. But fertility problems will place an increasingly heavy burden on U.S. health care, according to the new report. Between 1965 and 1982, the number of infertility-related visits to a physician rose from 600,000 each year to 1.6 million, although the overall number of infertile couples remained about the same. As a result of these visits, as many as 200,000 babies – or 5 percent of the total – are born each year. Most of these "assisted reproductions" result from now-standard procedures, such as surgery to open blocked tubes and artificial insemination.

At technology's leading edge, however, are such emotion-laden issues as surrogate motherhood and *in vitro* fertilization (IVF). In the future, predicts the OTA report, roughly 100 "surrogate mother arrangements" will be made each year, despite present confusion over these contracts' legality. Although half of the 169 IVF programs in the United States have poor records and only 1 in 10 IVF patients becomes pregnant during treatment, the report predicts improving success rates. Costing $4,000 to $6,000 per treatment, IVF would still exclude the poor.

Government inaction has stymied IVF research, says Gary B. Ellis, the OTA project leader. Federal regulations mandate that, in order to receive public funding, proposals on human IVF research must be reviewed by an HHS ethics advisory board. In a 1979 report, such a group found this research ethically acceptable and concluded that "a broad prohibition of research involving human IVF is neither justified nor wise." The next year, however, HHS officials allowed the board to expire, essentially creating a moratorium on human IVF research that still exists. Ellis, who calls the situation "a blockade of research," said in an interview his agency regards HHS as "living in violation of its own regulations."

Among the options for Congress, the report lists the appointment of a new board and the expansion of federal support for both IVF research and male infertility. The report also notes that eight other countries, including Great Britain and Australia, have directly addressed the ethical and legislative issues involved in reproduction technologies, whereas the United States has not.

Ellis says OTA officials consider the *prevention* of infertility one of the more important issues to be addressed, because so many cases are "eminently preventable." The study found about 20 percent of infertility cases are due to treatable causes such as sexually transmitted diseases. Ellis, who stresses that OTA's function is merely to "lay out options," says the government could classify common, infertility-causing chlamydial infection as a so-called reportable disease, making it easier to track. *– D.D. Edwards*

Polio policy: Status quo

A report released this week recommends no immediate change in polio vaccine policy despite a small but persistent risk of polio infection associated with the most commonly used vaccine. That risk has nourished a decades-long debate over the advantages of the commonly administered oral vaccine – made from weakened poliovirus – relative to another vaccine made from killed poliovirus. In the United States both are approved for use, but the oral vaccine today accounts for more than 99 percent of the doses distributed.

With the introduction of polio vaccines in the early 1950s, the incidence of the disease plummeted in the United States from approximately 60,000 cases per year to an annual average of only 10 cases. Of the few U.S. cases that do occur each year, however, about three-quarters are vaccine-associated – the result of a "reactivation" of the weakened poliovirus that normally confers immunity without actually causing the paralyzing disease.

The new report, prepared by the Institute of Medicine of the National Academy of Sciences, estimates the risk of polio at 1 in 560,000 for individuals receiving their first dose of the vaccine. It recommends giving parents a choice of polio vaccines, but concludes that until more refined vaccines are approved – perhaps within the next one to two years – the public health is best served by continued reliance on the oral vaccine. □

Dieting away organ rejection, diseases

Removing essential fatty acids from the diet of organ-donating rats causes loss of immune cells from their tissues, thus providing a unique way to prevent a recipient's rejection of the transplanted organ, scientists report. While the researchers agree that human donors are unlikely ever to use a similar diet, they say it is possible a drug may someday mimic the diet's rejection-suppressing effects. Data from the studies also suggest such an approach may help prevent autoimmune diseases as well as local inflammatory reactions – without destroying the body's beneficial immune responses.

Last year, researchers at Washington University School of Medicine in St. Louis found that immune cells called Ia-positive macrophages disappear from the kidneys of rats fed a diet deficient in essential fatty acids, which the body does not make and which therefore must be supplied in the diet. The mechanism causing this depletion remains unknown. But because these cells are in part responsible for a transplanted organ being perceived as "foreign" by a recipient, George F. Schreiner and his co-workers then tested whether such a dietary treatment could help save transplanted rat kidneys given to unrelated rats. They report in the May 20 SCIENCE that kidneys from rats fed the special diet for at least two months survived after being transplanted. Kidneys from normally fed rats, however, were quickly rejected.

Recipient rats remained on normal food throughout the study, and the fatty acid composition of their new kidneys returned to normal within five days after surgery. Macrophages also returned during the same period, but came from the recipient and therefore did not cause a rejection response.

Schreiner said in an interview the scientists are now focusing on a fatty acid called Mead acid, which accumulates in the specially fed animals. He says Mead acid may be interfering with the movement of macrophages into tissues, and the scientists hope it or a similar compound can replace harsh immunosuppressive drugs now in use. Also of interest, Schreiner says, are yet-unpublished results showing rats are "markedly protected" against tissue-destroying inflammatory reactions. He says the diet also blocks diabetes in two rodent models, probably by stopping macrophage influx into pancreatic cells destroyed during diabetes. Although the treatment apparently prevents such autoimmune processes, the animals can still protect themselves against infection, he says.

– D.D. Edwards

News of the week continued on p. 333