Cedars-Sinai is proud to be the **#1** choice for cardiology and cardiac surgery patients.

**Ranked #1** for Cardiology and Cardiac Surgery in California by *U.S. News & World Report*

Find out more
To refer a patient, please call **310-423-3300**.
To schedule a consult, please call **1 800 CEDARS1** (1-800-233-2771).
Please visit our website: [cedars-sinai.org/heart](http://cedars-sinai.org/heart)

---

**Adult Heart Transplant**
- More adult heart transplants than any other U.S. program 2016–2021
- The No. 1 choice for complex heart transplant patients in the U.S. and around the world

**Lung Transplant**
- The leading program for minimally invasive lung transplantation
- More thoracic organ transplants than any other program in California in 2021

**Mechanical Circulatory Support**
- 135 total artificial hearts 2012–2021
- Over 30,000 hours of ECMO care in 2021

**Advanced Heart Failure**
- The best outcomes nationally for patients with advanced heart failure

**Robotic Cardiac Surgery**
- >1,000 robotic mitral repairs with >99% success rates
- The largest robotic cardiac surgery team in the U.S.

**Structural Heart Disease**
- The No. 1 choice for complex and high-risk structural heart disease in the U.S.
- >5,000 TAVR procedures performed to date
- >1,000 MitraClip procedures performed 2017–2021
- >200 transcatheter tricuspid repairs and replacements

**Aortic Disease**
- >3,000 aortic valve replacements and repairs 2011–2021

**Coronary Disease**
- Top outcomes nationally for patients with coronary artery disease
- National leaders in advanced percutaneous, surgical and hybrid coronary revascularization

**Electrophysiology**
- National leaders in cardiac arrest prevention

**Pediatric and Congenital Heart Disease**
- First-in-Man with novel percutaneous pulmonary valve replacement
- The first choice for congenital cardiac care, from conception to advanced age
Dear Colleagues,

It is with considerable pride that we share our annual report for 2022. We are particularly proud that the Smidt Heart Institute takes exceptional care of the patients with the most complex and challenging conditions, which have often been deemed too risky for intervention elsewhere. We don’t always succeed in turning the tide of disease, but we never stop trying. We are here for you and your patients. Please feel free to reach out if we can help, at any time.
**Transformative Research Themes**

**Regenerative Medicine**

**Team Leader:** Eduardo Marbán, MD, PhD  
**Questions:** How can we reverse “inreversible” injury to the heart? Can cells and their products be used to create new biological agents?

**Accomplishments:** Cutting-edge clinical trials of cell therapy in Duchenne muscular dystrophy and in heart failure. Major discovery program for novel RNA-based drugs based on exosome contents.

**Novel Therapies for Cardiac Arrhythmias**

**Team Leaders:** Eugenio Cingolani, MD; Peng-Sheng Chen, MD  
**Questions:** Are there viable alternatives to devices and ablation for heart rhythm disorders?

**Accomplishments:** First biological pacemakers in clinically relevant animal models. Novel nondestructive treatment of refractory ventricular tachycardia by biologics. New approaches to autonomic system modulation.

**Vascular Biology**

**Team Leaders:** Prediman K. Shah, MD; Ali Azizzadeh, MD  
**Questions:** Can atherosclerosis be prevented or reversed? How can we spare major surgery in vasculopathic patients?

**Accomplishments:** Proof of principle for anti-cholesterol vaccine strategy. Proteomics-based discovery of novel pathways mediating vascular injury. Clinical testing of new percutaneous approaches to complex bifurcating lesions.

**Biomarker Discovery and Validation**

**Team Leader:** Jennifer Van Eyk, JPHD  
**Questions:** How can we detect disease before it is clinically apparent?

**Accomplishments:** Bench-to-bedside approach implemented to facilitate biomarker discovery. Use of inflammatory biomarkers to monitor coronary disease progression in large populations.

**COVID-19**

**Team Leader:** Susan Cheng, MD, MPH, MMSc  
**Questions:** What factors predispose to bad outcomes in COVID-19?

**Accomplishments:** First major population-based prospective study, CORALE, used to detect autoimmune responses in COVID-19?

**Healthcare Delivery Optimization**

**Team Leader:** Joseph Ebinger, MD  
**Questions:** How can we produce better clinical outcomes while minimizing resource utilization?

**Accomplishments:** Real-time monitoring of costs and outcomes to enable tests of change in realistic clinical settings.

**Valvular Vascular Disease**

**Team Leader:** Raj Makkar, MD; Joanna Chikwe, MD  
**Questions:** When should we do surgery versus percutaneous intervention? How often are artificial valves plagued by thrombosis?

**Accomplishments:** Leading pivotal trials comparing SAVR vs. TAVR and surgical vs. transcatheter mitral repair. First-in-human studies on tricuspid valve replacement. Discovery of common clinically inapparent thrombolytic repair. First-in-human studies on tricuspid valve placement plagued by thrombus?

**Healthcare Delivery Optimization**

**Team Leader:** Joseph Ebinger, MD  
**Questions:** How can we produce better clinical outcomes while minimizing resource utilization?

**Accomplishments:** Real-time monitoring of costs and outcomes to enable tests of change in realistic clinical settings.

**Imaging**

**Team Leaders:** Daniel Berman, MD; Debiao Li, PhD  
**Questions:** How can we interpret clinical imaging studies optimally? Can we image coronary lesions without dye?

**Accomplishments:** Use of artificial intelligence to read echocardiograms and nuclear studies. Novel pulse protocols to offset MRI cardiac motion artifacts.

---

**Highest-Impact Publications from the Smidt Heart Institute at Cedars-Sinai**

**Nature and Nature Journals**


**Science, Cell, the Lancet, Journal of Clinical Investigation, Proceedings of the National Academy of Science**

Advanced Heart Failure

EXPERTISE
Advanced Heart Failure
Valvular Cardiomyopathy
Implantable Monitors
Amyloidosis
Constrictive Pericarditis
Mechanical Support
Hypertrophic Cardiomyopathy
Non-Compaction
Cardiomyopathy
Gene Therapy
Ischemic Cardiomyopathy
Pulmonary Hypertension
Heart Transplantation
Sarcoidosis
Chemotherapy
Cardiomyopathy
Mechanical Support
Postpartum Cardiomyopathy
Arrhythmogenic RV Dysplasia
Gene Therapy
Myocarditis
Cardiac Tumors
Advanced Outpatient Therapy
Dilated Cardiac Failure
Adult Congenital Heart Disease

MAJOR PROGRAMS
Advanced Heart Failure Program
Director: Michele Hamilton, MD, Vice-Chair of Clinical Affairs, Department of Cardiology, Director of the Heart Failure Program and Professor of Cardiology

Hypertrophic Cardiomyopathy Program
Director: Robert J. Siegel, MD, S. Reed Kinneman, MD Chair in Cardiac Ultrasound, and Professor of Cardiology

Cardiac Amyloid Program
Director: Jignesh K. Patel, MD, PhD, Clinical Professor of Medicine

Pulmonary Hypertension Program
Directors: Antoine Hage, MD; Michael Lewis, MD

Cardio- Oncology Program
Director: C. Noel Barney Merz, MD, Irwin and Sheila Allen Chair in Women’s Heart Research, and Professor of Cardiology

Coronary Care Unit
Director: Bojan Cercek, MD, PhD, Eleanor and Harold Foonberg Chair in Cardiac Intensive Care in honor of Prediman K. Shah, MD, and Professor of Cardiology

Cardiac Surgery Intensive Care Unit
Medical Director: Michael Nunn, MD, Associate Professor of Cardiac Surgery
Surgical Director: Dominic Emerson, MD, Assistant Professor of Cardiac Surgery

Surviving Heart Failure

Nature

New England Journal of Medicine


Journal of the American College of Cardiology

Circulation


SURVIVING HEART FAILURE
Patients with heart failure treated at Cedars-Sinai experience among the best outcomes in the nation,* thanks to an integrated heart team creating unique care plans for over 18,000 patients each year, state-of-the-art diagnostics and therapeutics, and seamless supportive care from hospital to home.

*Source: Hospital Compare. Learn more at cedars-sinai.org/heartfailure

6 Smidt Heart Institute | cedars-sinai.org/heart 7 Smidt Heart Institute | 2022 Annual Report
Heart and Lung Transplant and Mechanical Circulatory Support

EXPERTISE
Heart Transplantation
Lung Transplantation
Minimally Invasive Lung Transplantation
Heart-Kidney Transplantation
Multi-Organ Lung Transplantation
Heart-Liver Transplantation
Heart-Lung Transplantation
Sensitized Transplantation
Advanced Transplant Immunology
Complex and Re-Transplantation
HLA Immunogenetics
Cardiac Biopsy
Organ Circulatory Support Transplantation
Organ Circulatory Support Transplantation
Pulmonary Fibrosis
Next-Generation Ventricular Assist Devices
Emphysema
Total Artificial Heart Program
COVID-19 Acute Respiratory Distress Syndrome
Percutaneous Mechanical Circulatory Support
COVID-19 Pulmonary Fibrosis
Pulmonary Hypertension

MAJOR PROGRAMS
Heart Transplant and Mechanical Circulatory Support Program
Director: Jon A. Kobashigawa, MD, DSL/Thomas D. Gordon Chair in Transplantation Medicine and Professor of Cardiology
Surgical Director: Fardad Esmaillian, MD, Professor of Cardiac Surgery
Medical Directors: Jignesh Patel, MD, PhD, Professor of Medicine
Lawrence Czer, MD, Professor of Medicine

Lung Transplant Program
Surgical Director: Dominick Negra, MD, Assistant Professor of Cardiac Surgery
Medical Director: Reinaldo Rampillo, MD, Associate Professor of Medicine

New England Journal of Medicine

The Lancet

Circulation

Journal of the American College of Cardiology

Journal of Heart and Lung Transplantation

American Journal of Transplantation

602
157
135
heart transplants performed at Cedars-Sinai 2017–2021
More adult heart transplants than any other U.S. program
thoracic organ transplants performed in FY2021
The No. 1 choice for less invasive lung transplant
Total artificial hearts implanted at Cedars-Sinai 2012–2021
144 days: longest successful ECMO support at Cedars-Sinai

Highest-Impact Publications from the Smidt Heart Institute at Cedars-Sinai

9
Smidt Heart Institute | 2022 Annual Report

8 Smidt Heart Institute | cedars-sinai.org/heart
Transcatheter Tricuspid Repair

Mitral and Tricuspid Valve

**EXPERTISE**
- Robotic Mitral Repair
- Transcatheter Mitral Repair
- Mitral Valve Prolapse
- Barlow’s Mitral Repair
- Transcatheter Mitral Replacement
- Mitral Valve Endocarditis
- Redo-Mitral Repair
- Transcatheter Tricuspid Repair
- Mitral Annular Calcification
- Tricuspid Repair
- Transcatheter Tricuspid Replacement
- Tricuspid Regurgitation
- Atrial Ablation
- Left Atrial Appendage Closure
- Valvular Carcinoid

**MAJOR PROGRAMS**
**Department of Cardiac Surgery**
Chair: Joanna Chikwe, MD, Irina and George Schaeffer Distinguished Chair in Cardiac Surgery in honor of Alfredo Trento, and Professor of Cardiac Surgery
Director Emeritus: Alfredo Trento, MD, Estelle, Abe and Marjorie Sanders Chair in Cardiac Surgery and Professor of Cardiac Surgery

**Cardiac Interventional Services**
Director: Raj Makkar, MD, Stephen R. Corday, MD Chair in Interventional Cardiology, Vice President of Cardiovascular Innovation and Intervention and Professor of Cardiology

**Robotic Cardiac Surgery Program**
Director: Danny Ramsay, MD, Associate Professor of Cardiac Surgery

**MITRAL VALVE REPAIR**
>1,000 robotic mitral repairs with >99% success rates
Highest national STS 3-star ratings for mitral surgery quality 2017–2021

**TRANSCATHETER VALVE REPAIR**
1,033 MitraClips performed 2017–2021
>200 transcatheter tricuspid repairs and replacements

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**Highest-Impact Publications**
from the Smidt Heart Institute at Cedars-Sinai

**New England Journal of Medicine**

**The Lancet**

**European Heart Journal**
- Yoon SH, Whisenant BK, et al; Chakravarty T, Makkar RR; Concomitant Mitral Annular Calcification and Severe Aortic Stenosis: Prevalence, Characteristics and Outcomes Following Transcatheter Aortic Valve Replacement. Eur Heart J 2017; 38: 1194–1203

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**Journal of the American College of Cardiology**

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**JAMA Cardiology**
Aortic Valve

EXPERTISE
Aortic Valve Repair
TAVR
Ross Procedure
Valve-in-Valve TAVR
Valve-Sparing Root Replacement
Bicuspid Aortic Valve
Minimally Invasive Aortic Replacement
Aortic Insufficiency
Redo-Aortic Valve and Root Reconstruction

MAJOR PROGRAMS
Cardiac Interventional Services
Director: Raj Makkar, MD, Stephen R. Corday, MD Chair in Interventional Cardiology, Vice President of Cardiovascular Innovation and Intervention and Professor of Cardiology
Aortic Surgery Program
Director: Pedro Catarino, MD, Professor of Cardiac Surgery

TRANSCATHETER AORTIC VALVE REPLACEMENT
3,000 TAVRs FY2017–2021

AORTIC VALVE SURGERY
>3,000 aortic valve replacements and repairs 2011–2021

>5,000 TAVRs performed to date

RESEARCH
TAVR for Bicuspid aortic stenosis

WATCH:
Director of Aortic Surgery Pedro Catarino, MD

Highest-Impact Publications from the Smidt Heart Institute at Cedars-Sinai

2021

New England Journal of Medicine


Journal of the American College of Cardiology


JAMA


Journal of the American College of Cardiology


JAMA


Journal of the American College of Cardiology

Coronary Disease

**EXPERTISE**
Complex and High-Risk PCI
Total Arterial Revascularization
Chronic Total Occlusions
Multi-Arterial Revascularization
Brachytherapy
Off-Pump and Hybrid Coronary Bypass
Rotational Atherectomy
Robotic Coronary Artery Bypass
Intravascular Ultrasound
Redo-Coronary Artery Bypass Surgery
Primary Revascularization
High-Risk Coronary Artery Bypass Surgery
Coronary CT Angiography

**SURVIVING MYOCARDIAL INFARCTION**

*Source: Hospital Compare.*

418 Patients with acute myocardial infarction treated at Cedars-Sinai experience among the best outcomes in the nation* thanks to an integrated heart team with specific expertise in all aspects of ischemic heart disease and coronary revascularization, and seamless supportive care from hospital to home.

150 high-risk percutaneous coronary interventions performed with Impella support

100 robotic minimally invasive coronary bypass operations

**MAJOR PROGRAMS**
Atherosclerosis and Prevention
Director: Prediman K. Shah, MD, Shappell and Webb Family Chair in Clinical Cardiology.
Director of the Oppenheimer Atherosclerosis Research Center, Professor of Medicine

Coronary Care Unit
Director: Bojan Cerkez, MD, PhD, Eleanor and Harold Foonberg Chair in Cardiovascular Intensive Care in honor of Prediman K. Shah, MD, and Professor of Cardiology

Cardiac Interventional Services
Director: Raj Makkar, MD, Stephen R. Corday, MD Chair in Interventional Cardiology, Vice President of Cardiovascular Innovation and Intervention and Professor of Cardiology

Department of Cardiac Surgery
Chair: Joanna Chikwe, MD, Irma and George Schaeffer Distinguished Chair in Cardiovascular Surgery in honor of Alfredo Trento, MD, and Professor of Cardiac Surgery
Director Emeritus: Alfredo Trento, MD, Estelle, Abe and Marjorie Sanders Chair in Cardiac Surgery and Professor of Cardiac Surgery

**Highest-Impact Publications from the Smidt Heart Institute at Cedars-Sinai**

**Nature Journals**

**New England Journal of Medicine**

**Circulation**

**Journal of the American College of Cardiology**

**Circulation**
Aortic and Vascular Surgery

MAJOR PROGRAMS
Clinic for Hypertrophic Cardiomyopathy and Aortopathies
Director: Robert J. Siegel, MD, S. Rexford Kennamer, MD
Chair in Cardiac Ultrasound, Professor of Cardiology
Aortic Surgery Program
Co-Directors: Pedro Catarino, MD, Professor of Cardiac Surgery
Ali Azizzadeh, MD, Professor of Surgery
Division of Vascular Surgery
Division of Urology, Vice Chair Department of Surgery, Associate Director for Vascular Therapeutics, and Professor of Surgery

EXPERTISE
Ascending Aorta Replacement
Descenting Aorta Replacement
Aortic Surveillanace
Frozen Elephant Trunk
Aortic Dissection
Marfan and Loeys-Dietz Syndromes
Aortic Aneurysm

Electrophysiology

MAJOR PROGRAMS
Center for Cardiac Arrest Prevention
Director: Sumeet Chugh, MD
Pauline and Harold Price Chair in Cardiac Electrophysiology Research, Section Chief of Clinical Electrophysiology, Professor of Cardiology, and President of the Cardiac Electrophysiology Society 2020–2021
Atrial Fibrillation Prevention
Director: Christine M. Albert, MD, MPH, Lee and Harold Kapelovitz Distinguished Chair in Cardiology, Professor of Cardiology and President 2020–2021, Heart Rhythm Society
Interventional Electrophysiology
Director: Michael Shehata, MD, Associate Professor of Cardiology
Device Lead Extraction
Director: Raymond Schaar, MD, Associate Professor of Cardiac Surgery

EXPERTISE
Catheter Ablation
Hybrid Surgical Ablation
Electrical Device Implantation, including Leadless Pacemaker Lead Extraction
Left Atrial Appendage Occlusion
Familial Arrhythmia Syndromes
Long QT Syndrome
Arrhythmogenic RV Dysplasia
Brugada Syndrome
Hypertrophic Cardiomyopathy
Other Familial Syndromes

Highest-Impact Publications

New England Journal of Medicine

Circulation

JAMA


Cardiovascular Outcomes

Highest-Impact Publications

New England Journal of Medicine

JAMA
- Albert CM, Cook NR, Pister J, et al. Effect of Marine Omega-3 Fatty Acid and Vitamin D Supplementation of Incident Atrial Fibrillation: A Randomized Clinical Trial JAMA 2021; 325: 1061-1073
- Albert CM, Bhatt DL, Catheter ablation for Atrial Fibrillation: Lessons learned from CABANA. JAMA 2019; 321: 1295-1297

European Heart Journal

Circulation

Journal of the American College of Cardiology

Circulation Research
Women's Heart

MAJOR PROGRAMS
The Barbra Streisand Women’s Heart Center
Director: C. Noel Bairey Merz, MD
Irwin and Sheila Alper Chair in Women’s Heart Research and Professor of Cardiology

Basic Science Research
Director: Jennifer Van Eyk, PhD, Erika J. Glazer Chair in Women’s Heart Health, Director of Advanced Clinical Biosystems in the Department of Biomedical Sciences and Professor of Cardiology

Public Health Research
Director: Susan Cheng, MD, MPH, MMSc, Erika J. Glazer Chair in Women's Cardiovascular Health and Population Science, Director of Cardiovascular Population Sciences and Professor of Cardiology

Women's Hormone and Menopause Program
Director: Chrissandra Shuffett, MD, MS, Anita Dann Friedman Endowed Chair in Women’s Cardiovascular Medicine and Research and Professor of Medicine

EXPERTISE
Personalized Risk Assessment and Evaluation
Arhythmia Diagnosis
Cardio-Oncology
Cardiovascular Diagnostic Intervention
Post-Partum Health Program
Cardiol Intima Media
Thickness Scan
Women’s Hormone and Menopause Program
Coronary Calcium Scan
Risk Management in Women’s Health
Coronary Reactivity Testing
Exercise Stress Testing
Enhanced External Counter Pulsation (EECP)
Endothelial Function Testing

Highest-Impact Publications

The Lancet

JAMA
- Wei J, Cheng S, Bairey Merz CN. Coronary microvascular Dysfunction Causing Cardiac Ischemia in Women. JAMA 2019; 322: 2358
- Bairey Merz CN. Testing for Coronary Microvascular Dysfunction. JAMA 2019; 322: 2358

European Heart Journal
- Löschner TF, Miller VH, Bairey Merz CN, Ora F. Diversity is richness: why data reporting according to sex, age, and ethnicity matters. Eur Heart J. 2020 Sep 14(19):3117-3121.

Journal of the American College of Cardiology

Circulation

Congenital Heart Disease

MAJOR PROGRAMS
The Gwinn Family Congenital Heart Program
Director: Evan Zahn MD, Professor of Cardiology
Congenital Heart Surgery Program
Director: Richard Kim MD, Professor of Cardiovascular Surgery

EXPERTISE
Atrial and Ventricular Septal Defect
Adult Congenital Heart Disease
Coarctation of the Aorta
Pediatric Congenital Heart Disease
Double Outer Right Ventricle
Pregnancy with Congenital Heart Disease
Hypoplastic Left Heart Syndrome
Fetal Cardiac Evaluation and Diagnosis
Percutaneous Closure of the Patent Ductus Arteriosus
Genetic Testing and Counselling
Fontan Procedure
Transposition of the Great Arteries
Grafting
Tricuspid Anusus
Double Switch Repair
Aortic Stenosis and Bicuspid Aortic Disease
Atrial Septal Defect Closure
Ebstein Anomaly
Venricular Septal Defect Closure
Mitril Regurgitation
Norwood Procedure
Anomalous Pulmonary Venous Drainage
Percutaneous intervention
Pulmonary Atresia and Stenosis
ECMO
Tricuspid Atria and Regurgitation

#1 for maternal and obstetric care in Los Angeles
First-in-man with novel pulmonary valve replacement

Highest-Impact Publications


No. 1

* in the Western U.S. for Cardiology and Heart Surgery by U.S. News & World Report

* in expertise for percutaneous valve procedures in the nation

* in the nation for adult heart transplants 2016–2021
## Cardiac Interventions

<table>
<thead>
<tr>
<th>Invasive Cardiac Procedures</th>
<th>FY18–21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary Angiography</td>
<td>24,616</td>
</tr>
<tr>
<td>Percutaneous Intervention (PCI)</td>
<td>8,022</td>
</tr>
<tr>
<td>Transcatheter Valve Replacements</td>
<td></td>
</tr>
<tr>
<td>Aortic (TAVR)</td>
<td>2,421</td>
</tr>
<tr>
<td>Mitral (TMVR)</td>
<td>103</td>
</tr>
<tr>
<td>Tricuspid (TTVR)</td>
<td>48</td>
</tr>
<tr>
<td>Pulmonary (TPVR)</td>
<td>47</td>
</tr>
<tr>
<td>Re-Do TAVR (valve-in-valve)</td>
<td>140</td>
</tr>
<tr>
<td>MitraClip</td>
<td>834</td>
</tr>
<tr>
<td>Tricuspid Clip</td>
<td>171</td>
</tr>
<tr>
<td>Valvuloplasty</td>
<td></td>
</tr>
<tr>
<td>Aortic</td>
<td>27</td>
</tr>
<tr>
<td>Mitral</td>
<td>24</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>7</td>
</tr>
<tr>
<td>Carotid Angiography/Carotid Stent</td>
<td>68</td>
</tr>
<tr>
<td>Endomyocardial Biopsy</td>
<td>4,259</td>
</tr>
<tr>
<td>Intracoronary Stem Cell Injection/Therapy</td>
<td>44</td>
</tr>
<tr>
<td>Intravascular Ultrasound</td>
<td>2,768</td>
</tr>
<tr>
<td>Coronary Reactivity Testing</td>
<td>101</td>
</tr>
<tr>
<td>Percutaneous Alcohol Septal Ablation for Hypertrophic Cardiomyopathy</td>
<td>77</td>
</tr>
<tr>
<td>Percutaneous Closure of Paravalvular Leak</td>
<td>77</td>
</tr>
<tr>
<td>Percutaneous Closure of Septal Defects</td>
<td></td>
</tr>
<tr>
<td>Atrial Septal Defect (ASD)</td>
<td>89</td>
</tr>
<tr>
<td>Patent Foramen Ovale (PFO)</td>
<td>208</td>
</tr>
<tr>
<td>Ventricular Septal Defect (VSD)</td>
<td>18</td>
</tr>
<tr>
<td>Percutaneous closure of Patent Ductus Arteriosus</td>
<td>36</td>
</tr>
<tr>
<td>Percutaneous Left Ventricular Assist Devices</td>
<td>268</td>
</tr>
<tr>
<td>Percutaneous Closure of Left Atrial Appendage Occlusion</td>
<td>511</td>
</tr>
<tr>
<td>Electrophysiology Studies</td>
<td>2,428</td>
</tr>
<tr>
<td>Catheter Ablation Procedures</td>
<td>2,338</td>
</tr>
<tr>
<td>Cardiac Electronic Implantable Device (CIED) Implantations</td>
<td>3,167</td>
</tr>
<tr>
<td>Leadless Pacemaker Implantations</td>
<td>327</td>
</tr>
</tbody>
</table>

## Cardiac Surgery

<table>
<thead>
<tr>
<th>Operations</th>
<th>FY17–21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart and Lung Transplantation, and Mechanical Circulatory Support</td>
<td></td>
</tr>
<tr>
<td>Heart Transplants (single and multi-organ)</td>
<td>602</td>
</tr>
<tr>
<td>Lung Transplants (single and double)</td>
<td>131</td>
</tr>
<tr>
<td>Ventricular Assist Devices and Total Artificial Hearts</td>
<td>427</td>
</tr>
<tr>
<td>Extracorporeal Membrane Oxygenation</td>
<td>378</td>
</tr>
<tr>
<td>Robotic Cardiac Surgery</td>
<td></td>
</tr>
<tr>
<td>Mitral Valve Repair</td>
<td>486</td>
</tr>
<tr>
<td>Coronary Revascularization (stand-alone and hybrid)</td>
<td>145</td>
</tr>
<tr>
<td>Valvular Heart Surgery</td>
<td></td>
</tr>
<tr>
<td>Mitral Valve Reconstruction (repair and replacements)</td>
<td>1,018</td>
</tr>
<tr>
<td>Aortic Valve Reconstruction (repair, valve sparing and replacements)</td>
<td>1,114</td>
</tr>
<tr>
<td>TAVR</td>
<td>3,000</td>
</tr>
<tr>
<td>Aorta, Coronary and Other Cardiac Surgery</td>
<td></td>
</tr>
<tr>
<td>Thoracic Aortic Open and Endovascular Surgery</td>
<td>822</td>
</tr>
<tr>
<td>Coronary Revascularization</td>
<td>1,201</td>
</tr>
<tr>
<td>Surgical Endocardial Ablation (concomitant and stand-alone)</td>
<td>948</td>
</tr>
<tr>
<td>Other (congenital, septal myectomy, pericardiectomy)</td>
<td>199</td>
</tr>
</tbody>
</table>

>1,000

robotic mitral repairs performed to date, with >99% repair rate
Peer-Reviewed Articles FY12-FY21

<table>
<thead>
<tr>
<th>Year</th>
<th>Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY12</td>
<td>263</td>
</tr>
<tr>
<td>FY13</td>
<td>553</td>
</tr>
<tr>
<td>FY14</td>
<td>829</td>
</tr>
<tr>
<td>FY15</td>
<td>1,337</td>
</tr>
<tr>
<td>FY16</td>
<td>1,794</td>
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<tr>
<td>FY17</td>
<td>2,261</td>
</tr>
<tr>
<td>FY18</td>
<td>2,732</td>
</tr>
<tr>
<td>FY19</td>
<td>3,120</td>
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<tr>
<td>FY20</td>
<td>3,545</td>
</tr>
<tr>
<td>FY21</td>
<td>4,014</td>
</tr>
</tbody>
</table>

Research Funding FY12-FY21

<table>
<thead>
<tr>
<th>Year</th>
<th>Funding (in $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY12</td>
<td>$18,504,544</td>
</tr>
<tr>
<td>FY13</td>
<td>$18,494,118</td>
</tr>
<tr>
<td>FY14</td>
<td>$18,382,574</td>
</tr>
<tr>
<td>FY15</td>
<td>$28,560,985</td>
</tr>
<tr>
<td>FY16</td>
<td>$28,583,016</td>
</tr>
<tr>
<td>FY17</td>
<td>$31,094,628</td>
</tr>
<tr>
<td>FY18</td>
<td>$33,796,380</td>
</tr>
<tr>
<td>FY19</td>
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Intellectual Property

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ENDOWED CHAIRS

Eduardo Marbán, MD, PhD
Mark Siegel Family Foundation Distinguished Chair and Executive Director of the Smidt Heart Institute

Jon A. Kobashigawa, MD
DSDL/Thomas D. Gordon Chair in Heart Transplantation Medicine
Director, Heart Transplant Program
Professor of Cardiology

Raj Makkar, MD
Stephen R. Corday, MD, Chair in Interventional Cardiology
Vice President, Cardiovascular Innovation and Intervention
Executive Director, Cardiac Interventional Services

C. Noël Bairey Merz, MD
Irwin and Sheila Allen Chair in Women’s Heart Research
Director, Barbra Streisand Women’s Heart Center
Professor of Cardiology

Sumeet Chugh, MD
Pauline and Harold Price Chair in Cardiac Electrophysiology Research Division Chief, Clinical Electrophysiology
Director, Center for Cardiac Arrest Prevention

Alfredo Trento, MD
Estelle, Abe and Marjorie Sanders Chair in Cardiac Surgery
Director Emeritus, Cardiothoracic Surgery
Professor of Cardiology

Christine M. Albert, MD, MPH
Lee and Harold Kapelvisz Distinguished Chair in Cardiology
Chair, Department of Cardiology

Robert J. Siegel, MD
S. Rexford Kennamer Chair in Cardiac Ultrasound
Medical Director, Clinic for Hypertrophic Cardiomyopathy and Arrhythmias
Professor of Cardiology

Chrisandra Shufelt, MD, MS
Anita Dann Friedman Chair in Women’s Cardiovascular Medicine and Research
Director, Women’s Hormone and Menopause Program
Co-Director of Preventive and Rehabilitative Cardiac Center
Associate Director, Barbra Streisand Women’s Heart Center
Professor of Cardiology

Peng-Sheng Chen, MD
Burns and Allen Chair in Cardiology Research
Professor of Cardiology

Joshua Goldhaber, MD
Dorothy and E. Philip Lyon Chair in Laser Research
Associate Director, CIU
Director of Cardiology Fellowship Training
Director of the Division of Applied Cell Biology & Physiology
Professor of Cardiology

Roberta Gottlieb, MD
Dorothy and E. Philip Lyon Chair in Molecular Cardiology
Professor of Cardiology

Joanna Chikwe, MD
Inna and George Schaiffer Distinguished Chair in Cardiac Surgery in honor of Alfredo Trento, MD
Chair, Department of Cardiology

Bojan Cercek, MD, PhD
Eleanor and Harold Foongberg Chair in Cardiac Intensive Care
(in honor of Prediman K. Shah, MD, FACC, FACP, FCCP)
Director, Coronary Care Unit
Co-Director, Atherosclerosis Research Center
Professor of Cardiology

Susan Cheng, MD, MPH, MMSc
Erika J. Glazer Chair in Women’s Cardiovascular Health and Population Science
Director, Public Health Research
Cardiovascular Population Sciences in the Barbra Streisand Women’s Heart Center
Associate Professor of Cardiology

Jennifer Van Eyk, PhD
Erika J. Glazer Chair in Women’s Heart Health
Director, Advanced Clinical Biosystems Institute in the Department of Biomedical Sciences
Director, Basic Science Research in the Women’s Heart Center
Professor, Medicine
Professor, Medical Sciences

Prediman K. Shah, MD
Shapell and Webb Family Chair in Clinical Cardiology
Director of Atherosclerosis Prevention and Management Center
Professor of Cardiology

1,165 donors supported the Smidt Heart Institute in FY21

Intellectual Property FY12-FY21

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Research Funding FY12-FY21

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Contact Us

If you have a patient you would like to refer to one of our programs, please contact us at 310-423-3300 or visit cedars-sinai.org/heart. Our physicians will work with you to understand the unique needs of your patient and develop the best treatment plan, and will be available for additional consultations and procedures as needed.

Aortic Disease
310-423-3851
The Aortic program is an inter-disciplinary team that detects and treats the full range of diseases that affect the artery and provides access to groundbreaking surgical techniques and leading-edge clinical trials.

Barbra Streisand Women’s Heart Center
310-423-9680
The Barbra Streisand Women’s Heart Center plays a leading role in identifying female-pattern heart disease, developing diagnostic tools and advancing specialized care for women.

California Heart Center
310-248-8300
The center, affiliated with the Cedars-Sinai Smidt Heart Institute, offers the full spectrum of cardiology care, including cardiac evaluation, heart failure management, interventional cardiology, nuclear cardiology, echocardiography and hypertension management.

Cardio-Oncology
310-423-2726
Cardiologists diagnose and treat heart disease in patients who are undergoing cancer treatment or who are cancer survivors.

Cardiogenetics
310-423-2726
The Cardiogenetics program provides a multidisciplinary approach for the treatment of patients and families afflicted with familial cardiac conditions. Patients are evaluated by a cardiologist who specializes in these conditions, together with a genetic counselor, to help clarify the patient’s diagnosis, create a personalized management of care plan based on genetic test results and provide a risk assessment for other family members afflicted with these conditions.

Cardiovascular Surgery
310-423-3851
Our cardiac surgeons are national leaders in robotic, minimally invasive and complex cardiac surgery.

Congenital Heart Program
310-423-1153
The Congenital Heart program offers state-of-the-art treatment for congenital heart patients from birth through their entire adult life.

Electrophysiology
310-248-6679
The Clinical Electrophysiology program provides state-of-the-art technology in patients with abnormal heart rhythms (cardiac arrhythmias and atrial fibrillation).

General & Preventive Cardiology
310-423-2726
The General and Preventive Cardiology program provides patients access to medical professionals nationally recognized for their skills in the detection, prevention and treatment of heart disease.

Heart Failure and Cardiomyopathy
310-423-2077
As the anchor of the Advanced Heart Disease program at the Smidt Heart Institute, the specialized Heart Failure program provides a comprehensive assessment and treatment plan for people with congestive heart failure and all types of heart muscle disease (cardiomyopathy).

Heart Transplant
310-423-5460
For the past several years, Cedars-Sinai has led the nation in the number of adult heart transplants completed. The program offers advanced options in cardiac support devices, surgical techniques and anti-rejection technologies.

Hypertension
310-423-2726
The Hypertension program takes a multispecialty approach to the evaluation and management of patients with complex hypertension. The program has been identified by the American Society of Hypertension as a certified Hypertension Center of Excellence.

Interventional Cardiology
310-423-3977
The Interventional Cardiology program uses innovative nonsurgical techniques for treating coronary and valvular heart disease.

Lipid Disorders
310-423-2726
Cardiologists provide a full range of diagnostics and treatments for patients with cholesterol and triglyceride disorders.

Mechanical Circulatory Support
310-423-7338
The program provides complete care for patients with heart failure. Mechanical devices that help the heart pump blood can save the lives of patients awaiting a transplant. For others, they are a permanent treatment.

Preventive and Rehabilitative Cardiac Center
310-423-9660
The center gives cardiology patients tools to improve their health and fitness. Services include monitored exercise programs, nutrition advice and stress management.

Regenerative Medicine
310-423-1231
The Regenerative Medicine program is composed of a multidisciplinary team of physicians and allied health professionals who provide the largest worldwide experience in cardiac stem cell therapy, including more than 10 different cell types and methods of delivery.

Valvular Heart Disease
Interventional: 310-423-3977
Surgical: 310-423-3851
The valve team, comprised of highly specialized interventional cardiologists and cardiac surgeons, is at the forefront of providing novel, minimally invasive procedures to repair and replace heart valves. We offer a full spectrum of innovative procedures, ranging from completely percutaneous approaches to minimally invasive and traditional open-heart surgery. Treatment plans are individually tailored to the patient’s condition to ensure the best possible outcome.

Vascular Surgery
310-423-5400
The Vascular Surgery program provides expert diagnosis and management of all arterial and venous disorders and offers a full spectrum of advanced open, endovascular and hybrid procedures.