In 2011, Cleveland Clinic surgeons performed 2,816 valve surgeries. This includes 2,030 primary operations and 786 reoperations. Cleveland Clinic continues to be the leader in the number of valve surgeries performed in the United States.

### Distribution of Isolated and Combined Valve Operations (N = 2,816)

**2011**

- **29.5%** Isolated Primary Valve Surgeries (N = 831)
- **42.5%** Combined Primary Valve Surgeries (N = 1,199)
- **11.3%** Isolated Valve Reoperations (N = 317)
- **16.7%** Combined Valve Reoperations (N = 469)

The majority of valve operations performed at Cleveland Clinic in 2011 were combined primary procedures. However, reoperations accounted for 28 percent of all valve surgeries. These procedures are typically more complex and challenging than primary procedures.
Cleveland Clinic recently received The Society of Thoracic Surgeons’ (STS) prestigious three-star rating for aortic valve replacement. The rating is awarded to hospitals across the country that demonstrate the highest quality of cardiac surgery. Cleveland Clinic was awarded the rating based on data comparisons from January 2009 through December 2011.

Cleveland Clinic performs the largest number of aortic valve operations in the nation. In 2011, we performed 1,739 aortic valve operations. Ninety-one percent were valve replacements (N = 1,553), 5 percent were valve repairs (N = 101) and 4 percent were valve-sparing operations (N = 85).

The hospital mortality rate at Cleveland Clinic for patients who had an isolated aortic valve replacement in 2011 was 0.6 percent. This is significantly lower than The Society of Thoracic Surgeons’ (STS) benchmark of 3.5 percent. Hospital mortality rates for all other aortic valve replacement procedures were also lower than the STS benchmark.

Patients who had isolated aortic valve replacement surgery at Cleveland Clinic in 2011 had fewer complications than expected, according to The Society of Thoracic Surgeons’ (STS) benchmarks.

Cleveland Clinic is the nation’s leader in mitral valve surgery volume. Our surgeons performed 1,286 mitral valve surgeries in 2011. A total of 870 (68%) were repairs and 416 (32%) were replacements.
Mitral Valve Surgery Volume – Repair vs. Replacement
2007 – 2011

Cleveland Clinic surgeons performed mitral valve repairs before it was the preferred treatment for patients with mitral valve disease. Valve repair, rather than replacement, is associated with better survival, improved lifestyle, better preservation of heart function, and lower risk of stroke and infection (endocarditis), and there is no need for anticoagulation therapy. The majority of mitral valve repairs at Cleveland Clinic are performed using a minimally invasive approach.

Primary Isolated Mitral Valve Surgery Hospital Mortality*
2011

In 2011, Cleveland Clinic had the country’s lowest mortality rate (0%) for primary isolated mitral valve repair. The mortality rate for patients who had a primary isolated mitral valve replacement was also well below The Society of Thoracic Surgeons’ (STS) benchmark.

Infective endocarditis is a life-threatening disease. It causes bacterial or fungal growths on the heart valves that can lead to perforation, rupture and subsequent valve regurgitation. Prompt diagnosis and treatment are critical. Cleveland Clinic surgeons treat a variety of patients with infective endocarditis, including those with advanced disease and prosthetic valve endocarditis.

Surgical Treatment of Infective Endocarditis

Infective endocarditis is a life-threatening disease. It causes bacterial or fungal growths on the heart valves that can lead to perforation, rupture and subsequent valve regurgitation. Prompt diagnosis and treatment are critical. Cleveland Clinic surgeons treat a variety of patients with infective endocarditis, including those with advanced disease and prosthetic valve endocarditis.

Volume and Hospital Mortality (N = 128)

In 2011, we performed 128 surgical procedures to treat infective endocarditis and maintained low mortality rates.
Many Cleveland Clinic patients with mitral valve stenosis are treated with percutaneous mitral valvuloplasty. The mortality rate is consistently 0 percent with this procedure, and patients experience a shorter recovery than those who have traditional surgery.

Robotically Assisted Valve Surgery (N = 160)

Cleveland Clinic performs more robotically assisted mitral valve surgeries than any major academic hospital in the United States.

Robotically Assisted Mitral Valve Repair Volume
2007 – 2011

Cleveland Clinic surgeons performed 160 robotically assisted mitral valve repairs in 2011.
Valve Surgery Mortality

2011

Percent

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Observed Mortality (%)</th>
<th>Expected Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated AVR</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>AVR + CABG</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Isolated MVR</td>
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<td>0%</td>
</tr>
<tr>
<td>MVR + CABG</td>
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<tr>
<td>Isolated MV Repair</td>
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</tr>
<tr>
<td>MV Repair + CABG</td>
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<td>0%</td>
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</tbody>
</table>

Cleveland Clinic is the nation's leader in valve surgery volume and quality. Compared with comparable hospitals, mortality rates for valve surgery are far lower.

Source: University HealthSystem Consortium (UHC) Comparative Database, January through November 2011 discharges.

Abbreviations: AVR, aortic valve replacement; CABG, coronary artery bypass grafting; MV, mitral valve; MVR, mitral valve replacement.

Percutaneous Valve Treatments

Cleveland Clinic remains dedicated to developing and using the best possible percutaneous methods to treat patients with valve disease. We are a national leader in these types of procedures.

Transcatheter Aortic Valve Replacement Volume and 30-Day Mortality

2007 – 2011

In 2011, Cleveland Clinic performed 105 percutaneous aortic valve replacements. The procedure, also referred to as transcatheter aortic valve replacement (TAVR), is FDA-approved to treat patients who meet specific criteria. Cleveland Clinic continues to participate in the Placement of Aortic Transcatheter Valves (PARTNER) trial to assess use of this procedure to treat other patient populations.

Sources:
Cleveland Clinic is currently recruiting patients for the second arm of the Placement of Aortic Transcatheter Valves (PARTNER II) trial. This phase involves a randomized study of patients who have a moderately high risk associated with traditional surgery to treat severe aortic stenosis. Researchers are studying the use of percutaneous aortic valve replacement in this patient population. The procedure is done through the transfemoral or left subclavian artery or via a transapical approach. Research also includes an approach through the ascending aorta via a mini-J incision.

Percutaneous Aortic Valvuloplasty Volume and Hospital Mortality

Cleveland Clinic is a national leader in the development and use of percutaneous valve treatments.