

United States
Organ Transplantation

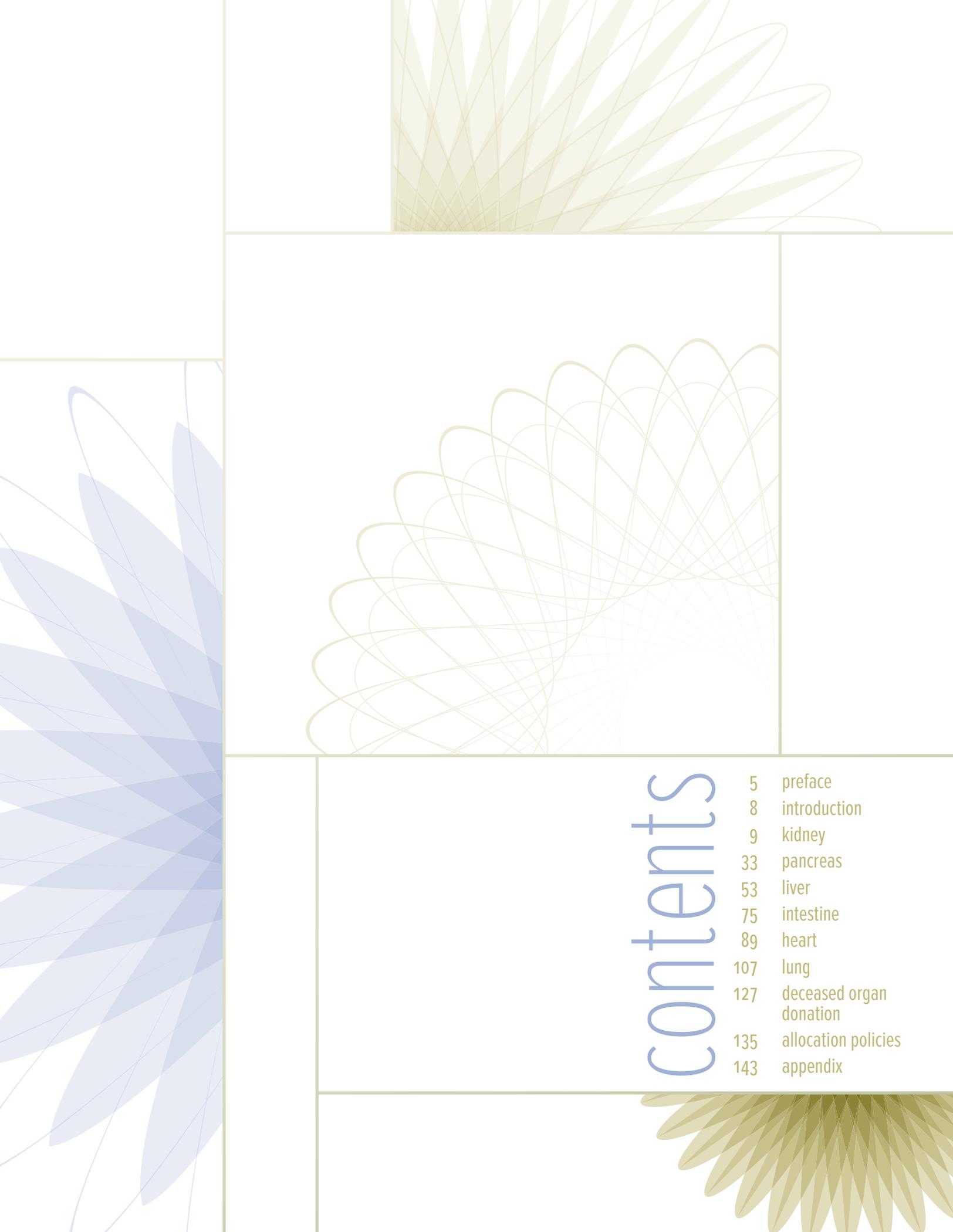
OPTN & SRTR
ANNUAL DATA REPORT
2010

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Figure titles specify adult and pediatric populations; if not listed, figure includes patients of all ages. (For lung data, patients aged 12 and older are grouped with adults.) And unless otherwise indicated, data in all figures are for solitary organ transplants.

Each chapter contains (when relevant to the specific organ) the following sections:

- wait list
- deceased donation
- live donation
- transplant
- donor-recipient matching
- outcomes
- immunosuppression
- pediatric transplant
- center characteristics
- maps of transplant centers

preface

This Annual Report of the Organ Procurement and Transplantation Network (OPTN) and the US Scientific Registry of Transplant Recipients (SRTR) is the 20th such annual report and is based largely on data pertaining to the 12-year period from 1998 to 2009.

This publication was developed for the US Department of Health and Human Services, Health Resources and Services Administration, Healthcare Systems Bureau, Division of Transplantation, by the SRTR contractor, the Minneapolis Medical Research Foundation (MMRF), and the OPTN contractor, the United Network for Organ Sharing (UNOS), under contracts HHS250201000018C and 234-2005-37011C, respectively.

As the SRTR contractor, the MMRF, through its Chronic Disease Research Group (CDRG), determined which data to present, conducted the required analyses, created the figures and tables, drafted the text, and designed the document. As the OPTN contractor, UNOS critiqued the draft report and provided the glossary. This Annual Data Report will be made available at <http://www.srtr.org>. This preface describes the changes from previous reports and also serves as an introduction to the sections that follow.

OVERVIEW AND HIGHLIGHTS

This is the first Annual Data Report to which the current SRTR contractor has contributed. It features a new design and format, consistent with the broader goals of providing information about transplantation in the US that is accessible to patients, caregivers, researchers, and the general public.

This Annual Data Report includes chapters on kidney, pancreas, liver, intestine, heart, and lung transplantation, chapters on deceased donor or-

gan donation and allocation policy, and an appendix. The organ-specific chapters include sections describing the waiting list, deceased donor organ donation, living donor organ donation, transplant, donor-recipient matching, outcomes, immunosuppression, pediatric transplant, and center characteristics. When possible, similar data and formats are used for each chapter and section. However, this is not always possible because some data are not pertinent to all organs. Graphical presentation of the data is emphasized, but the data behind each figure are available on the above-mentioned website in a spreadsheet format. Data tables are also provided on the site.

Milestone dates in the production of this Report: Data were cut: October 2010. Data were analyzed: November 2010 through April 2011. Draft submitted to HRSA: May 2011. Approved by HRSA: September 2011. Posted to website: October 2011. Submitted to the American Journal of Transplantation: October 2011.

DATA REQUESTS TO THE SRTR

Simple data requests can be fulfilled with existing data, do not require additional programming or analyses, can generally be fulfilled quickly (i.e., in less than 4 hours), and do not require a data use agreement (DUA) or payment.

Data requests for a standard analytical file (SAF) or a simulated allocation model (SAM) require a DUA and payment. SRTR offers a student discount for researchers who qualify.

Data requests requiring linkages with other public or private data sources can often be accommodated. To protect the privacy of individuals in the transplant registry, SRTR will perform linkages and analyses that require use of personal identifiers;

SRTR will release the resulting data as summary data or as individual data with encrypted identifiers. In exceptional circumstances, identifiers may be released to other government agencies or to investigators for linkage, but only after authorization by the SRTR Technical Advisory Committee and the SRTR Project Officer at HRSA.

Data requests for additional SRTR programming will be considered depending on available resources and reviewed on a case-by-case basis by SRTR and the SRTR Project Officer at HRSA. Requesters must sign a DUA. An hourly rate will be assessed for time spent on the request; cost to fulfill the request is based solely on the programming time required. Data sets require payment in addition to that for programming time.

WEBSITES

WWW.SRTR.ORG is a public website containing transplant program-specific reports, organ procurement organization (OPO)-specific reports, summary tables, archives of past reports, timelines for future reports, risk-adjustment models, methods, basic references for researchers who use SRTR data files, a link to the Annual Data Report and its supporting documentation and data tables, answers to frequently asked questions, and other information.

HTTPS://SECURESRTR.TRANSPLANT.HRSA.GOV is a secure website that provides access to the pre-release program- and OPO-specific reports, survival spreadsheets, and other useful information. Each transplant program and OPO has its own username and password for access to the site.

HTTP://UNOS.ORG is a public website containing information on donation and transplantation, data collection instruments, data reports, education materials for patients and transplant professionals, policy development, and other information. This website also links to the OPTN website.

HTTP://OPTN.TRANSPLANT.HRSA.GOV is a public website containing news, information, and resources about transplantation and donation, including transplant data reports; policy development; and related boards and committees. It also contains allocation calculators, a calendar of events, answers to frequently asked questions, and other information.

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301-443-3376 (HRSA / Office of Communications)
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612-337-8960 (SRTR)

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Or, provide the URL for the webpage cited and the access date: Organ Procurement and Transplantation Network (OPTN) and Scientific Registry of Transplant Recipients (SRTR). OPTN/SRTR 2010 Annual Data Report. Department of Health and Human Services, Health Resources and Services Administration, Healthcare Systems Bureau, Division of Transplantation; 2011. Available at [insert URL here]. Accessed [insert date here].

Abbreviated citation: OPTN/SRTR 2010 Annual Data Report. HHS/HRSA/HSB/DOT.

PUBLICATIONS BASED ON DATA IN THIS REPORT OR SUPPLIED ON REQUEST MUST INCLUDE A CITATION AND THE FOLLOWING STATEMENT:

The data and analyses reported in the 2010 Annual Data Report of the Organ Procurement and Transplantation Network and the US Scientific Registry of Transplant Recipients have been supplied by the Minneapolis Medical Research Foundation and UNOS under contract with HHS/HRSA. The authors alone are responsible for reporting and interpreting these data; the views expressed herein are those of the authors and not necessarily those of the US Government.

introduction

This Introduction provides a brief overview of transplantation in the United States, emphasizing a few pertinent comparisons between organs.

DECEASED DONOR TRANSPLANT WAITING LISTS

Separate waiting lists are maintained for each deceased donor organ that is allocated for transplant by the Organ Procurement and Transplantation Network (OPTN). Some patients undergo living donor transplant and never appear on a deceased donor waiting list. However, many patients who undergo living donor transplant have also been listed on the deceased donor waiting list. The kidney transplant waiting list has the largest number of patients by far (Figure 1a). On December 31, 2009, 52,503 active patients were wait-listed for kidney transplant, 1,218 for simultaneous pancreas-kidney (SPK) transplant, 432 for pancreas transplant alone (PTA) or pancreas after kidney (PAK) transplant, 12,454 for liver transplant, 148 for intestine transplant, 1,992 for heart transplant, and 1,207 for lung transplant. Some patients are listed for multiple organs and appear on more than one waiting list. Starting in 2011, the pancreas transplant waiting lists are combined into a single list, but this is not reflected in the current Annual Data Report.

The number of patients on the kidney transplant waiting list has steadily increased. In the past decade, the number of active patients on the waiting list has increased almost 2-fold, from 34,120 in 1998 to 52,503 in 2009 (Figure 1a). This number does not include patients listed as inactive, who comprised 34.8% of the total in 2009. Much of the growth in the waiting list can be attributed to new patients being added at a rate greater than the rate of transplants. In the past decade, the number of new patients (active and inactive) added every year to the kidney transplant waiting list increased 65.1%, from 17,588 in 1998 to 29,031 in 2009 (Figure 1b). In 2009, 30.0% of newly listed patients were inactive.

The numbers of patients on waiting lists for SPK and PTA/PAK have declined steadily in the past few years (Figure 1a), and the numbers of new listings have paralleled these declines (Figure 1b). Reasons for this are not entirely clear.

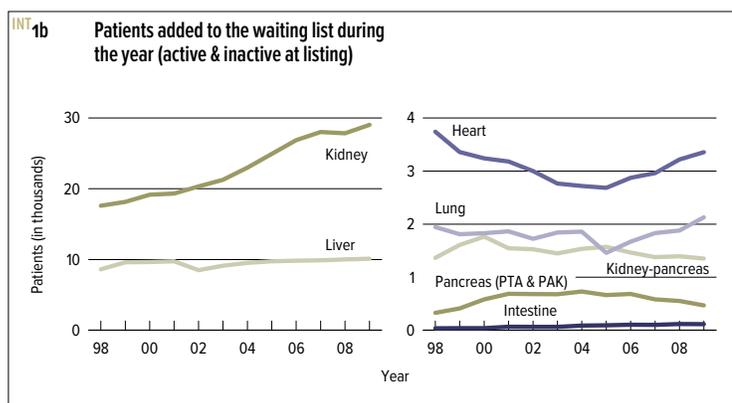
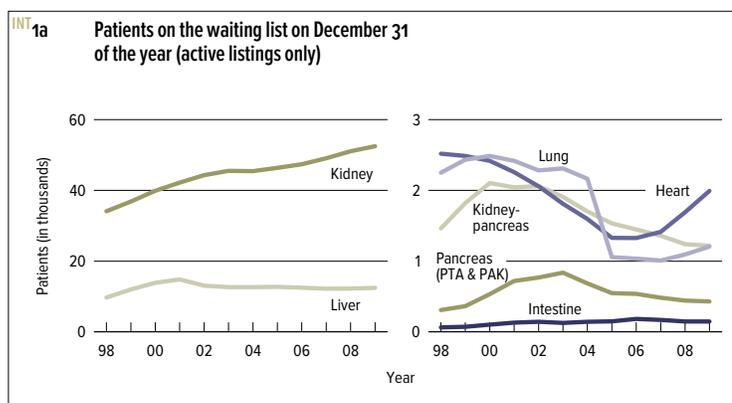
The number of patients on the waiting list for intestinal transplant, albeit small, has steadily grown over the past decade (Figure 1a). This is due

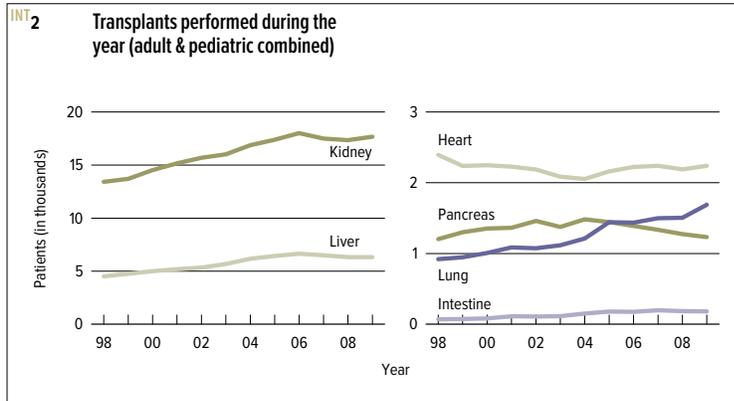
at least in part to growth in the number of new listings (Figure 1b).

The liver transplant waiting list has grown less than the kidney list. However, the number of active patients on the liver transplant waiting list increased 28.4%, from 9,700 in 1998 to 12,454 in 2009 (Figure 1a). The number of new patients (active and inactive) added to the list every year increased 17.5%, from 8,608 in 1998 to 10,115 in 2009 (Figure 1b). The number of patients on the waiting list does not tell the full story if patients who may have benefited from a liver transplant were never listed.

From 1998 to 2006, the number of active patients on the heart transplant waiting list declined 47.3%, but this number increased 50% from 2006 to 2009 (Figure 1a). The decline and increase have been accompanied by parallel changes in new heart transplant listings (Figure 1b).

In 2005, a new allocation system based on the Lung Allocation Score (LAS) was implemented





in an attempt to allow sicker patients to undergo lung transplants more quickly. With implementation of this new system, many patients who would not undergo transplant were removed from the lung transplant waiting list, resulting in a precipitous decline in the number of patients listed (Figure 1a). However, the number of new listings has been relatively stable (Figure 1b).

TRANSPLANTS

The number of kidney transplants (deceased and living donor) peaked at 18,013 in 2006, declined to 17,357 in 2008, and increased again in 2009 to 17,682 (Figure 2). Pancreas transplants increased from 1,204 in 1998 to 1,483 in 2004, but declined to 1,233 in 2009. Liver transplants rose from 4,518 in 1998 to 6,651 in 2006, declined to 6,319 in 2008, and remained at 6,320 in 2009. Intestinal transplants increased more than 2-fold, from 70 in 1998 to 180 in 2009. Heart transplants fell from 2,395 in 1998 to 2,055 in 2004, but gradually increased to 2,241 in 2009. Lung transplants increased 83.7%, from 920 in 1998 to 1,690 in 2009.

OUTCOMES

One-year graft survival (survival with a functioning organ) improved over the past decade for all organ transplants (Figure 3a). One-year kidney graft survival was 92.0% for deceased donor transplants performed in 2008, and 96.5% for living donor transplants; 1-year graft survival rates were similar for pancreas after SPK (86.4%), liver (84.9%), heart (88.6%), and lung (83.1%). However, 1-year graft survival for pancreas after PTA or PAK was only 75.4%, and 1-year graft survival after intestinal transplant in 2008–2009 was 72.2%.

Five-year graft survival was 70.0% for deceased donor kidney transplants in 2004, and 82.5% for living donor transplants (Figure 3b). Five-year pancreas graft survival after SPK was 71.6%. Five-year liver graft survival was 67.1% and heart graft survival, 73.1%. However, 5-year pancreas graft survival after PTA or PAK was only 48.3%. Similarly disappointing was 5-year intestine graft survival of 50.6% (in 2004–2005) and 5-year lung graft survival of 51.6%.

The incidence of acute allograft rejection varies substantially by organ (Figure 4), and is lowest for kidneys. One-year incidence of acute rejection was 11.6% for deceased donor kidneys and 10.0% for living donor kidneys; 24.8% for pancreata after SPK, and 16.6% and 17.9% for pancreata after PAK and PTA, respectively; and 17.5% for livers, 43.1% for intestines, 24.0% for hearts, and 23.8% for lungs.

