

within a number of years is unimportant."

Some of Weinberger's confidence may stem from the substantial advantage that the United States has over the Soviets in the technologies critical to an effective defense. According to a recent report by Richard DeLauer, the under secretary of defense for research and engineering, the United States is equal to the Soviets in directed energy technology, but superior in virtually every other technology needed to fashion a working antiballistic missile system, including computers, optics, automated control, electro-optical sensors, microelectronics, propulsion, radar, signal processing, software, telecommunications, and guidance systems.

George Keyworth, the President's science adviser, lists this superiority as a principal justification for developing an antiballistic missile system. "I see this shift [from offensive to defensive weapons] as a decided advantage to the West in maintaining a stable peace," he recently told an aerospace manufacturers convention. "The reason stems from the superiority we and other Western countries have over the Eastern bloc in terms of industrial capacity and industrial base." He went on to say that the Soviets

"have to play catch up when it comes to advanced technology"—a circumstance that the United States can exploit by continually operating "at the knowledge frontiers. In that way, by the expedient of always staying several steps ahead, we can thwart even the most aggressive attempts by adversaries to keep up."

The U.S. advantage in short-range antiballistic missile systems, which operate within the atmosphere, is particularly large. At present, the Soviets depend on a system that was first deployed around Moscow in the 1960's, consisting of several dozen interceptors with nuclear warheads, and a series of large, outmoded radars surrounding the city. Because the system is obviously of little value in defending against a U.S. attack, Western intelligence experts have long expected that the Soviets would improve it by constructing newer, more survivable radars and other components. They were astonished several years ago when the Soviets instead decided to construct a single, enormous, highly vulnerable radar at Pushkino, 35 kilometers north of Moscow. Richard Ruffine, a Pentagon analyst who specializes in antiballistic missile systems,

says that "initially there was speculation that it was a pyramid, or perhaps Brezhnev's tomb—it was so unlikely. It is not a good way to build a system." Ruffine says that the radar, together with other modest improvements, makes the Soviet system only slightly better than what the United States developed 15 years ago under the Safeguard program. Everyone concedes that U.S. scientists have made significant progress since then.

The U.S. effort might be damned whether it succeeds or not. If a workable defense is never constructed, a lot of time and money will have been squandered. If by some stroke of luck it eventually proves successful, the Soviets will undoubtedly be at an enormous strategic disadvantage. Knowing this in advance, the Soviets might be tempted to initiate a preemptive strike, so as to eliminate the prospect of nuclear subjugation. And finally, a danger always exists that an ineffectual system would be deployed anyway, providing a leaky umbrella for more provocative U.S. behavior.

—R. JEFFREY SMITH

*Next week: The U.S. effort to ruin a potential Soviet missile defense.*

## Organ Shortage Clouds New Transplant Era

*Organs are used from only one in ten potential donors; some say legislation is needed to make more organs available*

Surgeons have recently begun to talk of a new era in organ transplantation, brought about by technical advances and new drugs to prevent rejection of transplanted tissue. But the application of this new technology is likely to be constrained by an old problem: an acute shortage of transplantable organs. Last year in the United States, out of some 20,000 potential donors—young or middle aged patients classified as brain dead—only 2500 actually gave their organs.

The supply of organs is already grossly inadequate. About 6000 to 8000 patients whose kidneys have failed and who are being kept alive by dialysis are on waiting lists for kidney transplants. And that may be only the tip of the iceberg. According to Richard Rettig, a social scientist at the Illinois Institute of Technology who has spent the past 15 months studying kidney transplants and organ procurement, about 22,500 dialysis patients

are suitable candidates for transplants. But the dialysis patients are the lucky ones. At least they can be kept alive while they wait. For other patients who need hearts, lungs, or livers the search for donated organs is a life-or-death proposition.

Moreover, the need for organs is expected to increase dramatically when the new drug Cyclosporin is approved by the Food and Drug Administration. Cyclosporin prevents organ rejection and has revolutionized the field of organ transplantation (see page 40). Currently, only a few medical centers are licensed to use the drug. But experts predict that the number of centers doing heart and liver transplants will double as soon as Cyclosporin becomes generally available—whether or not Medicare and insurance companies decide to pay.

Suitable organ donors must not only be brain dead but must also be fairly young. The cutoff age for heart donors is

usually 35 for men and 40 for women, liver donors cannot be much older than 40, and kidney donors must be under 55.

The problem of how to relieve the organ shortage was the topic of hearings in April before the House Committee on Science and Technology, chaired by Representative Albert Gore (D-Tenn.). In June Surgeon General C. Everett Koop held a meeting near Winchester, Virginia, on the subject. So far, however, no agreement has emerged on the best course of action. Some say the emphasis should be on educating doctors about identifying and referring potential donors. Others place the emphasis on better informing the general public. Suggestions range from public information campaigns to passing legislation allowing doctors to assume they can take a brain-dead person's organs unless he specifically stated during his lifetime that they cannot.

Why are there so few donations? It is not, apparently, because most Americans object to giving their organs. According to a recent Gallup poll, 70 percent of Americans said they were willing to donate their organs. The major religions in this country also favor donations. In fact, says Robert Veach, an ethicist at Georgetown University's Kennedy Institute of Ethics, "There is uniform support in all major [religious] traditions not only for the ethical acceptability of donation but the actual moral obligation to take donation seriously."

At least one transplant specialist places much of the onus for the lack of donations on doctors. Donald Denny, who is director of organ procurement at the University of Pittsburgh, says, "We cannot rely on families at the time of death to remember the need for organs." Brain death is almost always completely unexpected—it can occur as a result of an auto accident, drowning, a shot in the head, drug poisoning, or a devastating viral illness. "These are massive catastrophic injuries. Death is not anticipated. The donors are in the prime of life and their families are beside themselves. What we really have to do is rely on doctors and nurses to recognize prospective donors," Denny says.

So why don't doctors make more of an effort to contact transplant teams? The reasons, Denny suggests, range from fear of legal repercussions to simple ignorance of who is a suitable donor and whom to call.

"The leading problem is [doctors'] concern that brain death is not well understood," Denny explains. The physicians fear that if they suggest that the patient's organs be removed, the family may later sue, saying that the patient was not really dead. But despite the doctors' fears, there have been very few lawsuits—none in the past 7 years or so. Moreover, those few suits that were brought to trial exonerated the doctors.

Despite the fact that the legal threat is not very great, Denny says he can understand doctors' concerns. "My surgeons want to be very sure before they remove organs that the family has accepted brain death emotionally as well as intellectually," he remarks.

In his attempts to educate doctors about the need for organ donations, Denny finds that a useful approach is to emphasize the benefit donations have to the families. He always writes to the families to tell them what happened to the donated organs and frequently the families write back saying that it was a source of comfort to them to know that someone else benefited from the death.

But even when doctors are ready to suggest organ donations and families are eager to donate, the doctors sometimes do not know whom to contact. In early April, therefore, the North American Transplant Organization, a professional association of organ procurement coordinators, established a 24-hour toll-free hotline based at the University of Pittsburgh. Doctors or nurses can call 800-24-DONOR and speak to University of Pittsburgh transplant coordinators who will help them get in touch with coordinators in their own area. So far, there have been about 12 referrals from doc-

gans solely on the basis of a signed donor card—which even now they are legally entitled to do—persuading more people to sign the cards will be no panacea.

A more drastic step would be for the United States to join the growing list of countries that recently enacted so-called presumed consent laws. These laws state that unless a person explicitly states that he does not want his organs donated, it is assumed that he does and transplant surgeons can act on that presumption without fear of legal reprisals. Such laws have been passed in Austria, Denmark, France, Italy, Israel, Poland, Norway,

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## As organ transplants become more and more successful, demand for donated organs is expected to soar.

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tors who never referred anyone for organ donations before. One of these referrals resulted in an actual donation of a heart and kidneys.

A number of persons concerned about the lack of organ donations would like to see an increased emphasis on making individual citizens aware of donations, rather than relying on doctors and nurses to suggest donating organs. A traditional way to do this is to offer people donor cards to sign. The National Kidney Foundation has distributed more than 30 million donor cards since 1968 and, in Maryland, drivers can indicate on the backs of their licenses whether they wish to donate their organs. But this approach has not been very successful. In Maryland, for example, only 1.5 percent of drivers sign their cards.

Some experts feel that perhaps the states or the federal government should get stricter about donor cards. For example, G. Melville Williams, a transplant surgeon at Johns Hopkins University, suggests that people be required to designate whether they wish to be donors at the time they renew their drivers licenses. But others, including Denny, worry that such an approach will backfire. "My fear is that when you insist on yes or no, people will say no," Denny says.

Even if more people did sign donor cards, however, most doctors would still want to obtain the consent of the families before going ahead and referring patients as organ donors. So the donor cards usually serve only to make people more aware of the possibility of giving their organs and to make families more aware of what patients' wishes were. Unless doctors were bolder about removing or-

Spain, Sweden, Switzerland, and Czechoslovakia.

Some observers would not object to presumed consent laws in this country also. Alexander Morgan Capron, a law professor at Georgetown University, says he would be in favor of such legislation if voluntary donations continue to be inadequate. James Childress, a professor of religious studies and medical education at the University of Virginia says, "A system of presumed consent is not ethically unacceptable."

Not everyone, however, supports the idea of presumed consent laws. LeRoy Walters of Georgetown University's Kennedy Institute of Ethics is not in favor of such laws, saying that he would prefer "more aggressive public education and presenting a choice [of organ donation] to every adult." Veach is even more forcefully opposed, saying, "Any scheme that abandons the mode of donation in favor of viewing the cadaver as a social resource to be mined for worthwhile social purpose will directly violate central tenets of Christian thought and create serious problems for Jews as well, especially in a state not based on Jewish law. It will, more pragmatically, predictably produce vociferous, agitated opposition."

The problem of getting more organ donations is not going to go away. Nor will it solve itself. In fact, as organ transplants become more and more successful, demand for donated organs is expected to soar. There are no easy answers, but surely, the transplant coordinators think, it should be possible to get more than the current 2500 donations per year in a country the size of the United States.—GINA KOLATA