

May 1989

HEART TRANSPLANTS

Concerns About Cost, Access, and Availability of Donor Organs



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United States
General Accounting Office
Washington, D.C. 20548

Human Resources Division

B-230495

May 3, 1989

The Honorable Fortney H. Stark
Chairman, Subcommittee on Health
Committee on Ways and Means
House of Representatives

Dear Mr. Chairman:

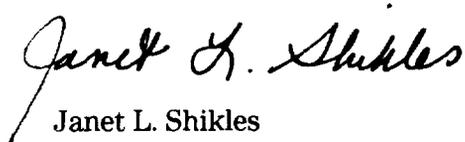
In response to your request and later discussions with your office, we undertook a review of heart transplantation issues. This report contains information on (1) the number of hospitals performing heart transplants, (2) medical and financial criteria used in selecting heart transplant candidates, (3) characteristics of recipients, and (4) heart transplant charges and sources of payment.

Although we did not request written agency comments on this report, we gave Department of Health and Human Services officials and the federal contractor who operates the organ transplant network an opportunity to review the draft report and provide comments. We incorporated their comments where appropriate.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies to the Secretary of Health and Human Services and make copies available to others on request.

The major contributors to this report are listed in appendix V.

Sincerely yours,


Janet L. Shikles
Director of National and Public
Health Issues

Executive Summary

Purpose

Within the past 20 years, heart transplantation has moved from an experimental procedure with high death rates to an effective treatment for end-stage heart disease. As a result, health care professionals and the federal government have become concerned over issues such as equitable access to transplantation, organ donation and procurement, and the diffusion of transplant technology. The Chairman, Subcommittee on Health, House Ways and Means Committee, requested that GAO obtain information on the (1) number of hospitals performing transplants and the criteria followed by heart transplant programs, (2) characteristics of and the procedures for selecting heart transplant recipients, and (3) charges associated with and payment sources for a transplant.

Background

The first heart transplant in the United States was performed in December 1967. In the following years, acute rejection and life-threatening infections led to high patient death rates. As a result, few heart transplants were performed between the early 1970s and the early 1980s. At that time, cyclosporine, an immunosuppressive medication, was introduced, significantly improving the patient's chances of survival.

As transplants of human organs became more prevalent, the Congress passed the National Organ Transplant Act of 1984. The act directed the Secretary of the Department of Health and Human Services to establish (1) the Task Force on Organ Transplantation, which, in 1986, reported on major issues confronting organ transplantation, and (2) the Organ Procurement and Transplantation Network, which matches donor organs with potential transplant recipients. The United Network for Organ Sharing (UNOS) operates the Transplantation Network.

In 1986, the Omnibus Budget Reconciliation Act required, as a condition for Medicare and Medicaid reimbursement, that heart transplant hospitals become members of the Organ Procurement and Transplantation Network. In 1987, Medicare coverage was extended to heart transplant programs approved by the Health Care Financing Administration. Transplant hospitals must meet certain criteria, such as the number of transplants performed and the experience of the transplant surgeon, to be members of the Transplantation Network or a Medicare-approved center. In 1988, 131 transplant hospitals belonged to this network, of which 23 were approved for Medicare reimbursement.

Results in Brief

Heart transplant programs have increased significantly in the 1980s. In 1983, 12 hospitals had heart transplant programs; 5 years later, 131

hospitals had such programs. This increase has improved geographical access to heart transplants. On the basis of recent experience, however, it appears that a significant number of transplant hospitals in 1989 may not perform the minimum number of transplants (12) recommended by the Task Force on Organ Transplantation.

Currently, heart transplants are limited by a lack of donors. In fiscal year 1988, 109 hospitals performed 1,529 heart transplants. However, over 900 patients were waiting for a heart transplant, 3 times more than the number of patients estimated to be waiting in 1986.

Heart transplant programs use medical and financial criteria in selecting potential candidates for a heart transplant. Ninety percent of the patients not accepted for transplantation did not meet the hospital medical criteria; another 7 percent failed to meet financial criteria.

The average heart transplant charge for 1987 was about \$115,000. The majority of patients were covered by private health insurance; most recipients of heart transplants were white, male, and over 45 years old.

Principal Findings

Major Increase in Transplant Programs

In 1986, the Task Force on Organ Transplantation recommended criteria for transplant programs that included the number of procedures to be performed, patient survival rates, and transplant surgeons' experience. The task force noted that the criteria relating to the number of transplants generated considerable debate. Although unable to obtain conclusive evidence, the task force concluded that there is a positive relationship between the number of heart transplants performed and patient outcomes. Therefore, the task force recommended that heart transplant hospitals perform at least 12 procedures per year. The task force added that as data are collected and analyzed, the appropriateness of this requirement could be reassessed (see p. 14 and app. I).

UNOS criteria for membership in the Transplantation Network are based on the experience of the surgeon. However, in May 1988, UNOS included volume of procedures (minimum of 12 a year) and survival rates (73 percent 1 year after transplantation and 65 percent 2 years after) as guidelines for reviewing heart transplant programs. These criteria are similar to those recommended by the task force (see p. 15).

Of the 131 hospitals that are members of the Transplantation Network, 69 performed 11 transplants or fewer and 22 did not perform any in fiscal year 1988 (see p. 17). In July 1989, UNOS will begin assessing heart transplant programs to determine their compliance with criteria established for continued membership in the Network (see p. 18).

A Shortage of Donor Hearts Exists

One reason some hospitals did not perform more transplants is the difficulty hospitals are experiencing in obtaining donor organs. As of September 30, 1988, 929 patients were waiting for a heart transplant, a significant increase from the 300 estimated waiting in 1986. Of these 929, over 20 percent were waiting 6 months to a year; 10 percent were waiting a year or more. Another 515 patients died before a donor could be found. Most of the hospitals GAO surveyed believe that recently enacted federal and state laws will help to increase the organ supply. These laws require hospitals to establish written protocols to identify potential donors and provide families the option to donate organs (see pp. 20-22).

Medical Factors Most Often Eliminate Applicants

Patients who request heart transplants are evaluated to determine the following: if they can benefit from other medical treatment and if they have a poor prognosis for survival without the transplant. Hospitals in GAO's survey used relatively standardized medical criteria. As a result, patients must (1) not suffer from other ailments that would hinder the success of the transplant and (2) be psychologically able to wait for a donor, undergo the transplant, and follow a rigorous medical routine. Almost all patients not accepted by the hospitals did not meet these medical criteria (see pp. 25-26).

Hospitals Have Established Financial Criteria

Hospitals also have financial criteria for accepting patients into their programs. Of the 18 surveyed hospitals, 14 stated they would accept some patients without sources of payment; 3 reported that payment must be assured before acceptance into the transplant program; and 1 did not provide data. About 7 percent of the transplant candidates were not accepted for financial reasons. In 1987, 7 of the 18 hospitals accepted 1 or more nonpaying patients. Altogether, in 1987, the 18 hospitals accepted 21 and rejected 36 nonpaying patients (see pp. 26-27).

**Heart Transplants
Average \$115,000**

A heart transplant is a costly procedure that includes (1) expenses before and after transplantation and (2) requirements that must be adhered to by recipients for the rest of their lives. Hospital charges, physician fees, and organ acquisition charges at the surveyed hospitals averaged about \$115,000 in 1987. Hospital charges accounted for 80 percent of the transplant charges. Patients also incur expenses associated with immunosuppressive medication, which recipients must take for the rest of their lives; follow-up visits; and possible patient readmissions due to complications after transplantation (see pp. 28-31).

**Private Health Insurance
Covers Most Heart
Transplants**

Most heart transplant recipients have private health insurance. At the surveyed hospitals, private insurance covered more of the hospital charges than any other source in 1987. The percentage of these reimbursements ranged among hospitals from 37 to 90 percent. This compares with Medicare reimbursements that ranged from 0 to 24 percent and Medicaid reimbursements that ranged from 0 to 31 percent. The hospitals reported between 0 and 60 percent of their charges were not reimbursed (see p. 34).

A recent survey of private insurers showed that of the 65 companies that accounted for 72 percent of the group health insurance business in the United States, 55 pay for heart transplants. Through their Medicaid programs, 34 states and the District of Columbia paid for 6 percent of the heart transplants performed in 1987. Medicare estimated that it will cover about 5 percent of the heart transplants performed in the United States in fiscal year 1988 (see p. 35).

**Most Patients Are White,
Male, and Over 45**

UNOS demographic data for fiscal year 1988 showed that 84 percent of transplant recipients were white; 8 percent were black; 2 percent were Hispanic; and 6 percent represented other groups or their race was unknown. Seventy-seven percent were males and 61 percent were over 45 years old (see p. 27).

Recommendations

This report contains no recommendations.

Agency Comments

GAO did not obtain formal agency comments on this report. However, GAO did obtain the views of agency officials and other knowledgeable persons and incorporated their views where appropriate.

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Abbreviations

GAO	General Accounting Office
HHS	Department of Health and Human Services
HCFA	Health Care Financing Administration
OPO	organ procurement organization
UNOS	United Network for Organ Sharing

Introduction

Heart transplantation has become a recognized treatment for end-stage heart disease. During fiscal year 1988, 109 hospitals performed 1,529 heart transplants in the United States, a significant increase from the 172 transplants performed by 12 hospitals in 1983. However, as transplants have become an accepted treatment, health care providers, insurers, the government, and the public have raised concerns as to equitable access to transplantation, the cost and payment for heart transplants, and the diffusion of transplant technology.

In response to these concerns, the Chairman, Subcommittee on Health, House Committee on Ways and Means, requested that we obtain information on the number of hospitals performing heart transplants, the characteristics of and procedures for selecting heart transplant recipients, and the charges associated with and payment sources for a transplant.

Major Increase in Heart Transplants in 1980s

On December 6, 1967, a few days after the world's first human heart transplant,¹ a medical team in Brooklyn, New York, performed the first heart transplant in the United States. The recipient, a 17-day-old baby, died after 6-1/2 hours. On January 6, 1968, the second heart transplant in the United States was performed in Stanford, California. The patient survived for 15 days. By December 1970, 167 heart transplants had been recorded by the National Heart, Lung, and Blood Institute, of which 105 were performed in the United States.

In these early heart transplants, acute rejection and life-threatening infections were consistent problems; these resulted in high death rates. By 1971, most heart transplant teams discontinued transplants. As a result, only 13 heart transplants were performed that year in the United States, compared with 54 in 1968. Only Stanford University Hospital and the Medical College of Virginia remained active in heart transplantation.

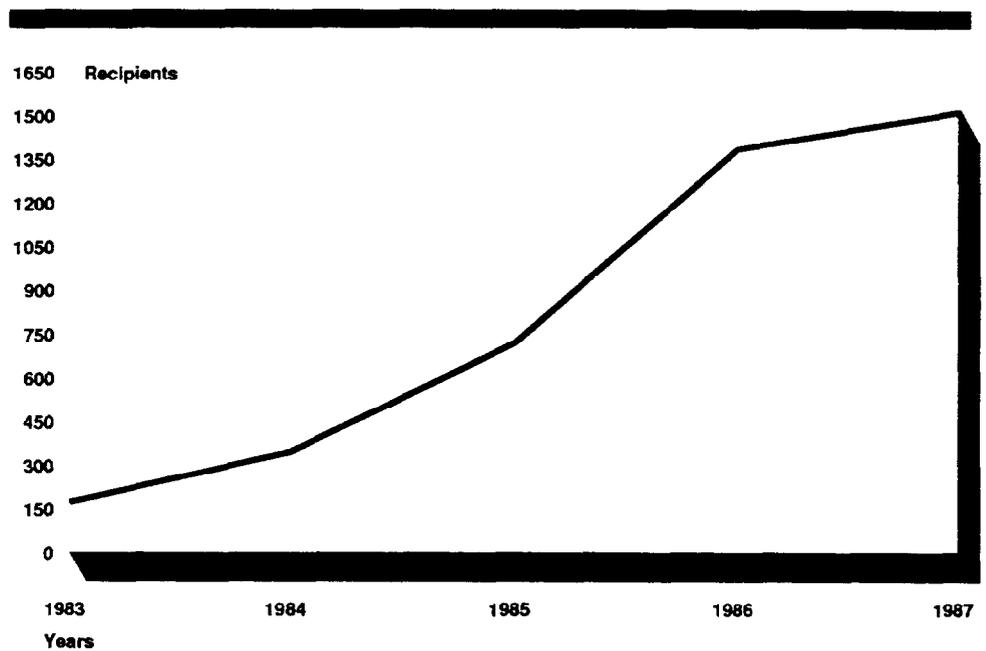
The number of heart transplants did not significantly increase until the early 1980s, when cyclosporine, an immunosuppressive medication, was introduced. The drug helps fight the body's rejection of a transplanted organ, thereby improving the patient's chance of survival. A recent

¹Performed by Christiaan Barnard in Capetown, South Africa.

study indicated that about 73 percent of heart transplant recipients have survived at least 5 years.²

With better survival rates, heart transplants increased significantly. From 1983 to 1986, the number of transplants almost doubled each year, increasing from 172 in 1983 to 1,368 in 1986. In 1987 the number (1,512) increased at a lesser rate. (See fig. 1.1.)

Figure 1.1: Heart Transplant Recipients (1983-87)



Source: (1) Office of Health Technology Assessment and Office of Organ Transplantation, Department of Health and Human Services (HHS), (2) Task Force on Organ Transplantation, April 1986 Report, and (3) United Network for Organ Sharing in Richmond, Va. (UNOS).

With the acceptance of heart transplantation as a treatment for end-stage heart disease, private insurers as well as public programs in the mid-1980s began reimbursing for the procedure. Currently, most private insurers pay for heart transplants. Medicaid also covers heart transplants in 34 states and the District of Columbia.³

²Luis Sergio Fragomeni, M.D., and Michael P. Kaye, M.D., *The Registry of the International Society for Heart Transplantation: Fifth Official Report—1988* (Minneapolis: International Society for Heart Transplantation, 1988).

³Medicaid is a grant-in-aid program by which the federal government pays from 50 to 79 percent of costs incurred by states for medical services provided to certain low-income people. Medicaid coverage varies considerably by state.

In November 1979, the Health Care Financing Administration (HCFA) decided, on an interim basis, to permit Medicare coverage for heart transplant patients at Stanford University Medical Center;⁴ HCFA expected that it would begin to cover heart transplants at all facilities performing the procedure. However, shortly thereafter, on June 12, 1980, the Department of Health and Human Services (HHS) announced a decision to exclude heart transplants from Medicare coverage because issues such as safety, efficacy, and patient selection remained unanswered.

To address these issues, HCFA funded the National Heart Transplantation Study.⁵ On the basis of study recommendations that the procedure was efficacious, Medicare began reimbursing for heart transplants performed at designated hospitals in April 1987. This decision was made retroactive to October 1986.

Federal Role in Organ Transplantation

The Congress passed the National Organ Transplant Act of 1984 (P.L. 98-507) to address the issues of organ donation and procurement. This act (1) directed the HHS Secretary to establish the Organ Procurement and Transplantation Network and the Task Force on Organ Transplantation to study and make recommendations to improve the field of transplantation; (2) prohibited the transfer for valuable consideration or purchase of donor organs by any person, if it affects interstate commerce; and (3) authorized grants to organ procurement organizations (OPOs) for establishment, initial operation, and expansion.⁶ OPOs coordinate organ procurement activities, including the recovery of donor organs, preserving and making arrangements to transport the organs, and providing education to encourage donations.

HHS awarded contracts to the United Network for Organ Sharing (UNOS) to operate the Transplantation Network and maintain a registry of organ transplants. For the registry, UNOS collects demographic data on all transplant recipients and follows their postoperative progress.

⁴Medicare is a federal health insurance program that assists in paying health care costs for almost all people 65 years of age or over and certain disabled people.

⁵Roger W. Evans, National Heart Transplantation Study (Seattle: Batelle Human Affairs Research Centers, 1985).

⁶OPOs are certified by HHS and funded primarily by HCFA. Only one OPO is certified per service area, which is defined as an entire state, at least 2.5 million persons, or at least 50 potential organ donors a year. Further information on OPO procedures for distributing organs is included in appendix III.

In its 1986 report,⁷ the congressionally mandated Task Force on Organ Transplantation recommended that HCFA require hospitals, as a condition of Medicare participation, to establish policies to identify potential donors and request organ donation from the next of kin. Later that year, the Congress passed the Omnibus Budget Reconciliation Act of 1986, Public Law 99-509; among other things, the act required all hospitals participating in Medicare and Medicaid to establish written protocols for identifying potential organ donors and assuring families the option to donate or decline donation. The act also required hospitals performing organ transplants to be members of, and abide by the rules of, the Transplantation Network. UNOS developed policies governing membership criteria, allocation of organs, and standards of quality.

Objectives, Scope, and Methodology

The Chairman, Subcommittee on Health, House Committee on Ways and Means, requested that we (1) identify the number of hospitals performing heart transplants as well as UNOS membership and HCFA reimbursement criteria; (2) determine the procedures for selecting heart transplant candidates; (3) obtain descriptive data on transplant recipients by race and sex; and (4) determine the charge for a heart transplant; what payments, guarantees, or deposits are required; and whether private insurance, federal programs, or the patient is paying for the procedure.

We agreed with the Chairman's office to limit the scope of our work to hospitals that were approved by HCFA for Medicare reimbursement for heart transplants and those that participated in the National Heart Transplantation Study. Therefore, in our study we included 19 hospitals (see table 1.1), of which 18, at the time of our survey, had Medicare-approved heart transplant programs.

⁷Task Force on Organ Transplantation, Organ Transplantation, Issues and Recommendations, Report of the Task Force on Organ Transplantation (Washington: U.S. Government Printing Office, 1986).

Table 1.1: Nineteen Hospitals in GAO Study

Hospital ^a	Location
University of Alabama Hospital	Birmingham, AL
University Medical Center/Arizona Health Sciences Center	Tucson, AZ ^b
Pacific Presbyterian Medical Center	San Francisco, CA
Stanford University Hospital	Stanford, CA ^b
Foster G. McGaw Hospital/Loyola University Medical Center	Maywood, IL
Methodist Hospital of Indiana, Inc.	Indianapolis, IN
Jewish Hospital, Inc.	Louisville, KY
Johns Hopkins Hospital	Baltimore, MD
Brigham and Women's Hospital	Boston, MA
University of Minnesota Hospital	Minneapolis, MN ^b
St. Louis University Medical Center	St. Louis, MO
Barnes Hospital/Washington University School of Medicine	St. Louis, MO
Columbia Presbyterian Medical Center	New York, NY ^b
Presbyterian University Hospital of Pittsburgh	Pittsburgh, PA ^b
Temple University Hospital	Philadelphia, PA
The Methodist Hospital/Baylor College of Medicine	Houston, TX
St. Luke's Episcopal Hospital	Houston, TX
University of Utah Medical Center	Salt Lake City, UT
Medical College of Virginia	Richmond, VA ^b

^aAll hospitals, except Columbia-Presbyterian Medical Center, receive Medicare reimbursement for heart transplants.

^bNational Heart Transplantation Study participants.

In conducting this study, we reviewed (1) relevant federal legislation, including the National Organ Transplant Act of 1984 and the Omnibus Budget Reconciliation Act of 1986, and (2) literature, including the Report of the Task Force on Organ Transplantation and the National Heart Transplantation Study. We interviewed appropriate officials at key HHS offices, such as the Office of Organ Transplants within the Public Health Service, HCFA, and the National Heart, Lung, and Blood Institute. We also interviewed (1) officials at UNOS, state Medicaid offices, and OPOS and (2) members of interest groups, such as the American Council on Transplantation, International Society of Heart Transplantation, and the National Heart Assist and Transplant Fund.

For three hospitals (Stanford University Hospital, Presbyterian University Hospital of Pittsburgh, and Johns Hopkins Hospital), we conducted on-site interviews and obtained detailed information on cost, reimbursement, and demographic data for 339 heart transplants performed in

1986 and 1987. We mailed copies of a questionnaire to the other 16 hospitals to obtain charge estimates and information on payment sources, as well as patient demographic data. One hospital—the Medical College of Virginia—did not respond to our questionnaire; therefore, we are using data from 18 hospitals in this report. At HCFA, we reviewed the patient selection criteria used by the hospitals in our survey.⁸

From UNOS, we obtained national data on the number of patients awaiting transplantation, the number of patients who died while awaiting transplantation, distribution of donor hearts, the number of transplants performed during fiscal year 1988, and demographic characteristics of heart transplant recipients.

Our work was performed between November 1987 and November 1988, in accordance with generally accepted government auditing standards. We did not obtain written comments on this report; however, a copy of the draft report was provided to HHS and UNOS officials and we incorporated their comments where appropriate.

⁸Hospitals requesting Medicare coverage for heart transplants must submit applications to HCFA. Information in these applications is compared with HCFA requirements as a basis for approving a heart transplant program for Medicare coverage. We reviewed the applications for the hospitals in our survey to determine their patient selection criteria. Eighteen of the hospitals were approved for Medicare coverage and one hospital withdrew its application.

Heart Transplants Limited by the Supply of Donor Organs

The congressionally mandated Task Force on Organ Transplantation recommended criteria for transplant programs, including the number of procedures to be performed, patient survival rates, and the experience of transplant surgeons. The task force concluded that there is a positive relationship between the number of transplants performed and patient outcomes; it recommended that heart transplant programs perform at least 12 heart transplants a year. HCFA adopted criteria similar to those recommended by the task force for approving heart transplant programs for Medicare reimbursement. UNOS criteria for membership in the Transplantation Network is on the basis of the experience of the surgeon.

At the end of fiscal year 1988, 131 hospitals had heart transplant programs and were members of UNOS. This number of transplant programs, considerably more than a few years earlier, has increased the geographical accessibility of this procedure to patients and their families. At the same time, however, 69 of these hospitals performed 1 to 11 transplants; another 22 did not perform any in fiscal year 1988.

One reason why some programs did not perform more transplants is because they are experiencing difficulty in obtaining donor organs. As of September 30, 1988, 929 patients were on the UNOS waiting list for transplants; this is a significant increase from 1986, when about 300 patients were waiting transplantation. Before they could receive a transplant, another 515 patients on the waiting list died during fiscal year 1988. Most hospitals in our survey believe, however, that recent federal and state laws may help increase organ donations.

Criteria for Designating Transplant Programs

In its April 1986 report, the Task Force on Organ Transplantation expressed concern that organ transplant programs were proliferating too rapidly, diffusing expertise and experience to the point that successful patient outcomes were threatened; scarce organs were not effectively used; and costs were increased.¹ While acknowledging that an increased number of geographically dispersed hospitals performing heart transplants may improve a patient's access to a transplant, the task force recommended that HHS designate specific centers to perform organ transplants. It also recommended that the programs be evaluated against explicit criteria, ensuring that only those institutions with the requisite capabilities be allowed to perform transplants. These criteria include facility requirements, such as allocating sufficient operating and

¹At the time of the task force report, 71 heart transplant programs were in operation.

recovery room as well as surgical bed resources and personnel; the volume of heart transplants to be performed each year (12);² and minimum patient survival rates (70 percent of patients should survive a heart transplant a minimum of 1 year). The task force noted that although the criteria relating to the number of transplants generated considerable debate, the majority of task force members concluded that a positive relationship exists between the number of transplants performed and patient outcomes; the members favored establishing a minimum number to be performed (see app. IV).

In establishing its membership criteria, UNOS did not adopt the recommended criteria of the task force for the number of procedures and survival rates. UNOS criteria for membership are based primarily on the experience of the transplant team. Recently, UNOS included the number of procedures and survival rates in its guidelines for selecting heart transplant programs for review.³

HCFA, which limits Medicare reimbursement to heart transplants performed at approved hospitals, established criteria that include requiring that (1) at least 12 transplants be performed each year, (2) 73 percent of recipients survive at least 1 year, and (3) 65 percent survive 2 years. To be approved by HCFA, programs must have demonstrated acceptable results for at least 3 years.⁴ The approved hospitals are also required to submit data to HCFA on patients selected, protocols used, and recipient outcomes. This information will be used by HCFA for an ongoing assessment of the programs. Within the next year, HCFA will study the effects of number of procedures performed on patient outcomes. On the basis of that study, HCFA will revise its criteria, if appropriate. A comparison of task force, UNOS, and Medicare criteria are shown in table 2.1.

²See appendix IV for information on the task force recommendation concerning number of procedures.

³Guidelines developed in May 1988 include performance of at least 12 heart transplants per year and patient survival rates of 73 percent for the first year and 65 percent for the second year after transplantation.

⁴To demonstrate experience and survival rates, the program must provide evidence of 12 or more patients in each of the 2 years preceding its application and 12 patients before that time but since January 1, 1982.

**Chapter 2
Heart Transplants Limited by the Supply of
Donor Organs**

Table 2.1: Criteria for Heart Transplant Programs

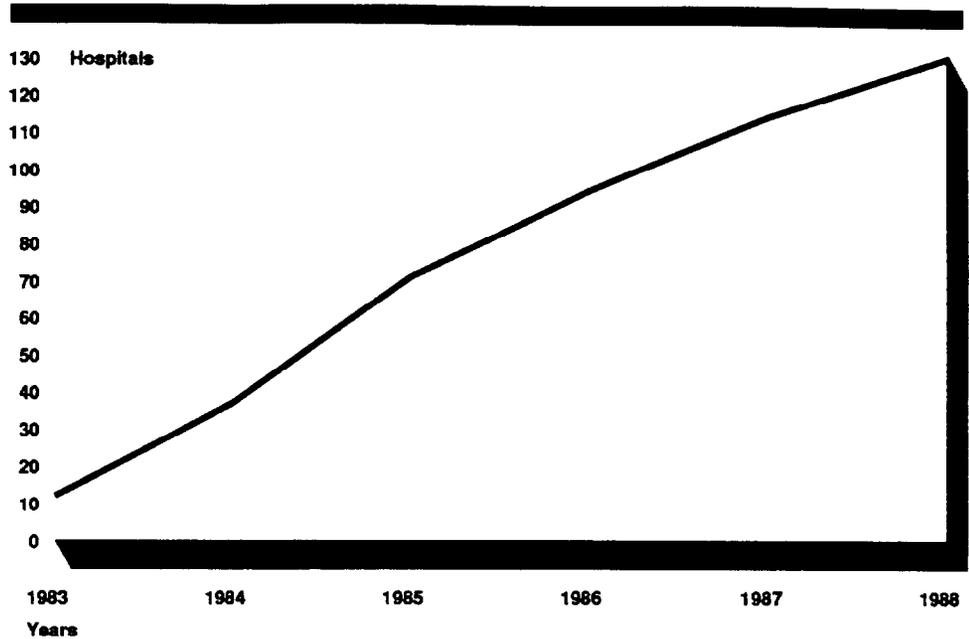
Criterion	Task force	Addressed by	
		UNOS	Medicare
Experience	An established, ongoing transplant program is evidence of experience.	Requires transplant personnel to have experience but does not require an established transplant program (see transplant surgeon certification criterion).	To measure experience and success, facility must have done 12 transplants in each of the 2 preceding years and another 12 since January 1, 1982.
Volume	Twelve transplants per year. Allow transplant programs 2 years to achieve minimums.	Not addressed for initial membership. Programs doing fewer than 12 transplants a year are subject to review.	At least 12 transplants per year.
Survival rates	Rate is 70 percent of patients should survive a minimum of 1 year.	Not addressed for initial membership. Programs with rates of less than 73 percent for the first year and 65 percent for the second year are subject to review.	Rate is 73 percent of recipients survive at least 1 year; 65 percent survive at least 2 years.
Education	Heart transplants must be performed in conjunction with graduate medical education.	Does not require transplant program to be affiliated with a teaching institution.	Affiliation with a teaching institution not essential for programs.
Transplant surgeon certification	A minimum of 1 year of training and experience in transplant surgery, postoperative care, and long-term management of transplant recipients. Must be board certified or have equivalent experience.	Transplant surgeons must have (1) a minimum of 1 year of formal training and 1 year of experience at a qualified transplant program or (2) 3 years of experience at such a program.	Specific qualifications for transplant surgeon not mentioned. Facility should identify transplant team members who are either board certified or have demonstrated competence.

A Majority of Hospitals Perform Fewer Than 12 Transplants a Year

In 1983, 12 hospitals performed heart transplants. By the end of fiscal year 1988, 131 hospitals with heart transplant capabilities were UNOS members (see fig. 2.1). Twenty-three of these were approved by HCFA for Medicare reimbursement.

Chapter 2
Heart Transplants Limited by the Supply of
Donor Organs

Figure 2.1: Heart Transplant Programs
 (1983-88)



Source: (1) Task Force on Organ Transplantation, April 1986 Report, (2) Office of Health Technology Assessment, Department of Health and Human Services (HHS), and (3) United Network for Organ Sharing in Richmond, Va. (UNOS).

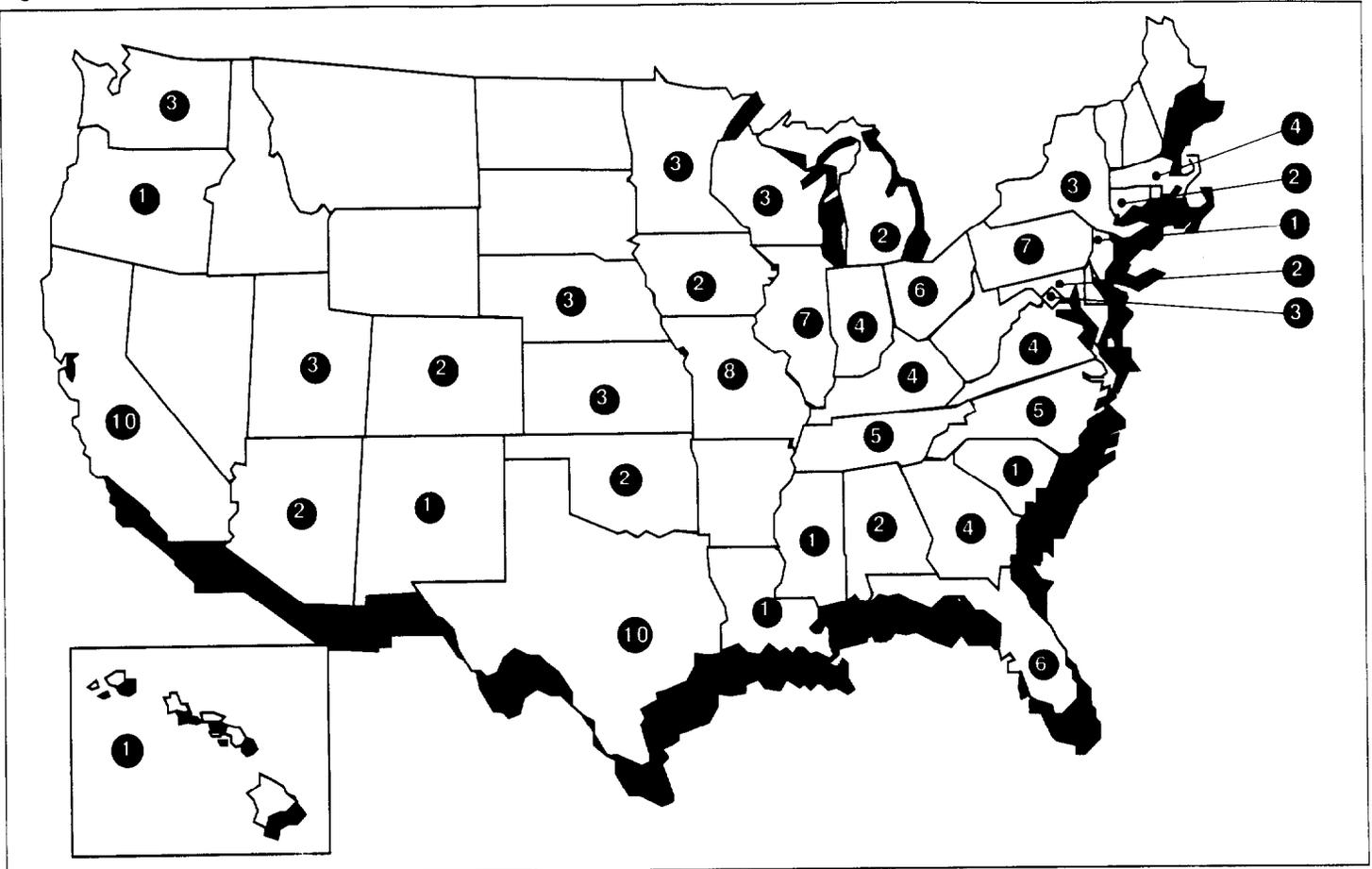
As of September 1988, 36 states and the District of Columbia had at least 1 heart transplant program (fig. 2.2). In addition, 6 metropolitan areas had 4 or more such programs (see table 2.2).

Table 2.2: Metropolitan Areas With Four or More Heart Transplant Programs

Area	Programs
Washington, DC	4
Boston, MA	4
Dallas, TX	4
Los Angeles, CA	5
St. Louis, MO	5
Chicago, IL	6

Chapter 2
Heart Transplants Limited by the Supply of
Donor Organs

Figure 2.2: Number of Heart Transplant Programs by State

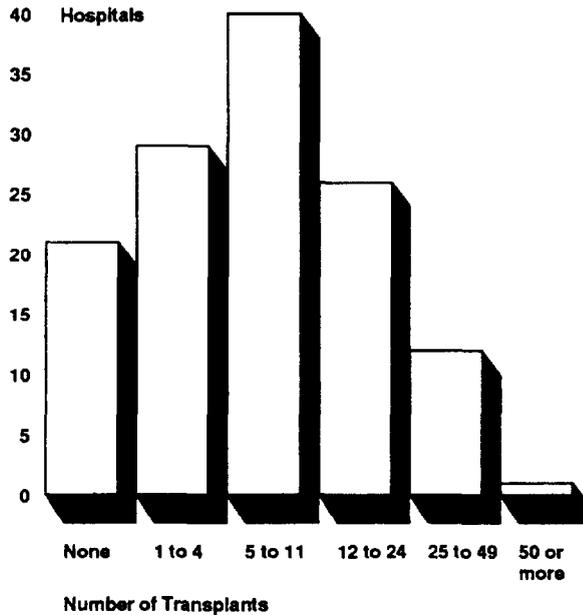


Source: UNOS.

The transplant activity also varied among hospitals. In fiscal year 1988 (see fig. 2.3), 22 of the 131 hospitals performed no transplants; 29 performed from 1 to 4; and 40 performed from 5 to 11.

If hospitals continue to perform the same number in 1989, many hospitals will not be able to perform the number of transplants recommended by the task force and used as a guideline by UNOS for assessing programs. In this regard, a UNOS official stated that in July 1989 they will begin assessing heart transplant programs. In assessing a program's competence to retain its membership, UNOS will consider not only the number of procedures performed and survival rates but also patient case-mix (for example, the hospital may have a higher proportion of high-risk patients than other programs).

**Figure 2.3: Heart Transplant Program
Activity** (Fiscal Year 1988)



Source: UNOS.

The number of transplants performed by the 18 hospitals in our survey are shown in table 2.3; the number performed in 1988 was as high as 71 and as low as 10. Of the 18 hospitals, 9 increased the number performed in 1988; 8 performed fewer; and 1 performed the same number as in 1987. Overall, the total number of transplants at the 18 hospitals declined from 674 in 1987 to 619 in 1988.

Chapter 2
Heart Transplants Limited by the Supply of
Donor Organs

Table 2.3: Activity of Heart Transplant Programs in GAO Study

Name	Date program was established	Transplants performed			
		Total	1986	1987	1988
Stanford University Hospital	1968	562	71	53	39
Presbyterian University Hospital of Pittsburgh ^a	1968	398	91	98	61
St. Luke's Episcopal Hospital ^b	1968	299	77	56	58
The Methodist Hospital/Baylor College of Medicine ^c	1968	113	26	23	35
St. Louis University Medical Center	1972	105	23	20	24
Columbia Presbyterian Medical Center	1977	244	37	57	59
University of Minnesota Hospital	1978	167	43	44	24
University Medical Center/Arizona Health Sciences Center	1979	185	30	40	31
University of Alabama Hospital	1981	181	46	23	21
Methodist Hospital of Indiana, Inc.	1982	92	19	20	20
Johns Hopkins Hospital	1983	98	28	20	13
Foster G. McGaw Hospital/Loyola University Medical Center	1984	135	35	27	31
Temple University Hospital	1984	128	38	40	32
Pacific Presbyterian Medical Center	1984	76	13	17	30
Brigham & Women's Hospital	1984	73	11	20	23
Jewish Hospital, Inc.	1984	54	12	15	10
Barnes Hospital/Washington University School of Medicine	1985	120	32	33	37
University of Utah Medical Center	1985	205	44	68	71
Total		3,235	676	674	619

^aHeart transplants were discontinued in 1968 and resumed in 1980.

^bHeart transplants were discontinued in 1969 and resumed in 1982.

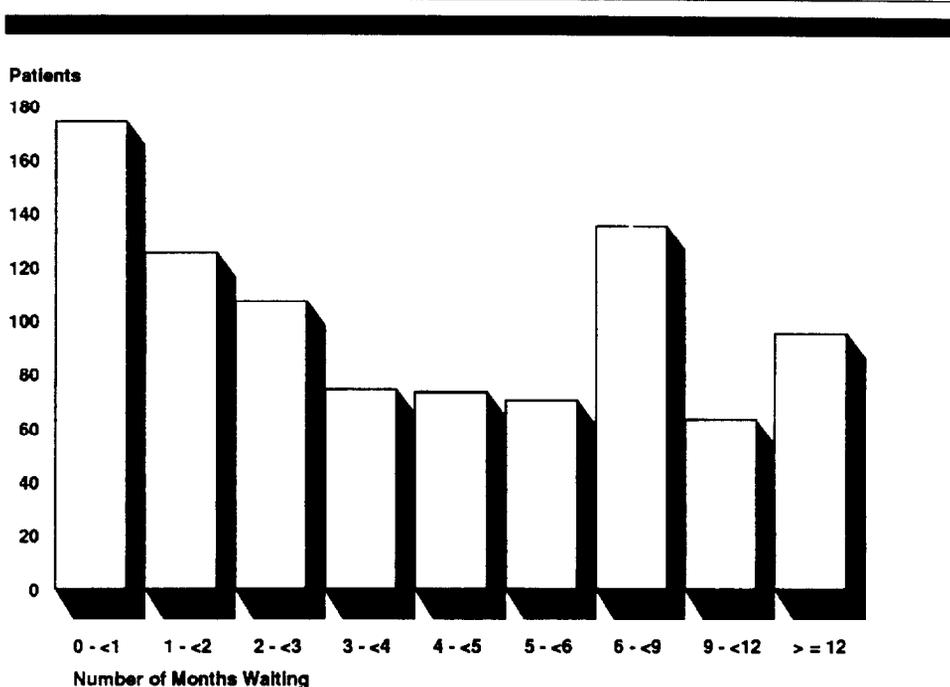
^cHeart transplants were discontinued in 1970 and resumed in 1984.

A Shortage of Donor Hearts Affects Ability to Perform Transplants

Almost half of our surveyed hospitals did fewer transplants in 1988 than in 1987. Hospitals reported that difficulties in acquiring organs have prevented them from performing more. Hospital officials commented that the number of donors has not increased proportionately with the increase in heart transplant candidates. Some officials also expressed concern about continuing to meet the HCFA criterion of 12 transplants or more a year. In fact, one Medicare-approved hospital performed only 10 heart transplants in 1988, down from 15 the previous year, because of the unavailability of organs.

Some transplant candidates wait a considerable time for a donor heart. As of September 30, 1988, 929 patients were awaiting a suitable heart. Of these, 202 patients (22 percent) had been waiting between 6 months to almost 1 year; another 95 patients (10 percent) had been waiting a year or longer (see fig. 2.4). During fiscal year 1988, an additional 515 patients died while on the waiting list for a donor heart.

Figure 2.4: Length of Time on UNOS Waiting List (As of Sept. 30, 1988)



Source: UNOS.

Changing technologies are enabling some patients to survive longer while waiting for hearts. For example, artificial hearts have been used in the last several years to maintain patients until suitable donors could be found. In 1986, 60 artificial hearts were used, twice the number used the previous year.⁵

One hospital in our survey reported that as potential recipients wait longer for donors, it becomes more difficult to manage these patients

⁵Gregory de Lissovoy, "Medicare and Heart Transplants," *Health Affairs* (Millwood, Va.: Project HOPE, Fall 1988), p. 68.

medically. Officials noted that more of these patients have to be admitted for prolonged hospitalizations. This treatment becomes expensive and increases the overall cost of transplantation. Seventeen of the 18 hospitals providing information stated that their patients were waiting longer for a donor in 1987 than in 1985.

Donor shortages can have other negative effects. For example, the International Society for Heart Transplantation reported an increase in 1987 in the number of heart transplant recipients who die within 30 days after transplantation. The society cited as one possible cause the opening of many new heart transplant programs. The society also noted other possible causes with a potential impact on recipient survival,⁶ such as relaxed criteria for accepting donor organs.

Recognition of the need to increase the supply of donor hearts is longstanding. How many potential donor hearts are actually available beyond the numbers currently being acquired is not known; however, studies have estimated that the number of potential donors range from 1,000's to 26,000.⁷ One indication that the pool of donor organs may increase in the future is a recent survey showing that more people are willing to donate organs.⁸ The survey shows that for 1987,

- 82 percent of the population were likely to give permission for donating the organ of a loved one;
- 61 percent were likely to donate a child's organ; and
- 48 percent were likely to want their own organs donated.

In an effort to increase the availability of organs, in 1986, the Congress required hospitals participating in the Medicare and Medicaid programs to establish written protocols for identifying potential organ donors and providing families the option to donate organs. As of September 1988, 44 states and the District of Columbia were reported to have laws aimed at increasing organ donation.⁹ Responses from the hospitals we surveyed showed that officials at 14 hospitals believe these laws would have a

⁶Fragomeni and Kaye, p. 249.

⁷Task Force on Organ Transplantation, p. 35, and Evans, p. ES-35.

⁸Office of Organ Transplantation. The Status of Organ Donation and Coordination Services: Report to the Congress for Fiscal Year 1987 (Washington, D.C.: U.S. Department of Health and Human Services, 1987).

⁹Kathleen S. Anderson and Daniel M. Fox, "The Impact of Routine Inquiry Laws on Organ Donation," Health Affairs (Millwood, Va.: Project HOPE, Winter 1988).

Chapter 2
Heart Transplants Limited by the Supply of
Donor Organs

positive effect on increasing organ donation. Officials at the other 4 hospitals believe it is either too early to measure the laws' effectiveness or that the laws will not be successful in increasing organ donation.

Hospitals Screen Patients Against Medical and Financial Criteria

Of the patients not accepted into the heart transplant programs we surveyed, 454 (90 percent) were for medical reasons; 36 (7 percent) were for financial reasons; and 17 (3 percent) for other reasons, such as the patients' deciding against transplantation. The medical criteria used by the hospitals in our survey were relatively standardized, such as the patient's age, overall medical condition, and other factors.

In addition, patients are evaluated against financial criteria. While most hospitals stated that they would accept some patients from whom payment is unlikely, few patients who could not pay were accepted into heart transplant programs in 1987. Seven of the hospitals in our survey accepted a total of 21 nonpaying patients; 11 hospitals accepted no nonpaying patients. Fourteen of the hospitals require a deposit from patients who use their own funds to pay for the transplant. In 1987, 10 patients made deposits before transplantation.

National data on people who received transplants in fiscal year 1988 showed that 84 percent were white; 8 percent, black; and 2 percent, Hispanic. Men represented 77 percent of the recipients, with 61 percent over 45 years old. However, programs usually do not accept patients over 60 years old.

Many Referred Heart Patients May Decide Against Transplantation

Patients with many fatal types of heart disease can benefit from a heart transplant. Heart disease includes hereditary weaknesses, infections that damage the heart muscle, and multiple heart attacks. Heart transplant candidates are generally referred to heart transplant programs by their cardiologists.

After the initial inquiry, a staff member at a transplant program discusses with patients (or sends information to them on) the selection criteria, the transplant procedure, expected outcomes, and cost. After this, some patients and their physicians decide against transplantation because of medical, social, or financial reasons.

Fifteen of the 18 hospitals we surveyed could not provide accurate information on the number of those who made initial inquiries but had no further communication with the hospital. One hospital, however, reported that many patients, after the initial inquiries, are screened out by their referring physicians. At that hospital in 1987, 294 inquiries were made by referring physicians. Of those, 115 did not have any further communication. Of 200 inquiries at another hospital, 97 did not. At a third hospital, of 53 inquiries, 8 did not.

Heart Transplant Programs Use Similar Medical Criteria

If the patient does have further communication with the transplant program, the referring physician discusses his or her condition orally or in writing with a staff member of the program. If initial data indicate that the patient meets certain criteria, a pretransplant evaluation is scheduled at the transplant hospital. Medical selection criteria include both medical and psychological factors that could have an impact on the successful outcome of the transplant.

We found the criteria used for selecting heart transplant candidates for the 18 hospitals in our survey relatively standardized. The first criterion for heart transplantation is that the patient is suffering from end-stage heart disease and cannot benefit from other medical or surgical procedures. Another major criterion specified by most of the 18 hospitals was that transplant candidates are not expected to survive beyond 6 to 12 months without a heart transplant. The patient's age, overall health other than heart disease, mental condition, and ability to adhere to a strict medical regimen are also considered (see table 3.1).

Table 3.1: Medical Selection Criteria at 18 Hospitals

Criterion	Standard
Advanced, end-stage heart disease	An expected survival time of 6 to 12 months without a heart transplant.
Age	Usually limits heart transplants to those patients who are less than 60 years old; however, most hospitals will make exceptions.
New York Heart Association severity of illness ^a	Half of the hospitals require that the patient should be classified as class III or IV.
Contraindication	Conditions precluding transplantation include systemic diseases (such as insulin-requiring diabetes or severe peripheral vascular disease); active infection, severe pulmonary hypertension; major organ dysfunction; marked obesity; and history of alcoholism, drug abuse, or mental illness.
Psychosocial	Factors include (1) demonstrating emotional stability and a realistic attitude in response to past and current illness and (2) complying with medical requirements, such as adhering to medication instructions and follow-up visits.

^aA patient classified with class III heart disease has symptoms of heart failure with minimal exertion. Class IV indicates that the patient has symptoms of heart failure while at rest.

Sixteen of the 18 hospitals provided information on the reasons patients were not accepted as candidates. Of 546 patients who were rejected in 1987, information was provided on 507. This information showed that 454 (90 percent) failed to meet medical criteria, 36 (7 percent) did not meet hospitals' financial criteria, and the remainder were not accepted

for other reasons (for example, the patient was undecided about transplantation).

With advancements in heart transplant technology and improvements in survival rates, selection criteria used by some transplant programs have been relaxed. Heart transplant programs are accepting older patients and, in at least one case, patients with ailments that previously were considered adverse to a successful heart transplant. For example, one hospital reported that it had raised the cut-off age from 50 to 55 years old. Heart transplant personnel also told us that they would consider patients in their early 60s if chances of a successful transplant were good. Another hospital stated that patient age limits have gradually increased. At the 18 hospitals in our survey, 10 percent of the 1987 heart recipients were 60 years old or older. One hospital said that it has recently removed insulin-dependent diabetes from its list of contraindications.

Few Nonpaying Patients Accepted for Heart Transplants

As part of their evaluation process, hospitals determine the patient's insurance coverage, eligibility for Medicare and Medicaid, or ability to pay for the transplant. Of the hospitals we surveyed, some will not accept a patient without some source of payment, requiring a deposit from self-paying patients. Other hospitals stated that they would accept some patients who could not pay for the transplant.

Seventeen of the 18 hospitals provided information on their financial policies. Fourteen hospitals stated that they would accept some nonpaying patients; 3 said that payment must be assured before transplantation. As shown in table 3.2, 21 nonpaying patients were accepted at the 18 hospitals.

Fourteen of the 18 hospitals stated that they require deposits, ranging from \$48,000 to \$130,000, from self-paying patients to cover transplant costs. However, few heart transplant recipients are self-paying patients. In 1987, 5 hospitals received deposits from 10 patients.

Chapter 3
Hospitals Screen Patients Against Medical
and Financial Criteria

Table 3.2: Financial Criteria for
18 Hospitals

Hospital	Acceptance of nonpaying patients			Deposit requirements for self-paying patients	
	Policy	Accepted	Rejected	Require	Amount
A	Yes	6	0	Yes	\$50,000
B	Yes	4	0	No	^a
C	Yes	4	0	Yes	50,000
D	Yes	2	0	Yes	125,000
E	Yes	2	1	No	^a
F	Yes	2	23	Yes	75,000
G	Yes	1	0	No	^a
H	Yes	0	0	No	^a
I	Yes	0	^b	Yes	95,000
J	Yes	0	1	Yes	^b
K	Yes	0	4	Yes	^b
L	Yes	0	^b	Yes	130,000
M	Yes	0	1	Yes	60,000
N	Yes	0	0	Yes	48,000
O	^b	0	^b	Yes	^b
P	No	0	5	Yes	60,000
Q	No	0	1	Yes	50,000
R	No	0	0	Yes	125,000
Total		21	36		

^aInformation not applicable.

^bInformation not provided.

Most Heart Transplant Recipients Are White, Male, and Over 45 Years Old

Most recipients of heart transplants are white, male, and over 45 years old. According to UNOS data for fiscal year 1988,¹ 83.9 percent of the heart recipients were white; 7.6 percent were black; 2.3 percent were Hispanic; and 1.6 percent were other races. UNOS could not provide race for 4.6 percent of these recipients. Seventy-seven percent of the recipients were male, and 22.1 percent were female. The sex was not reported for about 1 percent of the recipients. In terms of age, 61.2 percent were over 45 years old; 30.1 percent were from 16 to 45 years old; and 5.8 percent were from 1 to 15 years old. The age of about 3 percent of the recipients was unknown. Characteristics of heart recipients at the hospitals in our survey were similar to the national profile of heart recipients.

¹UNOS did not have demographic data on all fiscal year 1988 heart recipients at the time of reporting. The information is based on 1,269 of the 1,529 transplants performed.

Heart Transplants—A Costly Procedure Reimbursed Mostly by Private Insurers

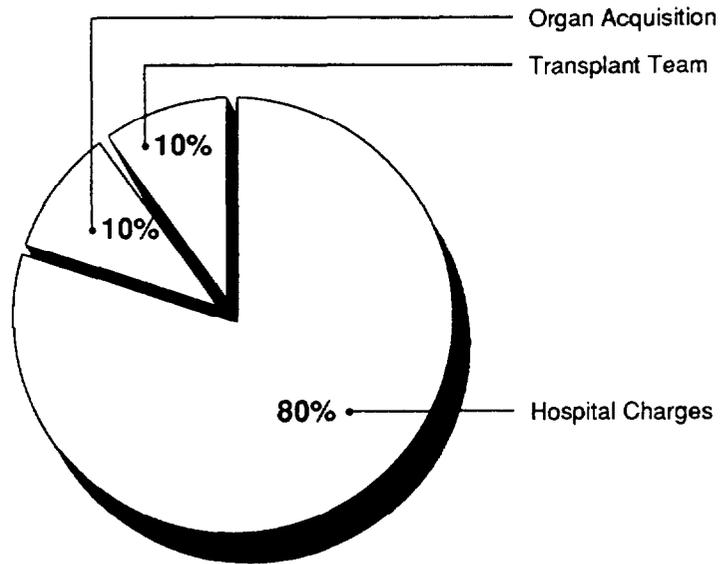
The hospitals in our survey reported that the charges for a heart transplant—which include hospital charges, organ acquisition charges, and transplant team charges—averaged about \$115,000 in 1987. Other expenses include the evaluation before acceptance into a heart transplant program, follow-up care after discharge, and immunosuppressive medications that recipients have to take for the rest of their lives. For some patients, expenses also include lodging near the hospital before and after transplantation and hospital readmissions because of complications.

Most private insurers, including all but one Blue Cross and Blue Shield Plan, cover heart transplants. To a lesser extent, Medicare and Medicaid also reimburse for heart transplants. In 1987, at the surveyed hospitals, private insurance covered most of the hospital charges.

Heart Transplant Charges Vary Among Hospitals and Patients

At the hospitals we surveyed, hospital charges (see table 4.4 for an example), on the average, accounted for about \$91,000 (80 percent) of the heart transplant charges (see fig. 4.1). In determining the charge for a heart transplant, we considered hospital charges as well as charges for the transplant team and organ acquisition. For 1987, for the hospitals in our survey, these charges averaged \$114,601. Heart transplant charges varied significantly across hospitals. For example, average hospital charges for heart transplants varied from \$51,829 to \$121,330 (see table 4.1).

Figure 4.1: Average Heart Transplant Charge for GAO-Surveyed Hospitals (1987)



Chapter 4
Heart Transplants—A Costly Procedure
Reimbursed Mostly by Private Insurers

Table 4.1: Heart Transplant Charges at 18 Hospitals (1987)

Hospital	Hospital charges		Average organ acquisition charge	Transplant team charge	Total
	Average	Range			
1	\$51,829	\$21,685–95,940	\$9,639	\$13,000	\$74,468
2	53,272	21,908–155,390	7,500	9,000	69,772
3	57,000	40,000–110,000	14,000	8,000	79,000
4	61,581	37,318–163,145	8,700	5,000	75,281
5	70,000	40,000–125,000	15,000	3,000	88,000
6	72,461	31,629–193,442	6,115	11,000	89,576
7	76,000	29,783–384,600	7,652	15,000	98,652
8	77,998	^a	13,500	7,500	98,998
9	78,729	45,240–115,740	12,933	8,500	100,162
10	82,999	34,967–198,056	16,500	2,000	101,499
11	87,731 ^b	16,350–447,490 ^b	15,000	^b	102,731
12	94,401	47,652–244,523	13,083	^a	^a
13	98,156	49,312–286,733	10,500	10,000	118,656
14	105,619	31,350–625,029	13,000	12,500	131,119
15	106,035	54,127–321,758	9,834	15,500	131,369
16	110,851	33,452–420,580	9,633	10,000	130,484
17	120,000	40,000–190,000	11,500	20,000	151,500
18	121,330	45,510–440,899	15,500	10,000	146,830

^aHospital did not provide information.

^bTransplant team charges included in hospital charges.

After discharge from the hospital, a heart transplant recipient will need follow-up care requiring frequent visits to the hospital on either an out-patient or inpatient basis. Hospitals reported that the charges for the first year of follow-up care range from a low of \$4,230 at one hospital to a high of \$34,911 at another hospital. Hospitals also reported that the first-year charge for immunosuppressive medications ranged from \$5,097 at one hospital to \$20,000 at another hospital (see table 4.2).

Table 4.2: Follow-Up Care and Immunosuppressive Medication Charges at 18 Hospitals (1987)

Hospital	Care	Medication
A	\$4,230	\$7,000
B	7,550	6,000
C	8,500	5,500
D	9,000	9,000
E	9,750	5,097
F	10,000	6,000
G	10,000	20,000
H	12,000	10,000
I	14,000	8,000
J	16,422	9,446
K	16,500	10,000
L	20,700	5,400
M	22,000	7,000
N	24,413	6,000
O	28,546	8,300
P	30,000	^a
Q	34,911	8,500
R	^a	6,000

^aHospital did not provide information.

Heart Transplant Charges at Three Hospitals

Three of the 18 hospitals provided patient-specific information on inpatient days, charges (including readmissions), and reimbursements for 339 patients receiving heart transplants in 1986 and 1987. These data show variations in charges by patients as well as hospitals.

One factor in the variations in charges is the patient's length of time in the hospital. During 1987, hospital charges at these three hospitals ranged from a low of \$19,759 to \$119,944 for a short stay (1 to 15 days) to a high of \$105,109 to \$466,399 for a stay in excess of 60 days. Inpatient stays ranged from 1 to 167 days (see table 4.3). In some cases, the patient died while in the hospital.

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Table 4.3: Variations in Inpatient Admissions and Hospital Charges for Three Hospitals

Length of hospitalization	Hospital	Patients	Hospital charges	
			Range	Average
1 to 15 days	I	4	\$48,744–60,902	\$56,556
	II	8	19,759–119,944	66,254
	III	4	71,010–103,453	85,708
16 to 30 days	I	6	55,711–69,611	64,374
	II	26	61,849–123,245	82,403
	III	10	80,440–183,708	112,011
31 to 45 days	I	6	82,389–116,716	95,221
	II	7	93,492–186,352	119,611
	III	29	84,750–286,455	118,348
46 to 60 days	I	1	^a	108,412
	II	4	108,065–462,490	213,895
	III	16	101,116–243,454	149,778
Over 60 days	I	3	118,959–210,557	166,440
	II	1	^a	360,235
	III	30	105,109–466,399	185,950

^aNot applicable.

Hospital charges include both hospital room charges and ancillary services. For example, at one hospital the average hospital charge for a heart transplant for the period July 1, 1986, to June 30, 1987, was \$119,453, which included a \$31,518 room charge and \$87,935 for ancillary services (see table 4.4).

Table 4.4: Example of Average Hospital Charges for a Heart Transplant (July 1, 1986, to June 30, 1987)

Type of charge	Cost
Room charge	\$31,518
Ancillary services:	
Anesthesia	4,474
Blood administration	4,357
Laboratory	19,809
Medical/surgical supplies	10,454
Operating room	23,205
Pharmacy	8,878
Pulmonary function	2,453
Radiology	5,143
Respiratory therapy	3,384
Miscellaneous	5,778
Total ancillary services	87,935
Total hospital charges	\$119,453

In addition to the above charges, the first of the three hospitals estimated the 1987 charge for evaluating a patient's viability as a heart transplant recipient to be \$2,210; the second, \$6,700; and the third, \$8,800. However, officials noted that it is difficult to determine evaluation charges since they may be coupled with treatment of the patient's heart disease before acceptance into the program.

Readmission information for the period January 1, 1986, through December 31, 1987, at three hospitals (see table 4.5) showed that 147 recipients were readmitted at an average hospital charge of \$24,697 for one or more hospital stays.

Table 4.5: Extent of Hospital Readmissions at Three Hospitals (1986 and 1987)

Hospital	Readmitted patients	Hospital charges	
		Average	Range
X	48	\$44,712	\$2,387–271,194
Y	34	19,595	1,234–97,881
Z	65	12,587	1,185–50,920

Expenses Incurred by Patients

Patients may have to consider additional expenses that, in some cases, are not covered by third-party payers. For example, in some instances, depending on the distance between the patient's permanent residence and the hospital, the patient and his or her family may need to live closer to the hospital for a lengthy period during evaluation, while waiting for a donor heart, or after transplantation. Hospitals estimate lodging expenses to be from about \$1,300 to as much as \$11,000, depending on duration of stay and local cost of living. Lodging expenses are typically not covered by insurance.

Another example is the expense of immunosuppressive drugs, which the patient will have to take for the remainder of his or her life. While nearly all private insurers that cover heart transplants also reimburse for these medications, Medicare reimburses for medications for only 1 year after transplant. However, the recently enacted Medicare Catastrophic Coverage Act of 1988 provides for continual reimbursement of these medications beginning in 1990. The hospitals we surveyed estimated that during the second year after transplantation, these medications average about \$6,200.

Private Insurers Are Major Payers for Heart Transplants

Seventeen of the 18 responding hospitals in our survey provided us with percentages of 1987 hospital charges reimbursed from various sources. Private insurance reimbursed more of the charges associated with heart transplants than any other source. The range of private insurance reimbursement varied from 37 to 90 percent. This compares with smaller reimbursements from Medicare—1 to 24 percent—and Medicaid—2 to 31 percent. Five hospitals reported no reimbursements from Medicare, and four reported no reimbursements from Medicaid (see table 4.6).

Table 4.6: Source of Reimbursement for Hospital Charges at 17 Hospitals in 1987

Hospital	Reimbursed by ^a				Not reimbursed
	Private insurance	Medicare	Medicaid	Patient resources	
AA	37	14	2	24	23
BB	37 ^{b, c}	0	3	0	60
CC	40	24	0	0	36
DD	43	15	17	6	16
EE	47	0	31	0	22
FF	55	10	30	0	0
GG	56 ^b	2	5	1	36
HH	60	12	11	0	17
II	65	13	0	10	12
JJ	70	3	9	12	6
KK	71	13	11	5	0
LL	72 ^b	2	6	4	15
MM	77	1	21	1	0
NN	82	0	16	0	2
OO	84	5	11	0	0
PP	87	0	0	0	13
QQ	90	0	0	10	0

^aReimbursement percentages, reported by hospitals, do not always equal 100 percent.

^bReimbursement data for 1986 and 1987.

^cThis hospital reported reimbursements on hospital charges as well as evaluation, follow-up, immunosuppressive medication, organ acquisition, and transplant team charges.

As noted in table 4.6, the amount of hospital charges not reimbursed also varies among the hospitals. For example, one hospital with a 36-percent nonreimbursement rate had contractual agreements with insurers to accept less than total charges for heart transplants. A second hospital, with a 22-percent nonreimbursement rate, agreed to accept 7 percent of its 1987 heart transplant recipients as nonpaying patients; a third hospital, with a 23-percent nonreimbursement rate, agreed to

accept 9 percent of its patients as nonpaying; and a fourth hospital, with a 36-percent nonreimbursement rate, agreed to accept 20 percent as nonpaying.

Three hospitals in our survey provided specific insurance coverage data on 300 of the 339 transplant recipients in 1986 and 1987. At these hospitals, 79 percent of the recipients had private insurance. About 15 percent were covered by Medicare and Medicaid.

Given that most private insurers cover heart transplantation, it is not surprising that reimbursement data from the surveyed hospitals showed that most transplants are covered by private insurance. The Health Insurance Association of America surveyed its members in 1985 to determine the coverage provided under group comprehensive and major medical expense plans. Sixty-five companies that accounted for 72 percent of the group health insurance business in the United States responded to the survey. Fifty-five of the 65 companies pay for heart transplants—37 as standard practice and 18 on a case-by-case basis.

The Blue Cross and Blue Shield Association reported that as of January 1989, all but 1 of its 76 member plans reimbursed for heart transplants. The procedure is covered in all cases that have been authorized by the plan before the procedure is done. All plans cover the cost of immunosuppressive medications.

Medicare's reimbursement of heart transplants is limited. HCFA estimated that Medicare would cover only 5 percent of the fiscal year 1988 transplants. This is due to several factors. First, patients must meet Medicare's age or disability criteria. However, few patients 65 years of age or older (the age limit required for Medicare eligibility) are considered for heart transplantation. Second, a patient must be unable to engage in gainful employment for 2 years. Unless already eligible (based on disability) for Medicare, most patients in need of heart transplants cannot survive the 2-year wait.

Thirty-four states and the District of Columbia reimburse for heart transplants under their Medicaid programs, either as part of a general policy or on an individual basis. However, in 1987, these states paid for

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a small percentage of heart transplants. Medicaid paid for 94 heart transplants, about 6 percent of the total performed that year.¹

¹Susan S. Laudicina, *Medicaid Coverage and Payment Policies for Organ Transplants: Findings of a National Survey* (Washington, D.C.: Intergovernmental Health Policy Project, George Washington University, 1988).

Conclusions

In the past 5 years, the United States has seen a significant increase in the number of hospitals performing heart transplants. In fiscal year 1988, 109 hospitals performed 1,529 transplants—nearly 10 times the number performed in 1983 when 12 hospitals were performing heart transplants. With improved outcomes for heart transplant recipients coupled with the increase in programs, more patients are likely to be referred for transplants in the future.

Although most hospitals we surveyed believed that recently enacted federal and state laws may help increase organ donation, heart transplants are currently limited by the lack of donors. The number of patients awaiting transplantation has tripled over the past 3 years, with over 900 patients awaiting transplantation in 1988. Approximately 300 of these were waiting 6 months or longer for donor hearts. Many patients will die before suitable donors are found.

The increase in heart transplant programs has increased the accessibility of this procedure to patients. Thirty-six states and the District of Columbia now have at least one heart transplant program. However, on the basis of past experience, a significant number of transplant hospitals may not be able to perform the number of transplants viewed as necessary for the proficiency of the transplant program and positive patient outcomes. In the past year, 91 of the 131 transplant hospitals did not perform the minimum number of transplants (12) that was recommended by a 1986 congressional task force.

UNOS Member Heart Transplant Hospitals (As of September 30, 1988)

Region	Institution	Location
I	Hartford Hospital	Hartford, CT
	Yale-New Haven Hospital	New Haven, CT
	Children's Hospital	Boston, MA
	Massachusetts General Hospital	Boston, MA
	New England Medical Center	Boston, MA
	Brigham & Women's Hospital ^a	Boston, MA
II	Georgetown University Medical Center	Washington, DC
	George Washington University Hospital	Washington, DC
	Washington Hospital Center	Washington, DC
	Johns Hopkins Hospital ^a	Baltimore, MD
	University of Maryland Hospital	Baltimore, MD
	Newark Beth Israel Medical Center	Newark, NJ
	Allegheny General Hospital	Pittsburgh, PA
	Children's Hospital	Pittsburgh, PA
	Presbyterian University Hospital of Pittsburgh ^a	Pittsburgh, PA
	Milton S. Hershey Medical Center	Hershey, PA
	St. Christopher's Hospital for Children	Philadelphia, PA
	Temple University Hospital ^a	Philadelphia, PA
	Hospital of the University of Pennsylvania	Philadelphia, PA
	Fairfax Hospital	Annandale, VA
	Medical College of Virginia ^a	Richmond, VA
	Hunter Holmes McGuire VA Hospital	Richmond, VA
University of Virginia School of Medicine	Charlottesville, VA	
III	Baptist Medical Center Princeton	Birmingham, AL
	University of Alabama Hospital ^a	Birmingham, AL
	Florida Hospital	Winter Park, FL
	Jackson Memorial Medical Center	Miami, FL
	Tampa General Hospital ^a	Tampa, FL
	St. Joseph's Hospital	Tampa, FL
	Tallahassee Memorial Regional Medical Center	Tallahassee, FL
	Shands Hospital/University of Florida College of Medicine	Gainesville, FL
	Henrietta Egleston Hospital for Children	Atlanta, GA
	Emory University Hospital	Atlanta, GA
	St. Joseph Hospital	Atlanta, GA
	University Hospital	Augusta, GA
	Ochsner Foundation Hospital	New Orleans, LA
	University of Mississippi Medical Center	Jackson, MS
	North Carolina Baptist Hospital	Winston-Salem, NC
North Carolina Memorial Hospital	Chapel Hill, NC	

(continued)

Appendix I
UNOS Member Heart Transplant Hospitals
(As of September 30, 1988)

Region	Institution	Location
	Charlotte Memorial Hospital	Charlotte, NC
	Duke University Hospital	Durham, NC
	Pitt County Memorial Hospital	Greenville, NC
	Medical University of South Carolina	Charleston, SC
	Baptist Memorial Hospital	Memphis, TN
	Le Bonheur Children's Medical Center	Memphis, TN
	Methodist Hospital of Memphis	Memphis, TN
	St. Thomas Hospital	Nashville, TN
	Vanderbilt University	Nashville, TN
IV	Baptist Medical Center of Oklahoma City	Oklahoma City, OK
	St. Anthony Hospital	Oklahoma City, OK
	Medical Center Hospital/University of Texas	San Antonio, TX
	Baylor University Medical Center	Dallas, TX
	Children's Medical Center of Dallas	Dallas, TX
	Methodist Medical Center	Dallas, TX
	St. Paul Medical Center	Dallas, TX
	Seton Medical Center	Austin, TX
	Hermann Hospital	Houston, TX
	St. Luke's Episcopal Hospital ^a	Houston, TX
	The Methodist Hospital/Baylor College of Medicine ^a	Houston, TX
	Humana Hospital of San Antonio	San Antonio, TX
V	Humana Hospital Phoenix	Phoenix, AZ
	University Medical Center/Arizona Health Sciences Center ^a	Tucson, AZ
	Samuel Merritt Hospital	Oakland, CA
	University of California Medical Center at Irvine	Orange, CA
	Loma Linda University Medical Center	Loma Linda, CA
	Pacific Presbyterian Medical Center ^a	San Francisco, CA
	Hoag Memorial Hospital Presbyterian	Newport Beach, CA
	Sutter Memorial Hospital	Sacramento, CA
	Sharp Memorial Hospital	San Diego, CA
	Stanford University Hospital ^a	Stanford, CA
	St. Vincent Medical Center	Los Angeles, CA
	UCLA Medical Center	Los Angeles, CA
	St. Francis Medical Center	Honolulu, HI
	Presbyterian Hospital	Albuquerque, NM
	LDS Hospital ^a	Salt Lake City, UT
	University of Utah Medical Center ^a	Salt Lake City, UT
	Primary Children's Medical Center	Salt Lake City, UT
VI	University Hospital/Oregon Health Sciences University ^a	Portland, OR
	Children's Hospital Medical Center	Seattle, WA
	University of Washington Hospital	Seattle, WA

(continued)

Appendix I
UNOS Member Heart Transplant Hospitals
(As of September 30, 1988)

Region	Institution	Location
	Sacred Heart Medical Center	Spokane, WA
VII	Children's Memorial Hospital	Chicago, IL
	Rush-Presbyterian-St. Luke's Medical Center	Chicago, IL
	University of Chicago Hospitals	Chicago, IL
	University of Illinois Hospital	Chicago, IL
	Evanston Hospital	Evanston, IL
	Foster G. McGaw Hospital/Loyola University Medical Center ^a	Maywood, IL
	St. Francis Medical Center	Peoria, IL
	Abbott Northwestern Hospital	Minneapolis, MN
	University of Minnesota Hospital ^a	Minneapolis, MN
	St. Mary's Hospital	Rochester, MN
	Milwaukee County Medical Complex	Milwaukee, WI
	St. Luke's Hospital	Milwaukee, WI
	University of Wisconsin Hospital	Madison, WI
VIII	A.M.I. St. Luke's Hospital	Denver, CO
	University of Colorado Hospital	Denver, CO
	University of Iowa Hospital & Clinic	Iowa City, IA
	Mercy Hospital Medical Center	Des Moines, IA
	St. Francis Hospital & Medical Center	Topeka, KS
	St. Francis Regional Medical Center	Wichita, KS
	University of Kansas Hospital	Kansas City, KS
	St. Luke's Hospital of Kansas City	Kansas City, MO
	Menorah Medical Center	Kansas City, MO
	Barnes Hospital/Washington University School of Medicine ^a	St. Louis, MO
	Cardinal Glennon Children's Hospital	St. Louis, MO
	Children's Hospital at Washington University Medical Center	St. Louis, MO
	St. Louis University Medical Center ^a	St. Louis, MO
	DePaul Health Center	Bridgeton, MO
	Univ. of Missouri-Columbia Hospital and Clinics	Columbia, MO
	Bryan Memorial Hospital	Lincoln, NE
	Bishop Clarkson Memorial Hospital	Omaha, NE
	University Hospital/University of Nebraska Medical Center	Omaha, NE
IX	Buffalo General Hospital	Buffalo, NY
	VA Medical Center	Buffalo, NY
	Columbia Presbyterian Medical Center	New York, NY
X	Methodist Hospital of Indiana, Inc. ^a	Indianapolis, IN
	Indiana University Hospital	Indianapolis, IN
	St. Vincent Hospital	Indianapolis, IN
	The Lutheran Hospital of Ft. Wayne	Fort Wayne, IN

(continued)

Appendix I
UNOS Member Heart Transplant Hospitals
(As of September 30, 1988)

Region	Institution	Location
	Humana Hospital-Audubon	Louisville, KY
	Jewish Hospital, Inc. ^a	Louisville, KY
	Kosair Children's Hospital	Louisville, KY
	University of Kentucky Medical Center	Lexington, KY
	Henry Ford Hospital ^a	Detroit, MI
	University of Michigan Hospital	Ann Arbor, MI
	Cleveland Clinic Hospital ^a	Cleveland, OH
	University Hospitals of Cleveland	Cleveland, OH
	Children's Hospital Medical Center	Cincinnati, OH
	University of Cincinnati Hospital	Cincinnati, OH
	Medical College of Ohio Hospitals	Toledo, OH
	Ohio State University Hospital	Columbus, OH

^aMedicare-approved heart transplant programs.

Heart Transplant Activity (Fiscal Year 1988)

United Network for Organ Sharing (UNOS) region	Transplant hospitals	Transplants performed	Patients	On waiting list			
				Months			
				Less than 3	3 to less than 6	6 to less than 12	12 or more
I Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont	6	49	14	3	5	3	3
II Delaware, District of Columbia, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia	17	231	166	53	38	52	23
III Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee	25	231	156	69	45	28	14
IV Oklahoma and Texas	12	202	93	53	21	9	10
V Arizona, California, Hawaii, Nevada, New Mexico, and Utah	17	248	107	58	21	24	4
VI Alaska, Idaho, Montana, Oregon, and Washington	4	40	15	10	3	2	0
VII Illinois, Minnesota, North Dakota, South Dakota, and Wisconsin	13	149	112	46	24	29	13
VIII Colorado, Iowa, Kansas, Missouri, Nebraska, and Wyoming	18	130	93	41	28	16	8
IX New York	3	65	55	28	15	10	2
X Indiana, Kentucky, Michigan, and Ohio	16	184	118	50	21	29	18
Total	131	1,529	929	411	221	202	95

Procedures for Distributing Organs

When informed by hospital staff that a potential donor is being treated, organ procurement organizations (OPOS), the focal points for coordinating the distribution of organs, begin the coordination between the donating and receiving hospitals. The potential donor must be brain dead, of acceptable age, have proper organ function, and not have medical conditions or diseases that could adversely affect the recipient. If permission is made for the excision of the donated organs, a suitable recipient is selected, and the organ is transported to the receiving hospital.

All potential organ transplant recipients must be listed on the United Network for Organ Sharing (UNOS) computer system waiting list. In allocating a donor heart, priority is given to patients waiting in the local area (that is, the local OPO service area¹). If a heart is not used locally, the distance of the recipient from the donor hospital is considered in prioritizing the recipient list. First priority will be given to patients within a 500-mile radius. If not used, the area will be extended by 500-mile increments until a recipient is located.

To help provide for the equitable distribution of organs, UNOS has divided the United States into 10 regions. UNOS information on 1,382 donor hearts transplanted during fiscal year 1988 shows that about 58 percent were from the transplanting hospital's local area; about 25 percent were from the same UNOS region; and 14 percent were from outside the region. UNOS could not determine the source of about 3 percent of the donor organs.

¹Defined as a geographical area that, unless it is an entire state, includes at least 2.5 million persons or at least 50 potential organ donors a year.

Recommendation of the Task Force on Organ Transplantation Concerning Volume of Heart Transplants

The National Organ Transplant Act of 1984, which required the Secretary of HHS to establish a Task Force on Organ Transplantation, specified that the task force analyze the diffusion of organ transplantation technology, including an assessment of whether (1) the number of transplant programs is sufficient or excessive and (2) the public has access to transplantation.

The task force, in its 1986 report, cited the need to regulate the diffusion of transplantation technology, especially considering the scarcity of donor organs. Although all members were not in agreement, the majority of the task force accepted the principle that the number of surgical procedures performed is positively associated with outcomes and inversely related to costs. Therefore, the task force recommended that a minimum volume criterion be enforced.

In reaching its recommendation, the task force relied on studies that have shown a relationship, for certain surgical procedures, between the number of procedures performed and outcomes. For example, open-heart surgery has been studied to determine if there is a correlation between volume of services and outcomes. For that procedure, it has been shown that a direct relationship exists between the volume of procedures and mortality; as volume increased, mortality decreased.

Unfortunately, for transplant procedures, little research was available linking volume with patient survival. A 1983 study, conducted for HCFA, on kidney transplantation and dialysis found that there was not a statistically significant relationship between the number of procedures performed and outcomes for transplantation or dialysis. At the request of the task force, the Urban Institute analyzed the relationship between volume, outcomes, and cost, using Medicare's 1979 through 1984 program data on kidney transplants for end-stage renal disease. This study could not conclude that there is a relationship between volume, outcomes, or cost. The task force was unable to identify any studies of heart transplants.

Based on the data for some surgical procedures and the inconclusive evidence for transplantation procedures, the task force took a conservative approach, in the belief that a minimum volume requirement for transplant programs was appropriate. However, the task force stated that as transplantation data are collected and analyzed to determine the relationship of volume to outcomes, the appropriateness of the requirement can be judged.

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