

## **Chapter 6**

# **Medical Interventions: The Beginning and End of Life**

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# Medical Interventions: The Beginning and End of Life<sup>1</sup>

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Rapid progress has been made in medical technologies in recent decades and seems certain to continue, with scientific breakthroughs in many fields. Emerging or impending advances in medical capability are often foreseeable, sometimes years before they occur. They can be anticipated when:

- there are no theoretical or logical barriers to their achievement,
- the scientific and technical barriers are identifiable and understood,
- there are alternative research strategies for attacking the problems, and
- society puts a high priority on achieving the goal and therefore provides incentives for persistent effort.

Some medical goals are less definitely achievable, yet continue to be strongly pursued

because their contribution to length of life, quality of life, or reduction of suffering is potentially great. Other great achievements in health care occur when there is a sudden discovery such as penicillin, a breakthrough such as organ transplants, or a new vaccine; such discoveries often give rise to a long procession of innovations and inventions.

Some of the trends and developments noted in this chapter are already underway. The timing and achievability of others are debated by experts. Nearly all are, however, considered likely to become available within 5 to 20 years. This is, indeed, a conservative view. It neglects many other achievements that may be equally or more likely, or even closer at hand. It is intended only to indicate the fertile, rapidly developing possibilities of medical science and technology and their potential power to intervene in matters of life and death.

While not all of these developments will impinge on constitutional principles many of them involve issues that may face America in the 21st century. This chapter looks at some of the most important impending developments, and the possible constitutional implications of their use.

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<sup>1</sup>I, preparing this chapter, OTA drew on interviews and focus group sessions conducted at the annual meeting of the American Association for the Advancement of Science (AAAS), Chicago, January 1987; results of a mailed questionnaire to section officers of the AAAS in December 1986, and an OTA workshop on Biology, Medicine, and Public Health, May 1987. In addition, Jonathan Peck, Institute for Alternative Futures, and Irene Jillson, Policy Research Incorporated, as OTA contractors, contributed to the development of this chapter.

## ADVANCES IN MEDICAL TECHNOLOGIES

Rapid advancement in information sciences, materials sciences, and molecular biology mean that new technologies will be developed over the next 5 to 20 years in the areas of medical communications and record-keeping, imaging of body structures, surgical techniques, prosthetics, organ and tissue implants and transplants, pharmaceuticals and family planning assists.

### Computers and Communications

Knowledge about health care has proliferated because of better monitoring of bodily systems and the environment. Computers have greatly improved the collection, measurement and analysis of statistics on disease occurrence, outcomes of treatment, and research results. This knowledge has changed the direction of research and development.

Reporting surgical results was common practice as far back as the 16th century,<sup>2</sup> but until recent decades other treatment outcome measures were largely limited to indicators of patient satisfaction, postoperative infection rates and numbers of malpractice suits. Computers have encouraged expansion of data about results of therapy, and thus assessment of the effectiveness of treatments.<sup>3</sup> New disease trends now may become evident much quicker, an important factor in public health programs.

Computers enhance the efficiency of laboratory research by saving labor costs in processing, storing and analyzing diagnostic tests results. Expert systems are used to help in diagnosis and in designing therapies. Computers analyze and model bodily systems and processes such as skin blood flow, to determine the best locus for amputations.<sup>4</sup> With computers, scientists simulate the immune system and thus search for the basic principles governing complex systems. This in turn can lead to future medical breakthroughs.

Outside the laboratory, computers can by integrating medical and financial data, allow cost-benefit analysis of various treatment possibilities to develop models for more efficient allocation of health care resources. Computers are also an essential component in nearly all new medical instruments. Older sensors could aid the physician in perceiving conditions within the body, but today's enhanced medical sensors can also measure, correlate, analyze and store information. Computers are also used to design instruments, analyze equipment failure, and repair equipment.<sup>5</sup> In scanners such as the CAT (computer-aided tomography),

the computer provides valuable information, but in two dimensional form which is easily interpreted by radiologists but less appropriate for surgeons. Computer graphics, however, can create three dimensional images that are more easily usable for appreciating special relationships and rectilinear measurements.<sup>6</sup>

Telecommunications technologies may in the future facilitate the delivery of health care to rural and remote areas difficult to service with health professionals. Information, imaging, and patient monitoring systems can integrate remote areas with regional hospitals.<sup>7</sup>

Beyond these new or developing uses of computers, there may be new kinds of computers for medical use. Bio-computers made of proteins and other molecules may someday be developed. These minute, fast machines would be invaluable in medical research and medical care. The technical bases for such biocomputers already exist or are being developed by molecular biologists, physicists, and computer scientists.<sup>8</sup>

### Imaging Technologies

Imaging technologies can analyze bodily tissue and body chemistry, monitor bodily functions and diagnose disease. Computerized axial tomography (CAT) scanners and position emission technology (PET) have already produced more knowledge of normal and pathological functions than could have been imagined a few years ago. PET can scan the brain without invasive surgery, reveal biochemical reactions taking place, show the response of

<sup>2</sup>Richard Cales and Donald Trunkey, "Preventable Trauma Deaths," *JAMA*, vol. 254, No. 8, Aug. 23-30, 1985, p. 1062.

<sup>3</sup>Clement Bezold, "Health Trends and Scenarios," in Jack A. Meyer and Marion Ein Lewin (eds.), *Changing the Future of Health Care* (Washington, DC: American Enterprise Institute for Public Policy Research, 1987), p. 84.

<sup>4</sup>Veterans' Administration, *Rehabilitation R&D Progress Reports* (Washington, DC: Veterans Administration Medical Center, 1986), p. 11.

<sup>5</sup>Murray Eden, "Smart Instruments, Microprocessors, and Personal Computers," *International Journal of Technology Assessment in Health Care*, vol. 3, 1987, pp. 327-330.

<sup>6</sup>Michael W. Vannler and Jeffrey L. Marsh, "3D Imaging Aids Skull Surgeons," *Computer Graphics World*, vol. 8, December 1985, pp. 49-50, 52-55.

<sup>7</sup>Chris Higgins, Earl Dunn, and David Conrath, "Telemedicine: An Historical Perspective," *Telecommunications Policy*, vol. 9, December 1984, pp. 307-313. In the early 1900s heart tracings were successfully sent via telegraph lines by Einthoven, the developer of the electrocardiogram, for analysis at a far-off laboratory site. Various combinations of television and telephone systems have successfully provided service to Indian reservations, jails, and remote areas of Alaska. Their use has generally been constrained because of high costs rather than technical inadequacy.

<sup>8</sup>Michael Conrad, "The Lure of Molecular Computing," *IEEE Spectrum*, October 1986, pp. 55-60.

a tumor to drug treatment, evaluate changes due to stroke, and observe the lesions causing Parkinson's disease, Alzheimer's disease, and perhaps schizophrenia. Magnetic resonance imaging (MRI) reveals not only bodily structures but even chemical processes within individual cells. It can measure blood-flow rates from specific locations in the brain (to predict possible strokes), and drugs such as antidepressants could be labeled with MRI-sensitive compounds and traced within the brain.<sup>9</sup> In the future, this capability will supplement, and could even replace in some situations, more subjective modes of diagnosis of mental illness. This could introduce into the constitutional debate new arguments regarding responsibility for behavior.

The increased knowledge about health raises the long range possibility of conflicts over response to that knowledge. For example, imaging equipment shows clearly the arterial plaque build-up often responsible for heart attacks, much of which, scientists believe, might be avoided by appropriate diet. This has led to development of plaque-dissolving drugs for cleaning out arteries and ridding kidneys of stones. But not all problems revealed by new medical technologies can be resolved by still more new technologies. In that case, social controls are sometimes proposed. Some people argue, for example, that those who eat irresponsibly (thus filling their arteries with plaque) are costing society too much in terms of health care and thus should perhaps be discouraged from doing so, perhaps by higher health insurance premiums.

### Surgery, Prosthesis, and Trauma Repair

Trends in surgical practice point to continued development of less invasive and destructive surgery. This is illustrated by balloon angioplasty, the use of stereotaxic headpieces in brain surgery, the use of lasers rather than scalpels in many areas of surgery, and microsurgery. Surgical instruments made with fiber-

optics permit looking directly into internal structures of the body; combining lasers and fiberoptic allows more sophisticated repair and less destructive removal of diseased tissues, and more sophisticated neurological procedures. New microsurgery techniques together with immunological advances may eventually allow the restitching of severed nerves or spinal cords.<sup>10</sup>

These procedures and instruments make surgery safer, less traumatic and less fearsome to the patient, and more effective. More surgery can now be done on an outpatient basis. The added safety may mean that more surgery will be done in the future, and more radical procedures will be attempted. This may well aggravate current debate about when physicians should and should not intervene to prolong life, and about who has the right to refuse such interventions for themselves or for others. The development of fetal surgery to correct abnormalities before birth is, for example, already raising constitutional issues.

Some scientists suggest the possibility of limb regeneration and of synthesis of organic tissues.<sup>11</sup> In the meantime, models created from computer scans aid in the design and production of prosthetics. Research engineers hope someday to develop cybernetic devices—building on advances in robotics, artificial intelligence and sensing systems—that will permit paraplegics to walk, blind people to see, and deaf people to hear. This could include electronically assisted and controlled artificial

<sup>10</sup>Angioplasty is surgical reconstruction of the blood vessels, in which a balloon catheter is inserted into a blood vessel and inflated to flatten plaque against the wall of the blood vessel. The stereotaxic headpiece is a metal framework surrounding the patient's head to allow precise, minimal invasion of the brain for biopsy, removal of tumors, and so on. Laser surgery, using a cutting and cauterizing ray rather than a blade, minimizes bleeding and swelling, allows spot-welding of detached retinas, and reduces incidental injuries to healthy tissue. Microsurgeons use high-powered microscopes, extremely thin needles, and miniaturized instruments to reattach nerves and veins, reconstruct the middle ear, reroute arteries, and perform other extremely delicate repairs, even in some cases on fetuses in the womb. Henry C. Adler et al., *Meditrends* (Chicago, IL: The Hospital Research & Educational Trust, 1986), p. 26.

<sup>11</sup>Replacement skin from human cadavers has been successfully transplanted to a burn victim with the aid of the anti-rejection drug, cyclosporine. See "Harvesting New Skin," *Science* 86, vol. 7, April 1986, p. 9.

<sup>9</sup>Lawrence Galton, *Med Tech* (New York, NY: Harper & Row, 1985), pp. 286-303.

limbs or limb supports, arms and hands that move in response to neural impulses, hand-held human-like voice synthesizers, and TV cameras implanted in eyes. Computerized electromyographic (EMG) feedback is being studied for the purpose of restoring function in persons with long-term spinal cord injury.<sup>12</sup>

A new class of materials, bio-ceramics, shows great promise in prostheses. Bone will grow into and unite with one class of ceramics for firm fixation of teeth and artificial joints to the surrounding tissues, an innovation that promises new opportunities for patient rehabilitation.<sup>13</sup>

Further medical technologies being developed for the care of traumas include:

- Artificial blood for use in treatment of chronic blood disorders and emergency treatment for traumas, particularly desirable to prevent transmission of diseases such as AIDS and hepatitis, is currently at the stage of basic research, although many problems are still unsolved.
- Dry curing of burns to eliminate serious infection is undergoing human experimentation.
- Artificial skin and drugs to control rejection are being perfected.
- Phototherapy or light treatment for a variety of health problems including psoriasis, sleeping disorders and apneas, radiation-related diseases, etc., is now at the basic research stage.
- A diapulse device for promoting healing of damaged nerves and spinal injuries is at the stage of animal experimentation.
- Treatment of damaged spinal cord nerves through bombardment of cells with electrically charged silver ions is being studied by scientists.

## Transplants and Implants

The transplantation of hearts and kidneys is no longer considered experimental, although still risky and severely limited by the scarcity of donors. Transplants of livers are still experimental. The use of artificial organs, such as the artificial heart, is also highly experimental and at present beset with serious and seemingly intractable problems. Yet a number of trends are working together to increase the feasibility of organ replacement with either real or artificial organs:

- gradual improvement in surgical techniques and in preservation of organs and tissues;
- developments in pharmacology, and especially in immunosuppressive, anti-rejection therapy;
- rapid advances in materials technology, including submolecular and surface engineering;
- development of sensors that can send feedback to control movement of muscles;
- development of miniature nuclear power packs; and
- computerized registry and matching of potential organ donors and recipients.

Implantation of either human organs or artificial organs may become more practical by the end of the century. Cryogenic techniques could be developed for preserving organs for later use; or organ incubators with computerized chemical baths and solutions may allow organs to be preserved for months.<sup>14</sup> pancreatic cells have been frozen, thawed, and grafted onto the kidneys of diabetic rats where they produced insulin; scientists will attempt to develop this technique for use in humans.<sup>15</sup>

Transplants of neural-type tissue from a Parkinson's patient's adrenal medulla to his brain have been performed in Sweden and Mexico, and brain tissue transplants using fetal brain tissue to assist patients with Parkinson's

<sup>12</sup>Veterans' Administration, *Rehabilitation R&D Progress Reports* (Washington, DC: Veterans' Administration Medical Center, 1986), p. 11, p. 66.

<sup>13</sup>John W. Boretos, "Bioceramics," *Chemtech*, vol. 17, April 1987, p. 224.

<sup>14</sup>Arthur C. Clarke, *July 20, 2019*, (New York, NY: MacMillan Publishing Co., 1986), p. 238.

<sup>15</sup>Shawna Vogel, "Cold Storage," *Discover*, February 1988, pp. 52-54.

disease have been done in Mexico and elsewhere." As discussed in chapter 4, this procedure has been discouraged in the United States because of some ethical concerns. Further development of these medical procedures and techniques outside of the United States is likely to stimulate challenges to Federal and State regulation or prohibition.

Implants of microchips and biochips may in the future allow better monitoring of bodily functions, regulate drug delivery devices, enhance defective sight or hearing, and provide neural control of damaged limbs. Some scientists hope that eventually "biological machines" could be implanted to repair human tissue and organs.

Advances in biological and non-biological materials and in microelectronics hold the promise of significant advances in related technologies, such as the following:

- programmable implantable medication systems including infusion pumps, for use in treatment of such problems as diabetes and cardiovascular disease; some are now in clinical trials;
- implanted electrodes and brain peptide releasers, for treatment of depression, propensity to aggression, and other emotional disorders;
- implanted electronic hearing aids;
- cerebellar pacemakers for control of epilepsy, chronic pain, schizophrenia, and violent behavior;
- automatic defibrillator for assisting damaged hearts; and
- artificial visual implants or assists and image enhancers for the visually impaired.

### Pharmaceuticals

Breakthroughs in pharmaceutical products and delivery systems promise radically different medical treatments for many illnesses. Drugs are being developed that act closer to the disease site and are specific to the damaging side effects of older untargeted treatments.

Entirely new types of therapeutic agents are being developed, some both more potent and more natural to the body than conventional pharmaceuticals.<sup>17</sup> Some possibilities are:

- **Immunomodulators**—These maintain proper functioning of the immune system, without the problems associated with current cell-killing drugs. New treatments would involve the use of natural substances such as interferon, to modify specific functions in the body. These immunomodulators will be used, first, as therapy for immune deficiency diseases and to suppress the immune system for grafting and transplanting organs, then to enhance the natural killer cells to attack new cancers and other diseases.
- **Neurotransmitters**—Scientists are becoming more familiar with the activities of these materials and new and more effective treatments should follow for Parkinson's disease, Alzheimer's disease, amyotrophic lateral sclerosis (ALS), Huntington's disease and mental diseases caused by neurotransmitter deficiencies. Some pharmaceuticals to enhance or prolong memory are already being tested.
- **Neurotrophic hormones**—It is hoped that neurotrophic hormones may stimulate growth in dying nerve cells that produce the transmitters. Research to identify neurotrophic hormones will probably be followed by large-scale synthesis and treatment. Drugs capable of penetrating the blood-brain barrier could treat loss of function in the neocortex due to severe head injury.
- **Mood-altering drugs**—These drugs have been found to exist naturally in the body as a class of compounds made up of endorphins and enkephalins. Many functions have been attributed to these materials including acting as a pain-blocking analgesia, tranquilizer, and antidepressant. Opiate blockers can be used to modify such behaviors as overeating and aberrant sex

<sup>16</sup> "Brain Graft Revives Sufferer From Parkinson's Disease," *New Scientist*, Jan. 14, 1988, p. 28.

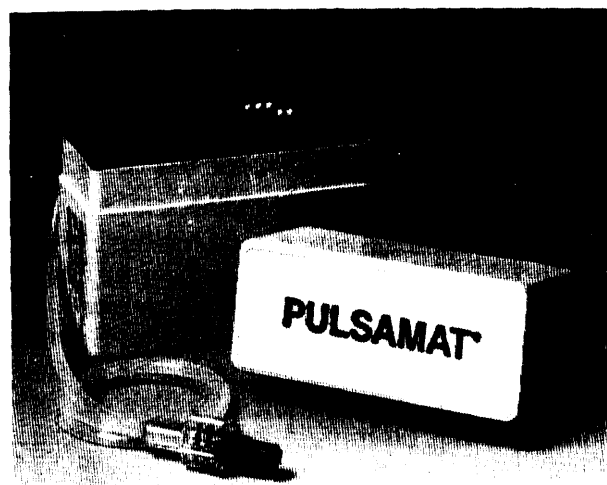
<sup>17</sup> William Check, "New Drugs and Drug Delivery Systems in the Year 2000," *American Pharmacy*, vol. NS24, No. 9, September 1984.

drives. These substances, being natural to the body, may not be addictive and may eliminate the side effects of current "mood elevator" and other drugs.

- **Monoclonal antibodies**—These products of genetic engineering have opened up a wealth of new therapeutic possibilities, such as cancer chemotherapy in which the cell-killing drugs would attack only the cancer-causing cells in the body. Toxic chemicals attached to the antibodies would then seek out cancerous cells before being activated. Monoclonal antibodies may also be used to kill donor cells that cause lethal conditions in bone marrow transplantations. They can be made to react with infectious bacteria against which antibiotics have not been successful. They can be designed to behave as enzymes, catalyzing chemical reactions and opening up the possibility of unlimited diversity in specific-acting enzymes. \*8
- **Prostaglandins**—A natural substance in the body, synthesized prostaglandins can be used as anticlotting agents useful in heart bypass surgery, prevention of heart attacks through clot prevention, and treatment of asthma, ulcers and inflammation.
- **Vaccines**—Synthetic vaccines that confer multiple protection could be used for influenza. Viruses that cause cold sores, genital herpes, chicken pox, etc., could be attacked with new vaccines.

New delivery systems may have nearly as momentous effects on medical care as new pharmaceuticals themselves do. Especially important will be the controlled release of drugs at dosages and times that are needed. New materials used for coating will release drugs at a constant rate through degradation, permeable membranes and electric charges. Magnetic systems can be used for pulse-released drugs such as immunosuppressants for transplant patients and implanted pumps will deliver precise dosages for treatment of cancer and for delivery of insulin. (See figure 6-1.) Dosages

Figure 6.1.—Portable Infusion Pump



Infusion pump is worn continuously and delivers gonadotropin releasing hormone intermittently either subcutaneously or intravenously.

SOURCE" Ferring Laboratories, Inc., Suffern, NY, 1988.

can be altered with time and, as equipment becomes smaller and simpler, can be used by patients to provide their own chemotherapy at home. Another form of delivery system will be sprays.

### Reproduction Technologies

For those wishing to have children, the possibilities of technological help have recently been greatly increased. These new assists are not always successful, and many carry significant risks and high costs. They include fertility drugs; artificial insemination using the semen of the husband, a selected partner, or an unknown donor; and in-vitro fertilization using either both parents' germ cells or donated eggs and/or semen, with implantation in the uterus of either the biological mother or a surrogate mother. Sperm freezing techniques permit an increase in the number of donors and theoretically make possible the selection of specific genetic characteristics for the babies. Frozen embryos have increased the ease and success rate of in-vitro fertilization and implantation, but raised ethical issues regarding the use of "excess" or left-over embryos.

<sup>18</sup>See ch. 3 for a more detailed description.



For those wishing to curtail production of a family, technologies will also provide choices: injectable contraceptives, a contraceptive vaccine, intrauterine devices for preventing embryo implantation; and non-surgical sterilization.

These “technologies at the beginning of life” promise to raise a number of serious constitutional issues, which are discussed in later sections of this chapter.

Science fiction abounds with stories about chimeras and clones. Chimeras are animals with the genes—and characteristics—of two or more species; in Greek mythology the chimera was a beast that had the head of a lion, the body of a goat and the tail of a serpent. Clones are animals genetically identical to a parent, i.e., reproduced asexually, or to a sibling (when an early stage embryo is divided and reimplanted). These have until recently been considered in the class of fairy tales. But large animals such as valuable cattle are now produced in multiple identical copies by removing a fertilized egg after two cell divisions, dividing it and allowing each fragment to be-

gin cell reproduction again, and implanting each new embryo in the womb of a less valuable brood cow. Chimeras have been developed by placing foreign genes in animals as complex as mice. A series of experiments have produced healthy chimeric mice by implanting in the uterus of a mouse, differentiated cells found in tumors. The interesting issue here is that what were thought to be undifferentiated cells in a tumor, actually contained a variety of tissues—tooth, bone, gland, etc.—from which could be grown an entire animal.<sup>19</sup>

It now appears unlikely that human clones or chimeras will be developed, although the barriers are in the long-run apt to be ethical and political rather than technical. The evolution of this capability could nevertheless result in production of body tissues, or new body parts, and at least in theory could allow unisex pregnancy and childbearing, even by males.

<sup>19</sup>Karl Illmensee and Leroy C. Stevens, “Teratomas and Chimeras,” *Scientific American*, vol. 240, April 1979, pp. 120-132.

## TRENDS SHAPING THE FUTURE OF MEDICAL TECHNOLOGY

Important trends that are emerging in regard to new and future medical technologies are:

1. an explosive increase in knowledge about the biology of disease, the environment, bodily functions and new treatments;
2. earlier diagnosis and treatment, increasingly moving beyond control of symptoms to interventions that will prevent symptoms;
3. an ever larger attention to the costs of health care in choices of treatment and in development of new technologies; resulting in an important role for technology assessment;
4. growing capability to maintain basic bodily functions technologically, when neurological control is degraded or almost entirely absent;

5. a proliferation of techniques to assist, control, or avoid reproduction; and
6. growing ability to evaluate, diagnose, and give medical or surgical treatment to the fetus in the womb.

Some of these themes, and particularly the last three listed above, promise to raise complex ethical, political, legal, and constitutional issues.

### Earlier and More Effective Diagnosis, Intervention, and Prevention

Intervention in the disease process can vary from consumer education on diet and lifestyles, to genetic engineering and drug therapy. The shift from controlling symptoms to more positive intervention is the result of a circular interaction between new scientific knowledge,

new instruments, and treatment-enabling technologies that in turn produce further knowledge. Earlier diagnosis and prevention of disease are of particular importance in approaches to chronic illnesses, which constitute the major illness burden in industrialized nations. They will, however, also affect acute illnesses in which genetic, behavioral and environmental factors can be identified.

Prevention of disease itself carries a potential for clashes between the general welfare and the assertion of individual rights, as illustrated by AIDS containment and crusades against tobacco use. As knowledge of disease-causing behavior, aversion to risk, and the incentive to control health care costs all grow, some people are arguing that freedom to indulge in unhealthy behavior should be curtailed. This issue was introduced in chapter 5 as raised by public health programs.

### Self-Care

New technologies, while causing some of this rapid increase in costs, also enable more people to take care of themselves when ill, thus potentially reducing health care costs. Home-based computers linked with diagnostic-treatment centers or implanted microchips for sensing body conditions and for release of drugs, could for example make possible self-administered chemotherapy treatment of cancer. Intravenous physical and respiratory therapy and monitoring of chronic disease could take place in the home.

A strong trend toward self-diagnosis, self-care, and home-care techniques has been evident for some time. Pregnancy test kits, kits for testing or measuring urine sugar content, and consumer instruments for monitoring blood pressure have already become familiar. Further home diagnostic tests are being developed. Implantable time-released medication is already in use for some conditions. Some experts anticipate the development of "hospitals on the wrist," i.e., wearable devices that monitor certain body functions and make chemotherapeutic and electromagnetic adjustments as necessary. Potentially, this might include

administering mood-altering or behavior-controlling medication.

Public policy problems with the trend toward self care include the cost, which is not currently reimbursed by medical insurance providers, the question of the reliability of tests and the expertise needed for their use, and concern about the provision of home care for those who are unable to care for themselves adequately. These problems do not appear to imply any constitutional issues.

### The Growing Importance of Health Care Costs

The cost of medical care is an important ingredient in a discussion of health care technologies and their constitutional implications. Health care in 1985 accounted for 11.2 percent of gross national product, up from 5.9 percent in 1965. Health cost increases far outstrip inflation and although they have lessened, they still outpace price increases of other goods and services. This growth is expected to continue, reaching 15 percent of GNP by the turn of the century.<sup>20</sup> In 1985 and 1986 the growth in the number of surgical procedures performed, which had flattened since 1981, resumed.

The health care system is being reshaped as joint ventures proliferate between hospitals, physicians and other investors; the role of market forces becomes more important in technology choices; and consumers and payers of health care demand more say in the process.<sup>21</sup> As costs become a major factor in health care, medical decisions are no longer the sole prerogative of physicians.

While some technologies such as expert systems and diagnostic testing kits can potentially decrease health care costs, others such as imaging machines and transplants are likely to remain very expensive. Technology has been called both the culprit in raising medical costs,

<sup>20</sup>Daniel R. Waldo et al., "National Health Expenditures, 1985," *Health Care Financing Review*, Fall 1986, vol. 8, No. 1, pp. 1-21. Also see "National Health Expenditures, 1986-2000," *Health Care Financing Review*, vol. 8, No. 4. Figures for 1987 obtained by telephone from Daniel Waldo, February 1988.

<sup>21</sup>*Meditrends*, footnote 10, p. vii.

and the benefactor that is improving health and life expectancy.<sup>22</sup> Even when new, less costly technologies are developed, the rate of use often increases, offsetting potential savings. And increased knowledge regarding health hazards in the environment is likely to increase the demand for health care, including research and product development. How the change in hospitals from an altruistically oriented local industry to a for-profit national chain industry affects health care costs is not

<sup>22</sup>Louis P. Garrison, Jr., and Gail R. Wilansky, "Cost Containment and Incentives for Technology," *Health Affairs*, vol. 5, Summer 1986, pp. 46-58.

yet clear, but this could become an important issue in the future.

While this report cannot explore in depth the issue of medical costs, governmental policy toward medical advances that provides some with great benefits, at high cost to others than the beneficiaries, is part of the general constitutional discussion on equality of access and of the alleged right to treatment.<sup>23</sup>

<sup>23</sup>For a discussion of the economies of the distributional issues and the criterion of social welfare, see John H. Doggeeris, "Medical Insurance, Technological Change, and Welfare," *Economic Inquiry*, vol. XXII, January 1984, pp. 56-67.

## EXTREME MEDICAL INTERVENTIONS AND THE EXPANDING LIMITS OF PERSONAL CHOICE<sup>24</sup>

Some of the major "medical miracles" recently unveiled or now on the horizon so fundamentally challenge our assumptions about human limitations that they may change our view of the proper relationship between the State and the individual, or of personal liberty and responsibility.

Taking the heart from a person whose circulation and respiration could be maintained only with a mechanical ventilator, and transplanting the heart into another person, directly challenged laws that conventionally determined death as the time when one's heart stopped beating. A strict application of this legal definition would make a human heart transplant a double homicide, in spite of the fact that its purpose is to save life. This technological innovation helped to force us to reach a new definition of death—the death of the brain.

<sup>24</sup>Much of the material in this section is based on contractor reports: "Constitutional Issues in Extreme Medical Measures at the Beginning and End of Life," prepared for OTA by George J. Anus, J. D., M. P. H., Utley Professor of Health Law, Boston University Schools of Medicine and Public Health, and "Constitutional Implications of Scientific and Technological Advances in Public Health, prepared for OTA by Dr. Leonard H. Glantz, Professor of Health Law, Boston University Schools of Medicine and Public Health, April 1987.

A person who is dead ceases to have constitutional rights. Thus before the redefinition of death, a person on a mechanical ventilator, even if "brain dead," was a person and retained all of the rights of a person under the Constitution; after the redefinition, the person in identical circumstances was a corpse with no rights, and could be used as a source of donor organs with or without his or her intent prior to death. This redefining of death was brought about primarily by three technologies: the electroencephalogram, which permitted physicians to confirm the absence of brain activity or functioning; mechanical ventilation, which maintained circulation until vital organs could be "harvested"; and immunosuppression drugs, which help control rejection and made organ transplantation workable.<sup>25</sup>

The law permitted physicians to develop this new definition of death on their own, because the law has always been that a person is dead when the doctor pronounces him or her dead, provided that the doctor make this pronouncement on the basis of "good and accepted med-

<sup>25</sup>President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Defining Death* (Washington, DC: U.S. Government Printing Office, 1981). G.J. Anus, "Defining Death: There Ought To Be A Law," *Hastings Center Report*, vol. 13, No. 1, 1983, pp. 20-21.

ical standards.<sup>26</sup> Some people have objected to having this standard developed by the medical profession because they object to giving physicians the first opportunity at defining the implications of new medical technology for basic rights.

The adoption of brain death as an acceptable criteria for human death raises further questions: Is brain functioning a necessary or appropriate criteria for life, or for personhood, or for rights? Do those who are born without functioning brains, e.g., anencephalic neonates,<sup>27</sup> have any rights?<sup>28</sup> What about those who are permanently comatose? If science can develop a test that confirms the irreversible loss of all higher brain functions, (neocortical), could brain death be expanded to include this category as well?<sup>29</sup>

Most medical technologies will not so radically alter the rights of individuals in this "all or none" fashion. But many of them have potentially profound impacts on the definition or application of critical constitutional rights because they affect life, death, procreation and privacy. For example, evolving technical capabilities to assist and support reproduction give rise to questions about the individual rights of the mother and the interest of the State in the welfare of the potential or developing fetus.

The development of the judicial concept of privacy was described in chapter 2. To recapitulate, the Supreme Court has concluded that the rights specifically protected in the Bill of Rights and buttressed by the Fourteenth Amendment delineate a penumbra of privacy, or a sphere of autonomy and confidentiality, on which government should intrude only when impelled by an important and pressing interest of State.

<sup>26</sup>G.J. Anus, L.H. Glantz, B.K. and Katz, *The Rights of Doctors, Nurses, and Allied Health Professionals* (New York, NY: Avon Publishing Co., 1981).

<sup>27</sup>A newborn infant with an incomplete and non-functioning brain.

<sup>28</sup>A. M. Capron, "Anencephalic Donors: Separate the Dead From the Dying, *Hastings Center Report*, vol. 17, No. 1, 1987, pp. 5-9.

<sup>29</sup>R. Veatch, *Death, Dying and the Biological Revolution* (New Haven, CT: Yale University Press, 1976).

The concept of constitutional privacy has been applied most directly to individual decisions about reproduction. The old deference to the State interest was indicated in chapter 4 and again in chapter 5 by reference to the case of *Buck v. Bell*, in 1926,<sup>30</sup> which upheld the constitutionality of a State's involuntary sterilization statute. Justice Holmes said: "The principle that sustains compulsory vaccination is broad enough to sustain cutting the Fallopian tubes. . . ." But in a very similar case in 1942, the Court specifically affirmed that marriage and procreation were fundamental rights, essential "to the very existence and survival of the race."

*Griswold v. Connecticut*,<sup>31</sup> in 1965, was however the real landmark case in this area. A State statute made it illegal for "any person" to "use any drug, medicinal article or instrument for the purpose of preventing conception. . . ." The statute also made it a crime to "assist, abet, or counsel" any person in committing this illegal act. A Planned Parenthood counselor and a physician gave advice on birth control to a married couple and prescribed a contraceptive device for the wife; they were then arrested and convicted.

The Supreme Court, in overturning the State statute, said, "We do not sit as a super-legislature to determine the wisdom, need, and propriety of laws. . . ." But it also said that taken as a whole, the Bill of Rights creates penumbral rights of "privacy and repose," in other words, a sphere of personal choice in which government has no business.

The Court was recognizing that modern science and technology-in this case, biological science and contraceptive technology-create new choices for people in their personal lives, and that government would at times attempt to regulate or negate those choices by controlling (or banning) the use of the technology, especially if this seemed essential for the general welfare. The Court said:

The present case, then, concerns a relationship lying within the zone of privacy created

<sup>30</sup>*Buck v. Bell*, 274 U.S. 200 (1926).

<sup>31</sup>381 U.S. 479 (1965).

by several fundamental Constitutional guarantees. . . . Would we allow the police to search the sacred precincts of marital bedrooms for telltale signs of the use of contraceptives? The very idea is repulsive to the notions of privacy surrounding the marriage relationships.

Three Justices concurred that the right of marital privacy is a “fundamental and basic” personal right but gave as the source of that right the Ninth Amendment.<sup>32</sup> Seven years later the Court extended the right of “reproductive privacy” to unmarried persons.<sup>33</sup> The Court said in that case:

If the right of privacy means anything, it is the right of the individual, married or single, to be free from unwanted governmental intrusion into matters so fundamentally affecting the person as the decision whether to bear or beget a child.

The decision specifically rejected arguments that the State was attempting to regulate potentially harmful articles, because as between married and unmarried people “the evil, as perceived by the State, would be identical.” This indicated that the Court will closely scrutinize State interference into areas of life which are considered “private.”

The Court has been strongly influenced in cases involving contraception and abortion by advances in medical technology. Improvements in medical technology have allowed individuals safer and more effective control over reproduction, and at the same time have tended to undercut the State interest so far as that interest was traditionally based on the safety of the mother.

<sup>32</sup>In Justice White’s concurring opinion it is noted that the State claimed to ban the use of contraceptives in order to discourage all forms of illicit sexual relations, premarital and extramarital. Because he could find no rational relationship between the use of contraceptives by married couples and the legitimate policy of discouraging illicit sexual activity, Justice White found that the law violated the Fourteenth Amendment right to liberty.

<sup>33</sup>*Eisenstadt v. Baird*, 405 U.S. 438 (1972). The statute at issue authorized prescription of contraceptives for married persons, made it illegal to prescribe or sell contraceptives to unmarried persons, but permitted both married and unmarried persons to obtain contraceptives if the purpose was to prevent disease rather than to prevent pregnancy.

This was made clear by the abortion decisions, *Roe v. Wade* and *Doe v. Bolton*<sup>34</sup> both in 1973. The first involved a statute making it illegal for a physician to perform an abortion even if a woman’s life was endangered by pregnancy. The Court recognized that the right of privacy is “broad enough to encompass a woman’s decision whether or not to terminate her pregnancy.” This right, while not absolute, is “fundamental” and may be infringed only if there is a compelling State interest.

The State claimed two such interests: preserving the life of unborn children and protecting maternal health. The Court rejected the latter interest because with new medical technology, abortion during at least the first trimester carries less risk to the mother than childbirth. After the first trimester, the Court said, the State could “regulate the abortion procedure to the extent that the regulation reasonably related to the preservation and protection of maternal health,” but could not prohibit abortion. At the point of fetal viability (when the “fetus could live outside the mother’s womb, albeit with artificial aid”) the State could prohibit abortion because its interest in the potential life becomes compelling. Even then, the State could not prohibit abortion when it was necessary to preserve the life or health of the mother.

The second of the two 1973 abortion cases concerned State requirements that all abortions take place in hospitals accredited by the Joint Commission on Accreditation of Hospitals. The Court could have chosen to apply a “minimum rationality” criteria and accepted the State’s authority to regulate in the interest of public health. Instead it recognized persuasive data about the technology, indicating that facilities other than hospitals could safely perform abortions. It found that the State was attempting to regulate abortions during the first trimester of pregnancy contrary to the earlier *Roe* decision.

Since 1973 the Court has heard a number of cases involving restrictive abortion statutes,

<sup>34</sup>*Roe v. Wade*, 410 U.S. 113 (1973) and *Doe v. Bolton*, 410 U.S. 179 (1973).

scrutinizing them closely for potential infringement on the right of privacy. Some of these decisions involved points related to the safety of advanced technology.<sup>35</sup> A recent case indicated that the Court will look closely not only the legislature's rationale for legislation but also at the motive in passing it.<sup>36</sup>

These decisions illustrate the relationship between new technological capabilities and pressure for reexamination of constitutional provisions. New abortion methods—safer to the mother and less costly than old methods—increased the demand for abortion and at the same time undercut one rationale for the State's interest in prohibiting it, i.e., the safety of the mother, by making early abortion statistically safer than childbirth. (Continuing political support for prohibition of abortion indicates that this rationale was not the only, or perhaps even a primary, reason for the State's position.) With medical technology now moving back the point of fetal viability, it may again encourage or at least support reexamination of the Court's position, for example, by eventually challenging the assumption that the second-trimester fetus could not survive. Indeed, "artificial wombs" could someday make it possible for all or most of gestation to take place outside of a mother's body. On the other hand, and probably sooner, progress in medical technology could make second- and third-trimester abortions as safe or safer for the mother as either natural childbirth or cesareans. In the long run, therefore, any defi-

nition of the interest of the State that is grounded on an assessment of technological capability will be subject to challenge and reinterpretation.

The full scope of activities that the Court will consider to fall under the rubric of the fundamental right to privacy is not yet clear. The Court has applied it to the distribution of contraceptives,<sup>37</sup> to the possession of obscene materials in one's own home,<sup>38</sup> and to prohibitions on interracial marriages.<sup>39</sup> State Supreme Courts have extended this right further: as a basis for individuals to refuse life sustaining medical care, or for their families to refuse it on their behalf,<sup>40</sup> to refuse antipsychotic medications,<sup>41</sup> and to obtain acupuncture treatments without State interference.<sup>42</sup>

On the other hand, the Supreme Court has refused to strike down a law that outlawed consensual sodomy,<sup>43</sup> saying that where no fundamental privacy right was implicated (implying that the right does not cover all forms of sexual activity per se) the State needs only show "a rational basis for the law." The "presumed belief of a majority of the electorate in Georgia that homosexual sodomy is immoral and unacceptable" provided that rational basis. Dissenters on the Court said that the issue is the right "to conduct intimate relationships in the intimacy of his or her own home."<sup>44</sup> It appears that the scope of the constitutional right to privacy as regards the body and its reproductive functions is still being defined by the Court.

Another marital privacy issue is suggested by the recent action of a judge of the Arizona Superior Court in sentencing a woman to life-

<sup>35</sup>*Planned Parenthood of Missouri v. Danforth*, 428 U.S. 52: A State prohibition of the use of saline amniocentesis for abortion after the first semester, based on the argument that alternative methods such as prostaglandin instillation were safer, was struck down because saline amniocentesis was an acceptable procedure, the alternatives were less readily available, and more hazardous techniques such as hysterectomy were allowed. Thus the prohibition was "an unreasonable or arbitrary regulation designed to inhibit . . . abortion." *Akron v. Akron Center for Reproductive Health*, 462 U.S. 416, 433 (1983): a statute requiring hospitalization for all abortions after the first trimester was struck down as merely an attempt to place "a significant obstacle" in the path of those seeking abortions; the Court recognized continuing improvement in safety of second trimester abortions.

<sup>36</sup>*Thornburgh v. American College of Obstetricians and Gynecologists*, 106 S. Ct. 2169 (1986). See L. Glantz, "Abortion and the Supreme Court: Why Legislative Motive Matters," *Am. J. Pub. Health*, vol. 76, 1986, p. 1452.

<sup>37</sup>*Carey v. Population Services International*, 431 U.S. 678 (1976).

<sup>38</sup>*Stanley v. Georgia*, 394 U.S. 557, 564 (1969).

<sup>39</sup>*Loving v. Virginia*, 338 U.S. 1, 12 (1967).

<sup>40</sup>In the case of *Karen Quinlan*, for example, 355 A.2d 617 (N.J. 1976); also *Superintendent of Belchertown v. Saikewicz*, 373 Mass. 728 (1977).

<sup>41</sup>*Rogers v. Okin*, 390 Mass., 489.

<sup>42</sup>*Andrews v. Ballard*, 498 F. Supp. S.D. Texas (1980).

<sup>43</sup>*Bowers v. Hardwick*, 106 S. Ct. 2841 (1986). The law was so written that it applies to married and single persons, and to both heterosexual and homosexual behavior. The challenge was brought by a homosexual male.

<sup>44</sup>*Blackmun*, dissenting, 2848, 2853.

time probation and ordering her to maintain birth control throughout her childbearing years. At about the same time a judge in Indiana, sentencing a woman for the death of her child, suggested that he would significantly reduce the sentence if she agreed to surgical sterilization. There were immediate indications that both of these sentences would be

appealed on the grounds that they violate the constitutional right to privacy.<sup>45</sup>

<sup>45</sup>"Mother Who Deserted Her Infants Is Ordered To Stay On Birth Control," *New York Times*, May 26, 1988. "Is Sterilization the Answer: A Controversial Punishment for Abusive Mothers," *Newsweek*, Aug. 8, 1988, p. 59.

## MEDICAL INTERVENTIONS AT THE BEGINNING OF LIFE

Modifications in the mode of human reproduction have long been the stuff of science fiction. For example, in George Orwell's 1984,<sup>46</sup> artificial insemination by donor was mandatory, and in Aldous Huxley's *Brave New World*,<sup>47</sup> reproduction was the exclusive domain of the State, and embryos were produced and monitored in artificial uteruses in government-run "hatcheries. Much more recently, Margaret Atwood in *Handmaid's Tale*<sup>48</sup> pictured a nation in which most women are sterile, but a lower caste of "handmaids" bear children for the ruling class as surrogate mothers, "two-legged wombs. . . ambulatory chalices."

The Supreme Court has yet to consider whether there are constitutional issues involved in human reproduction via the new "noncoital" reproductive technologies that permit reproduction without sexual intercourse.

The Supreme Court has protected the right to use birth control outside of marriage. It has not expressly recognized a right to bear children outside of marriage, and in the *Bowers* case, the decision included a dictum to the effect that State laws against sexual activity outside of marriage were not precluded. Therefore it is uncertain whether there is a constitutional right to procreate, by either coital or non-coital means (i.e., through artificial insemination and/or in vitro fertilization), or whether such

right, if it exists, extends to homosexual as well as heterosexual couples or individuals.<sup>49</sup>

Some experts, drawing analogies from court challenges associated with sterilization, contraception, and abortion, suggest that the concept of a "right to privacy" in procreation would be involved if government attempted to regulate or prohibit such technologies as in vitro fertilization (IVF) or the use of frozen embryos for implantation.<sup>50</sup> (See figure 6-2.)

Constitutional interpretation in this area has come to depend heavily on prevailing scientific views and on up-to-date assessments of technological capability and safety. The sterilization cases discussed above reflect the values of the eugenics movement of the first two decades of this century; after that period court decisions reflect new knowledge about genetics and newly available medical alternatives.

### In Vitro Fertilization (IVF) and Surrogacy

IVF was developed to assist married couples who were unable to have children because the wives' fallopian tubes were blocked or diseased. The IVF method bypassed diseased fallopian tubes, removing ova from the ovaries through a surgical procedure, combining the

<sup>46</sup>George Orwell, *1984* (New York, NY: Harcourt, Brace, 1949).

<sup>47</sup>Aldous Huxley, *Brave New World* (New York, NY: Harper & Brothers, 1946).

<sup>48</sup>Margaret Atwood, *Handmaid Tale* (Boston, MA: Houghton-Mifflin, 1986).

<sup>49</sup>U.S. Congress, Office of Technology Assessment, *Infertility: Medical and Social Choices* (Washington, DC: U.S. Government Printing Office, May 1988), pp. 219-220.

<sup>50</sup>More radical or unlikely possibilities such as cross-species fertilization, extracorporeal gestation (embryos brought to term in artificial wombs), or cloning might become highly controversial at the R&D stage, raising the issue of the "right to experiment" or "forbidden knowledge, as discussed in chapter 4.

Figure 6-2.-Multicellular Embryo



Human embryo developing in vitro before transfer to female reproductive tract or cryopreservation.

SOURCE: "Reprinted with permission. A. A. Acosta and J.E. Garcia, "Extracorporeal Fertilization and Embryo Transfer," *Infertility: Diagnosis and Management*, J. Alman (ed.) (New York, NY: Springer Verlag, 1984).

ova with the husband's sperm in a petri dish or test tube, and after fertilization and a number of cell divisions, transferring the embryo to the wife's uterus for implantation.<sup>51</sup> About 3,000 births have resulted from IVF in the United States in the past decade. IVF, at least as confined to married couples using their own gametes (ova and sperm) appears to raise only one possible constitutional issue: could a government prohibit the use of IVF?

This would presumably be based on the claim of potential harm to the embryo. If such legislation were based on an argument that IVF is "unnatural" and *therefore* "immoral" it

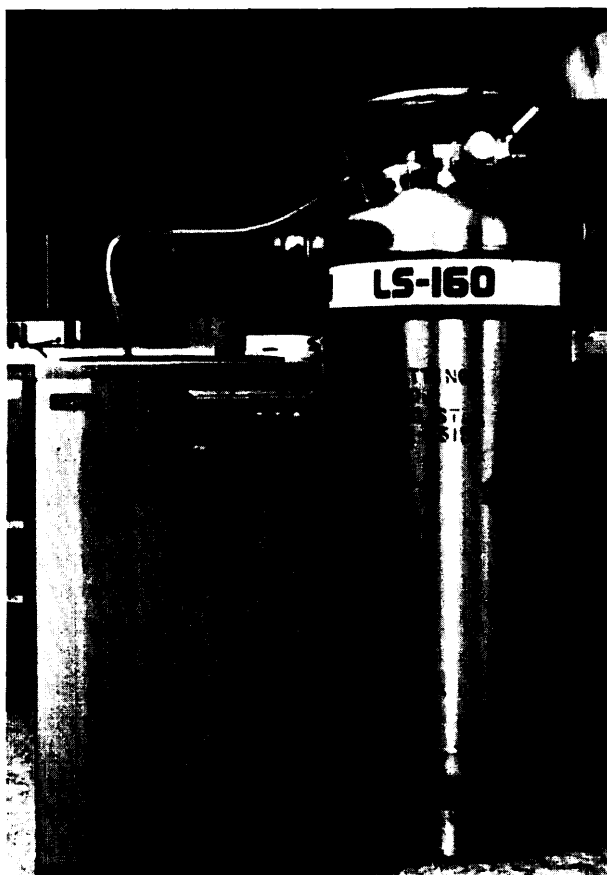
<sup>51</sup>G.J. Anus and S. Elias, "In Vitro Fertilization and Embryo Transfer: Medicolegal Aspects of a New Technique To Create a Family," *Family Law Quarterly*, vol. 17, 1983, pp. 199-223.

might be challenged as a violation of the separation of church and State. Based on the precedent of *Roe v. Wade*, the embryo is not considered "viable" until it is implanted in a uterus and thus, at the petri dish stage, it would have no rights that would outweigh the right of the gamete donors to decide whether to use it or not for procreation. If complete extracorporeal gestation outside of the womb becomes a possibility, then it is possible that the Court would be challenged to reconsider this assumption, but to do so would invite a reexamination of some forms of birth control technology, which work by preventing implantation of fertilized ova in the womb. This would, however, imply that rights predate the individual, or that the egg and sperm have rights.

Another objection to IVF, however, is that usually more than one embryo is created in the process. Decisions must then be made about the use of "left-over" embryos—i.e., ones created but not needed after transplantation of one of the embryos is successful. Could the State prohibit or regulate secondary use, in which the embryo is frozen and donated to a sterile couple? (See figure 6-3.) If the alternative to secondary use is destruction or open-ended storage of the embryo, it is difficult to see what interest the State would assert. Could the State require the donation of excess embryos to some embryo bank to avoid destruction? Gamete donors might claim a property right to choose whether or not the frozen embryo is donated or might object to the State allowing their genetic offspring to be raised by others. Should the State forbid experimentation on the "spare" embryos? Could the gamete-producing couple object? In fact, nearly always more than one embryo is implanted in the womb of the potential mother, since the failure rate is high (as is, very likely, the failure rate for "natural" implantation), and "excess" embryos are sacrificed either naturally, by the body, or deliberately by medical intervention. The difficulty is that the more nearly scientific artifice approaches "natural" processes, the more it takes on some of nature's own profligacy with potential life. These intertwined issues are likely to be brought forward



Figure 6-3.—Cryopreservation of Human Embryos in Liquid Nitrogen Storage Chamber



SOURCE Martin M. Quigley, Cleveland Clinic, Cleveland, OH

in the near future and may or may not be argued as constitutional issues.

The capability of preserving the viability of an embryo through freezing also makes it easier to transfer it to a surrogate mother for gestation, rather than to the wife or egg donor. In this case IVF would be used to allow a couple to avoid pregnancy altogether and yet have a child with the genes of both.

The line of judicial precedents already described supports a married couple, or a woman, or (probably) a heterosexual couple being protected from State interference in the decision to beget, conceive, or bear a child. In addition fetuses can be protected only after their viability and then only in ways that do not harm the mother.

Use of a surrogate mother, however, introduces a third, unrelated party into the process of procreation. The State has a strong interest in protecting this person from exploitation. "Surrogacy" is in fact an imprecise term; arrangements might involve several different combinations of genetic parents who provide the ova and sperm, a host mother who carries the fetus through gestation, and adoptive parents who may or may not include one or more genetic parents—three, four, or five different persons might be involved. New questions arise as to the terms of the contract between biological parents, host mother, and adoptive parents; the State would be called on to enforce these terms. For example, one question might be the right of the surrogate (host) mother to alienate or give up (by contract) her right to abort; would enforcement of such a contract amount to violation of the Thirteenth Amendment prohibition on involuntary servitude?

While a general ban on reproductive surrogacy might be constitutionally challenged as interfering with a right to procreate without State regulation (barring a compelling State interest), a State prohibition on *commercial* surrogacy, or the buying or selling of embryos, may be permitted as regulation of commerce; the selling of children is for example generally prohibited.

In June 1988, the governors of both Michigan and Florida were reported to have before them for signature legislation making it a felony to arrange a surrogate mother contract for payment. According to news reports bills to regulate or prohibit surrogacy have been introduced in at least 18 States.<sup>52</sup>

State-mandated record-keeping is common, and genetic record-keeping would probably be permissible either to document the safety of procedures such as IVF or to protect the future interests of children in learning about their genetic heritage. The major limitation on record-keeping in medical practice is assurance

<sup>52</sup> Andrew H. Malcolm, "Steps To Control Surrogate Births Stir Debate Anew," *New York Times*, June 26, 1988, p. 1.

that confidentiality can be maintained.<sup>53</sup> The Court has permitted record-keeping and mandatory reporting of abortions and complications, but only under very close scrutiny to ascertain that the records are for protection of maternal health and are kept confidential. The Court has also approved laws requiring pathological examination of fetal tissue. Requiring physicians to keep permanent records of sperm donors, ova donors, surrogate mothers, etc., and the collection of this data by the State would presumably not raise any constitutional issue provided it were released only to those involved, and to the child.<sup>54</sup>

Finally, there may be issues regarding the financing of new reproductive technologies. There have been two significant Supreme Court decisions on the question of State funding of abortions under the Medicaid program. In 1977, the Court concluded<sup>55</sup> that laws providing public funding for childbirth, but not for abortion, were not a denial of equal protection because poverty is not a "suspect" classification, like race or religion<sup>56</sup> and because by failing to fund abortions the State "places no obstacles in the pregnant woman's path to an abortion." In other words, the State did not cause the poverty that alone prevents the woman from obtaining an abortion.

In 1980 the Court examined the constitutionality of the "Hyde Amendment," which restricted Federal funding of abortions.<sup>57</sup> The

Court used the same reasoning as in the earlier case, i.e., the government is not required by the Constitution to fund any medical care, no matter how vital such care may be; funding is a matter for Congress or the State legislatures to decide. As discussed elsewhere, some people argue for a different interpretation of the Constitution, asserting a general "right to health care," but unless and until such a right is recognized, the refusal to fund infertility treatments while other medical interventions are funded would not raise constitutional issues.

### Fetal Surgery

With the capability of antenatal (before birth) examination, diagnosis, and treatment of the fetus has come the possibility of viewing the fetus as "the doctor's second patient. The ability to intervene to treat the fetus is at present very limited; in most cases, the only treatment possible now when a disease or defect can be diagnosed antenatally is termination of the pregnancy. But about 50 cases of hydrocephalus<sup>58</sup> have been treated in the womb by surgical decompression, with results that are "not encouraging."<sup>59</sup> There have been fewer cases of surgery for urinary tract obstruction, but with somewhat better results. Other potential uses for fetal surgery may include diaphragmatic hernia, spina bifida, gastroschisis, and allogenic bone transplants. These procedures are now experimental, and cannot be performed without the woman's informed consent, which she is under no obligation to give.

But in the future it is likely to be possible to treat the fetus for many conditions. The procedures are likely to be perfected and to become "standard medical procedures." They will, however, remain highly invasive. They will demand the cooperation of the pregnant woman, will involve doing things to or through

<sup>53</sup>The Supreme Court has concluded that all prescriptions for controlled substances can be entered into a central state computer, provided there are strict access procedures to limit disclosure to those who need to know, for law enforcement purposes. *Whalen v. Roe*, 429 U.S. 589 (1977).

<sup>54</sup>J. A. Robertson, "Embryos, Families, and Procreative Liberty: The Legal Structure of the New Reproduction," *So. Cal. Law Rev.*, vol. 59, 1986, pp. 939-1041.

<sup>55</sup>*Maher v. Roe*, 432 U.S. 438 (1977).

<sup>56</sup>As discussed in ch. 2, any laws that distinguish between people on the grounds of race or religion are given particularly close scrutiny by the Court, and the burden is on the government to show that such classification is necessary and appropriate and not intended to be discriminatory.

<sup>57</sup>*Harris v. McRae*, 448 U.S. 297 (1980). The Hyde Amendment is named after its congressional sponsor; the regulation under consideration by the Court forbade the use of Federal funds for abortion except where the life of the mother is endangered, or when the mother was the victim of rape or incest that was properly reported to a law enforcement or public health agency.

<sup>58</sup>An abnormal increase in the volume of fluid within the cranial cavity, resulting in pressure that causes atrophy of the brain.

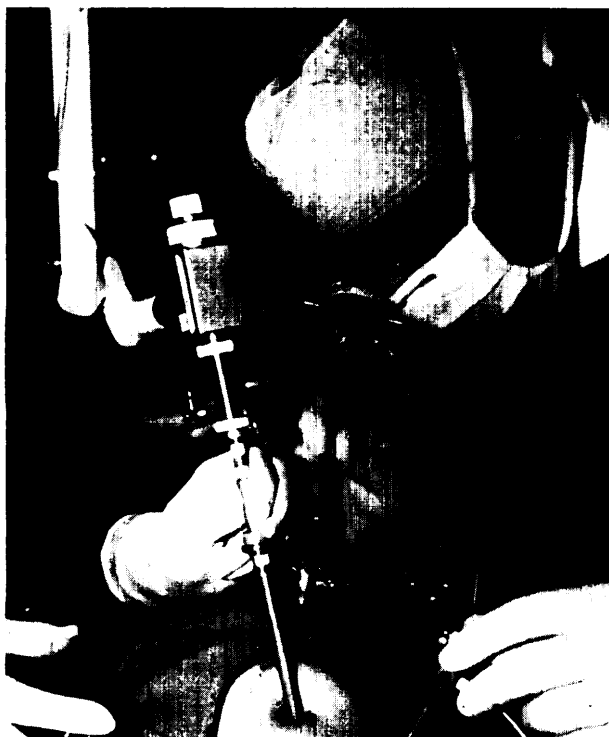
<sup>59</sup>S. Elias and G.J. Anus, *Reproductive Genetics and the Law* (Chicago, IL: Year Book Medical Publishers, 1987).

her body, and in some cases may cause her pain or put her life or health at risk. (See figure 6-4.) Legislators or the courts will then be asked to deal with the competing rights of the mother and the fetus.

There have been approximately two dozen court-ordered "forced cesarean sections" in the past 5 years.<sup>60</sup> Only one of these cases, the first, reached an appellate court level. A woman, due to deliver her child in about 4 days, had notified the hospital where she would be attended that she would not allow surgery because it was her religious belief that what happened to the child was the Lord's will. The hospital sought a court order authorizing physicians to perform a cesarean section and give any necessary blood transfusions. At an emergency hearing, conducted in the hospital, the examining physician testified that she had

<sup>60</sup>V.E.B. Kolfrt, J. Gallagher, and M.T. Parsons, "Court-Ordered Obstetrical Interventions," *New England Journal of Medicine*, vol. 316, May 7, 1987, pp. 1192-1196.

Figure 6-4.—Laparoscope in Use for Laser Surgery



SOURCE Martin M Quigley, Cleveland Clinic, Cleveland, OH

complete placenta previa, an abnormal condition of the placenta, with a 99 percent certainty that her child could not survive vaginal delivery and a 50 percent chance that she herself would not survive. The court decided that the unborn child merited legal protection and authorized the administration of "all medical procedures deemed necessary by the attending physician to preserve the life of the defendant unborn child." A public agency petitioned the same court for temporary custody of the allegedly deprived child. The court granted this petition on the basis that the State

has an interest in the life of this unborn, living human being (and) the intrusion involved . . . is outweighed by the duty of the state to protect a living, unborn human being from meeting his or her death before being given the opportunity to live.

The State Supreme Court immediately heard and denied the petition of the parents to stay the order,<sup>61</sup> with a two sentence conclusory opinion citing *Roe v. Wade*.

In spite of these legal decisions and orders, however, the woman uneventfully delivered a healthy baby—without surgical intervention.

In a second, lower court case, a hospital administration requested that a juvenile court find an unborn baby a "dependent and neglected child" and order a cesarean to safeguard its life. A cesarean section had been recommended on the grounds of an indication by a fetal heart monitor of possible fetal hypoxia. The patient was an unmarried woman who had previously born twins, and who was described as obese, angry, and uncooperative. She refused a cesarean out of fear of surgery. Her mother and sister and the father of the unborn child had tried unsuccessfully to change her mind. The court ordered the surgery, and it was performed, resulting in a healthy child and no maternal complications in spite of the fact that more than nine hours had elapsed since the tracings of an external fetal heart monitor indicated fetal distress and 6 hours after this

<sup>61</sup>*Jefferson v. Griffen Spalding Co. Hospital*, 247 Ga. 86, S.E. 2nd 457 (1981).

was confirmed with internal tracings. The physician commented that the case "underscores the limitations of continuous fetal heart monitoring as a means of predicting neonatal outcome."<sup>62</sup>

All of the forced cesarean section cases relied on two earlier cases, *Roe v. Wade* and *Ra-leigh Fitkin-Paul Morgan Memorial Hospital v. Anderson*, in 1964.<sup>63</sup> The latter involved an 8-month pregnant woman whom physicians believed was likely to hemorrhage severely. If that happened, she and her unborn child would need blood transfusions, but as a Jehovah's Witness, she would refuse them. The trial court upheld her refusal and the hospital appealed to the New Jersey Supreme Court. Although the woman had already left the hospital, against medical advice, the State Supreme Court determined that the unborn child was entitled to the law's protection and that blood transfusions could be forcibly administered to the woman "if necessary to save her life or the life of her child, as the physician in charge at the time may determine."

This precedent is thought to be of limited value. No transfusions were actually done as a result of the decision. It was a one-page opinion with little analysis or discussion. In any case the extent of bodily invasion or risk involved in a blood transfusion is less than that involved in major abdominal surgery such as a cesarean section. Eight years later, the same State Supreme Court decided the case of Karen Ann Quinlan, which extended the right to privacy to refusal of medical treatment,<sup>64</sup> allowing Quinlan's respirator to be removed.

*Roe v. Wade*, as already discussed, said that the State has a compelling interest in the life of viable fetuses, but it also said that it does not have such an interest if the "the life or health of the mother" is endangered by carrying the child to term. These two cases do not appear to favor the life or health of a fetus over that of the pregnant woman.

A somewhat analogous situation occurs when a court authorizes a 'search and seizure' of a substance inside the body of a criminal suspect. In a famous case<sup>65</sup> the Supreme Court ruled that blood tests to determine alcohol intake were reasonable, because of the strong interest of the community in determining guilt or innocence, the inability of determining intoxication by other means, and the very minor bodily invasion involved in drawing blood. In an earlier case, the administering of an emetic to induce vomiting in order to extract narcotics capsules that a suspect had swallowed, was held to violate the subject's interest in human dignity.<sup>66</sup> Much more recently the Supreme Court said it was an "unreasonable search and seizure" to order surgery to remove a bullet from an accused robber, because the state would be "taking control of. . . (his) body" and violating his "personal privacy and bodily integrity."<sup>67</sup>

A forced cesarean section is a more intrusive and dangerous surgical procedure than bullet removal, and may be considered more demeaning to the subject's bodily integrity, personal privacy, and human dignity. On the other hand, the potential State interest in the life of a child ready to be born is high. Other factors that courts may consider are whether a medical procedure is considered unusual and risky, or routine and safe. Many legal experts believe that surgery involving general anesthetic or physical invasion of the mother's body is now unlikely to be permitted.

Some ethicists argue that once a woman has implicitly given up the right to an abortion by carrying a fetus to near-term, she has an affirmative obligation to consent to any medical or surgical intervention that may help the fetus. Opponents argue that this is more a moral construct than an enforceable legal obligation. First, there is no point in pregnancy in which a woman formally or publicly waives the right to an abortion, although the State is allowed to limit the exercise of that right at some point.

<sup>62</sup>W.A. Bowers and B. Salgestad, "Fetal v. Maternal Rights," *Am. J. Obstet. Gynecol.*, vol. 58, 1981, p. 209.

<sup>63</sup>210 A.2nd 537 (N.J. 1964).

<sup>64</sup>*Matter of Quinlan*, 355 A. 2nd 647 (N.J. 1976).

<sup>65</sup>*Schmerber v. California*, 384 U.S. 757 (1966).

<sup>66</sup>*Rochin v. California*, 342 U.S. 165 (1952).

<sup>67</sup>*Winston v. Lee*, 470 U.S. (1985).

Secondly, the "waiver" argument would mean that a woman has full right to elect abortion, but if she elects childbirth she is required to surrender basic rights to bodily integrity and privacy. This is, arguably, an unconstitutional penalty on the exercise of the right to bear a child,<sup>68</sup> and would be contrary to the State's presumed interest in encouraging marital procreation. It should be noted that at some time in the future the State might not be presumed to have an interest in encouraging procreation. In the 1970s and even today some people have argued that the State should actively discourage population growth.

To some extent, the interpretation of a woman's constitutional right to refuse medical treatment during pregnancy may in the future be technologically driven: is there a treatment that is effective in preventing or curing a serious illness or defect, is it safe for the mother, can it be delivered nonintrusively? Affirmative answers may encourage courts in the future to give greater weight to the constitutional rights of a fetus as compared to those of the mother.

### Fetal Abuse

Less invasive interventions may also require balancing the interests of a woman with that of her unborn child. In some ways, however, supervision of diet, smoking, or drinking—that is, of otherwise legal activities—although physically less invasive, could be perceived as requiring more massive infringement on privacy or liberty than one-time surgery. Could a State constitutionally define a new crime, "fetal abuse, analogous to "child abuse," and use it to force a pregnant woman to refrain from taking certain actions harmful to a fetus? Or could the State force her to take actions thought to be good for the fetus?

Pamela Monson Stewart, because of placenta previa, was advised by her physician to stay off her feet, avoid intercourse, refrain from taking drugs, and seek immediate medical at-

tention should she begin to hemorrhage. According to police she ignored this advice, having intercourse with her husband and taking amphetamines after she noticed some bleeding, and not going to the hospital until many hours later. Her son was born with massive brain damage and died six weeks later. Criminal charges were filed under the State's child support statute, which includes "unborn children."<sup>69</sup>

The case was dismissed in early 1987 when the trial judge determined that this statute did not apply to her conduct. This may not indicate how similar cases might be decided. The prosecution, for example, argued that "disobeying instructions" or "failure to follow through on medical advice" should be grounds for criminal action. This seems foreign to the usual meaning of "medical advice" and would surely change the nature of the doctor-patient relationship.

The "fetal protection" policy enunciated by the prosecution appears to assume that like mother and child, mother and fetus are two separate individuals with separate rights. But unlike a child, the fetus is absolutely dependent on the mother's body and cannot be treated without invading the mother. Treating them separately before birth can only be done by favoring one over the other where rights conflict; and this appears to many people to treat the mother like an inert incubator or culture medium, or like the servant of the fetus.

Another problem is more technical. Child support laws requiring provision of food, housing, medical attention, etc., do not require parents to provide "optimal" or "desirable" quality of these goods. They do not forbid taking risks with children (e.g., having them ride in automobiles, or ski), or even causing pain to children (e.g., punishment). Thus fetal abuse laws would in effect be more stringent than child abuse laws.

<sup>68</sup>D.E. Johnsen, "The Creation of Fetal Rights: Conflicts With Women's Constitutional Rights to Liberty, Privacy and Equal Protection," *Yale L. J.*, vol. 95, 1986, p. 599.

<sup>69</sup>Cal. Penal Code, Sec. 270 [West, 1986]: If a parent of a minor child willfully omits, without lawful excuse, to furnish necessary clothing, food, shelter, or medical attendance, or other remedial case for his or her child, he or she is guilty of a misdemeanor . . .

## MEDICAL INTERVENTIONS AT THE END OF LIFE

Various types of life-extending devices such as kidney dialysis machines, heart-lung machines, and finally the Jarvis heart, are encouraging people to think of their organs as potentially replaceable parts, and of death from aging and deterioration as at least postponable. If life can be extended, should we have the liberty to use or to refuse those extenders? Could it ever come to be assumed that we have a right to them, or that all have an equal right to them?

As already noted, there is no constitutional right to health, or to medical or health care, in the United States.<sup>70</sup> The President's Commission for the Study of Ethical Problems in Medicine<sup>71</sup> recognized this, but concluded that:

Society has amoral obligation to ensure that everyone has access to adequate care without being subject to excessive burdens.

The Commission based this obligation on the criticality of health to the individual's opportunity to pursue a life plan, the necessity of medical care to "relieve pain and suffering and restore functioning, and prevent death," and the fact that most illnesses and injuries are beyond the control of the individual. The Commission concluded that the societal obligation does not extend to "everything needed" but clearly means that everyone should have access to some level of care.

It is therefore argued by many people that the courts may, at sometime in the future, conclude that access to a basic minimum of decent health care is fundamental to the exercise of personal liberty. They point out that while the Court has ruled that government need not fund any medical procedures, this was a 5-4 decision.<sup>72</sup> A few lower court cases have

required Medicaid financing of organ transplants.

At present, many advanced medical technologies are extremely costly. They raise serious questions about the equity with which the Federal government does make funding allocations to medical care, and whether this raises questions about due process and equal protection.

### Use of Artificial Hearts

The human trials of artificial hearts in the mid-1980s have constituted the most public human experiments in history. The impacts and issues associated with an artificial heart were debated long before that. The National Heart and Lung Institute convened a multidisciplinary panel to review these issues in the early 1970s.<sup>73</sup> The Panel noted that many of the issues surrounding the artificial heart "may lie in the realm of the symbolic and the irrational," given the role the human heart has always played, in speech, myth, poetry, and religion. But 12 years later, when NIH's most recent panel on the artificial heart reported in May 1985, the artificial heart tends to be seen by doctors and by the public as not much different from the other mechanical assist systems with which one has become familiar. The potential social issues are viewed primarily in terms of cost-effectiveness.

The 1985 panel concluded that were the heart fully successful, as much as \$4.25 billion annually might be necessary to provide one for every candidate whose life could be extended by the device.<sup>74</sup> This is more than is spent on any other medical procedure, over twice as much as is spent on kidney dialysis and transplantation, and half the annual budget of the National Institutes of Medicine. Nevertheless, the argument can certainly be made that the

<sup>70</sup>Of all major industrialized nations, only the United States and the Union of South Africa do not provide some form of health care insurance to all citizens.

<sup>71</sup>President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Securing Access to Health Care*, vol. 1 (Washington, DC: U.S. Government Printing Office, 1983), pp. 22.

<sup>72</sup>*Harris v. McRae*, 1980.

<sup>73</sup>Artificial Heart Assessment Panel of the National Heart and Lung Institute, *The Totally Implantable Artificial Heart*, DHEW Pub. No. (NIH) 74-191, Washington, DC, 1973.

<sup>74</sup>Using a series of assumptions, the panel arrived at a cost per heart of approximately \$150,000, and a range of 17,000 to 35,000 candidates.

United States could afford that cost, if high enough priority were given to the goal.

As with other high-cost medical procedures, the question of constitutional importance is the following: how should artificial heart implants (on a post-experimental basis) be allocated and funded, or how could access be rationed or limited to certain groups or individuals?

There are basically three options: universal coverage, rationing, and no funding. This question was presented when kidney dialysis was developed in the 1960s.<sup>75</sup> At first, patient selection for dialysis was made by committee; the committee's deliberations were described as reflecting "the prejudices and mindless clichés" of the white middle class.<sup>76</sup> To avoid having to make explicit, arbitrary "social worth" judgments, Congress in 1972 provided Federal funding for all kidney dialysis and transplantation. This approach has not been followed for heart and liver transplantation, perhaps because the kidney program has cost much more than originally anticipated.

There are four basic approaches to "rationing" artificial organs (and by extension, other extremely costly medical interventions): 1) the market, 2) committee selection, 3) lottery, and (4) the customary approach.

The market approach would let anyone pay for an artificial heart out of their own funds or private insurance. This approach seems to put a dollar value on life; it does not put a high value on fairness and equality. It is also open to the objection that artificial heart technology was largely developed with public funds, and that hospitals and medical schools that use and teach implant procedures are heavily subsidized with public funds. It is, nevertheless, currently constitutionally acceptable since there is no obligation on the part of government to provide any medical care or fund any medical program.

<sup>75</sup>R.A. Rettig, "The Policy Debate on Patient Care Financing for Victims of End Stage Renal Disease," *Law and Contemporary Problems* 40:196 (1976).

<sup>76</sup>David Sanders and Jesse Dukeminier, "Medical Advance and Legal Lag: Hemodialysis and Kidney Transplantation," *UCLA Law Rev.*, vol. 15, 1968, p. 357.

If the government does however decide to fund some artificial heart implants, but not all, some rationing or allocation method will be necessary. The Court has in the past been reluctant to interfere with government rationing schemes. For example, a maximum family allocation under a State Aid to Families with Dependent Children (AFDC) program was upheld against the challenge that it discriminated against members of large families.<sup>77</sup> But the Court struck down a food stamp requirement that all members of a household be related. Even though the Federal Government argued that this requirement was necessary to prevent fraud, the Court was unable to find a rational relationship between the regulation and the purpose of the food stamp program.<sup>78</sup>

This suggests that a rationing scheme is constitutional if based on a valid government interest, if it is for a legitimate government purpose, if it is reasonably related to that purpose, and if it is not invidiously discriminatory. When the necessities of life are involved, as with food stamps, the Court may be more inclined to examine critically the relationship between the statutory purpose and the rationing scheme. An artificial heart cannot well be considered an optional "luxury" for one who needs it; thus one would expect any rationing scheme the government adopts to be carefully scrutinized.

Infant Care Review Committees are a recent example of committee selection procedures; they review decisions to treat or not treat handicapped newborns. Such committees were formed to avoid the necessity of explicitly setting out criteria for selection decisions. But in the long run only two results are possible:<sup>79</sup> if a pattern develops in committee choices, then it can be articulated and those decision rules can be codified and used directly; if no pattern develops, the committee is vulnerable to the charge of arbitrariness. In the end, the committee approach may too closely

<sup>77</sup>*Dandridge v. Williams*, 397 U.S. 471 (1970).

<sup>78</sup>*Department of Agriculture v. Moreno*, 413 U.S. 528 (1973).

<sup>79</sup>G. Calabresi and P. Bobbitt, *Tragic Choices* (New York, NY: Norton, 1978).

involve the State in valuing some individuals over others. This approach also tends to undermine the concept of equality and the value of human life.

It is not clear whether such procedures might be successfully challenged by an unselected candidate on the grounds of lack of due process. If the Court views committee deliberations as like "adjudicatory hearings at which a decision is made based on the 'facts' of the candidate's medical condition, family support structure, past history, likely compliance with medical directions, then it might be decided that the candidate had certain constitutional rights to be involved in the deliberations (perhaps to have advice of counsel, to call witnesses, etc.) since his or her life is at stake. If the committee is making judicial-like decisions, the Court may also require candidate participation. If the Court views the deliberations as more like a legislative committee—setting policies and reviewing applications to see if they must be excluded on non-discretionary grounds—that may meet the conditions of due process.

Another allocation strategy is to put all candidates into a pool from which they are selected at random up to the limits of funding for artificial hearts.<sup>80</sup> This approach takes "equalizing" as the ultimate goal but has little else to recommend it because it makes no allowance for the potential for survival, quality of life, or other relevant characteristics of the candidates. There are, however, no obvious constitutional problems with this strategy.

The traditional approach of having individual physicians select patients on the basis of clinical suitability sloughs off public responsibility to private persons and (usually) prevents decisions from becoming openly controversial or politicized. "Clinical suitability" or "medical criteria" often include factors that are not strictly speaking medical, such as degree of family support for aftercare; medical criteria also usually take in mental illness, IQ,

criminal records, employment, alcoholism, etc. There is little accountability in this approach, but it has not yet been challenged constitutionally.

### Prolongation of Bodily Functions

As already noted, the mechanical ventilator, together with the EEG, required a new definition of death—whole brain death. (See figure 6-5.) This redefinition allowed withdrawal of artificial "life support at the time when brain death is already confirmed, since there is "no legal duty to administer medical treatment after death."<sup>81</sup> But society was presented with anew problem: when is it acceptable to remove life support systems from one who is not totally brain dead, if removal of the system will likely result in death? In other words, if one is "alive" only by virtue of the machine, is that life? Or an artificial substitute for life?

These questions were raised compellingly in the case of Karen Ann Quinlan. Following an episode not completely understood but assumed to be associated with drug intake, she stopped breathing for at least 15 minutes, after which she was resuscitated in an emergency room. Quinlan retained some brain activity but never regained consciousness. Her breathing was done by a mechanical ventilator (figure 6-6), and she was diagnosed as being in a persistent vegetative state, a permanent coma in which one has sleep-wake cycles but is unaware, so far as can be ascertained, of one's environment or one's existence.

Convinced that their daughter's case was hopeless, her parents asked that the ventilator be removed and she be allowed to die. Sympathetic but fearing criminal prosecution for homicide, physicians insisted that the parents obtain a court order. This was refused by a lower court after hearing some physicians testify that removal of the ventilator (stopping of treatment) was unethical. The State Supreme Court in a unanimous decision<sup>82</sup> au-

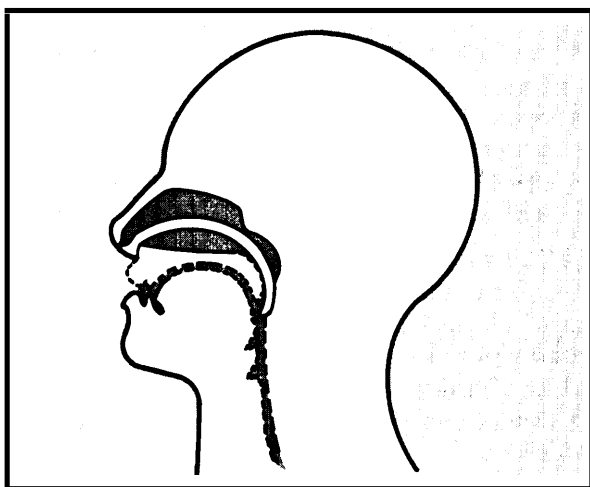
<sup>80</sup>George J. Anus, "Allocation of Artificial Hearts in the Year 2002, *Minerva v. National Health Agency*," *Am. J. Law and Med.*, vol. 3, 1977, pp. 59-76.

<sup>81</sup>*In re Spring*, 405 N.E.2d 115 (Mass. 1980).

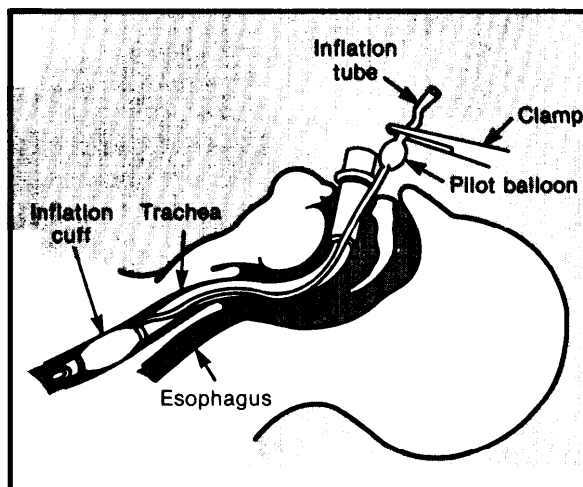
<sup>82</sup>*Matter of Quinlan*, 355 A. 2d 647 (NJ 1976).



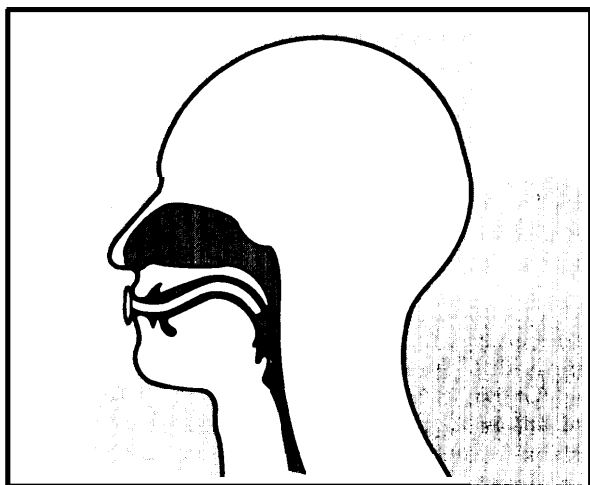
Figure 6-5.—Examples of Airway Devices Used in Advanced Cardiac Life Support



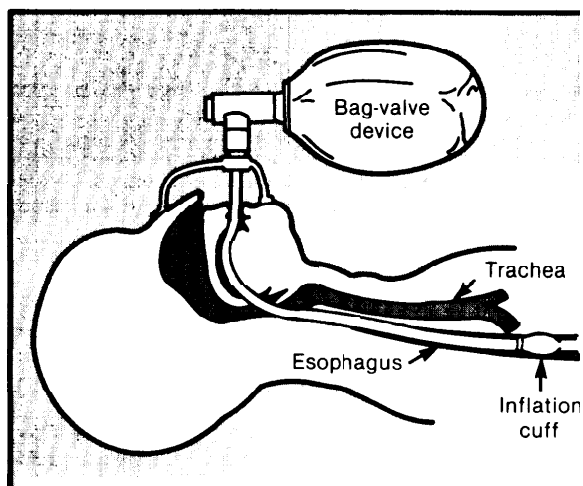
A nasopharyngeal airway may be inserted through the nose to the back of the throat to keep a path for air open.



An endotracheal tube with an inflatable cuff may be inserted through the nose or mouth (as pictured here) into the trachea. It is the most effective means of securing the airway of an unconscious patient.



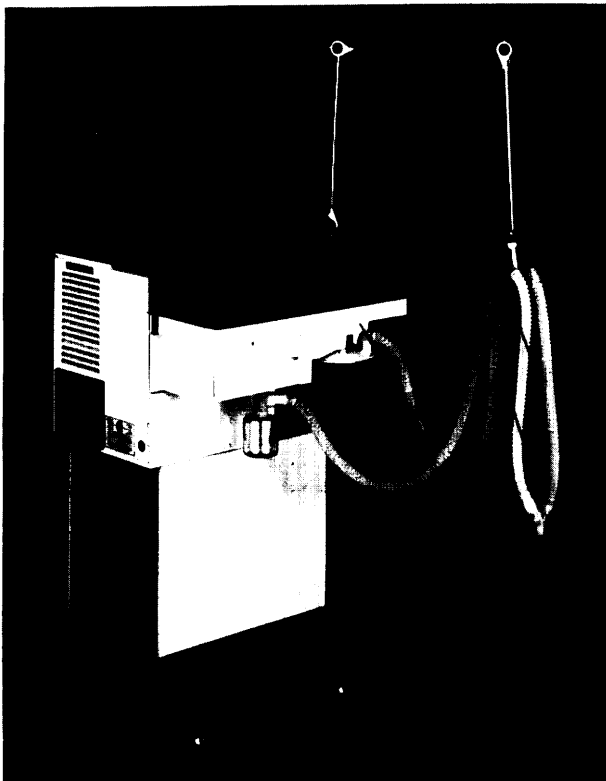
An oropharyngeal airway may be inserted through the mouth to keep a path for air open.



An esophageal obturator airway consists of a cuffed tube that is inserted through the mouth into the esophagus. Airholes in the portion that is in the throat allow passage of air into the trachea. A sealed mask prevents air leakage from the patient's mouth and nose. When the cuff in the esophagus is inflated, air is prevented from entering the stomach, stomach contents are prevented from entering the trachea and an open airway exists that can be used with a bag-valve device (shown) or a mechanical ventilator.

SOURCE: C. K. Cassel, M. Silverstein, J. LaPuma, et al., "Cardiopulmonary Resuscitation in the Elderly," prepared for the Office of Technology Assessment, U. S. Congress, Washington, DC, November 1985

Figure 6-6.— Positive Pressure Ventilator



The Bennett 7200a is a microprocessor-controlled volume ventilator typical of the positive pressure ventilators used in hospitals today.

SOURCE: Puritan-Bennett Corp.

thorized the removal, on the basis of Quinlan's constitutional right to privacy, saying

... Presumably this right is broad enough to encompass a patient's decision to decline medical treatment under certain circumstances, in much the same way as it is broad enough to encompass a woman's decision to terminate pregnancy under certain conditions.

Only 5 years earlier the same court had ruled that there was "no constitutional right to die."<sup>83</sup> In the Quinlan case, the Court examined in detail the question of whether the State had any "compelling interests" in maintaining Quinlan's life, given her (in fact, her guar-

dians') choice to refuse medical treatment. The court examined four possible interests:

- the preservation and sanctity of human life,
- prevention of suicide,
- protection of third parties, and
- upholding the ethical integrity of the medical profession.

The Court said the ethics of the profession were consistent with removal at the patient's request. There were no third parties to be protected since Quinlan had no spouse or children and her family requested removal. The ensuing death could not be homicide because it would come "from existing natural causes" in the absence of artificial interventions. For the same reason, there could be no charges of assisted suicide.

This case has become the touchstone for all post-1976 court cases examining the "right to privacy" in relation to refusing medical interventions. Some courts have based decisions to permit treatment withdrawal on common law battery principles but most also followed the Quinlan case in enunciating a constitutional right to refuse treatment. Another State court argued that honoring the right to privacy is itself honoring the sanctity of life:

The constitutional right to privacy, as we conceive it, is an expression of the sanctity of individual free choice and self-determination as fundamental constituents of life. The value of life as so perceived is lessened not by a decision to refuse treatment, but by the failure to allow a competent human being the right of choice.<sup>84</sup>

Since these cases courts have ruled that the constitutional right to privacy extends to refusing any medical intervention, including artificial feeding. However, other questions could arise with such devices as the (implanted) artificial heart. If it is seen as an assist machine like a mechanical ventilator then the person will have a right to have the machine "unplugged." There is little doubt that this would

<sup>83</sup>*JFK Memorial Hospital v. Heston*, 279 A2d 670 (NJ 1971). The young woman in this case was unable to express her wishes but was "apparently salvable to long life and vibrant health."

<sup>84</sup>*Superintendent of Belchertown v. Saikewicz*, 370 N.E. 2d 417 (1977).

be the case with the current version of the artificial heart, which requires a pneumatically powered device roughly the size of a dishwasher. A fully-implantable heart with a ten year power supply could be perceived differently, perhaps more like the results of a mitral valve replacement or a cardiac bypass operation.

### The Right To Die

As described above, the right to refuse or terminate the use of life support systems now seems well-established, even when it is virtually certain that death will rapidly result. Should a "right to die" also be recognized for those who are not machine-dependent? who are perhaps medicine-dependent? in intractable pain? or merely tired of dying, or even tired of living?

Some would argue that just as one has a constitutional right of privacy in making decisions about marriage and reproduction, one should be able to exercise a right of privacy in deciding against further survival. There is, after all, no other decision so intensely personal; and it is the only situation when one in fact exercises the choice that theoretically underlies all civil rights and duties—that of consenting or declining to participate in organized society. Further, it can be argued, the State has no compelling interest in prolonging life which is already unproductive and burdensome to the individual and the public, or in delaying a death which is welcome, inevitable, and already imminent.

On the other side of the argument, death is always inevitable, and a few people at any

stage of life find life unpromising and unproductive and death welcome. In other words, to accept voluntary euthanasia, some argue, is to open the door to recognition of a general right to suicide. Further, medical diagnosis may be incorrect; when medical treatment is refused or discontinued, the patient sometimes survives against expectations. Suicide on the other hand is irrevocable. Some people oppose voluntary euthanasia because it would almost surely require direct involvement of the State through some sort of prior judicial sanctioning. However, this has also often been the case with termination of treatment. Moreover the State is already directly involved in killing through the criminal death penalty. Finally, physicians might be required to assist or advise involuntary death, which could erode the ethical position of the profession or the public trust in it.

These are strong arguments on both sides. In the long run, constitutional decisions as to whether the scope of individual privacy and autonomy extends to an affirmative right to die will probably depend on both the value placed on self-determination within the society, and the progress made by medical technology in preserving not only life, but a high quality of life; that is, physical and mental health. The greater the degree of control over life or death that can be offered by science and technology, the more certain it is that difficult choices will be presented, and the more likely it is that constitutional questions will be raised by those choices.