



Aortic Stenosis

A brief summary of prevalence, diagnosis and treatment options.



Newcastle Heart
EXCELLENCE | DEDICATION | COMPASSION

Sue's story: a patient with aortic stenosis¹

In 2007, Sue had a heart attack, and was rushed to hospital. After an operation on her heart, Sue was asked to visit her general practitioner (GP) twice yearly to monitor her health. In 2013, Sue realised she was frequently becoming breathless, which impacted on her quality of life and day-to-day activities. She decided to consult with her GP and afterwards it became clear that Sue had developed severe aortic stenosis.



Aortic stenosis: an overview

Aortic stenosis is a life-threatening valvular heart disease, most commonly occurring in the elderly owing to age-related aortic valve calcification.

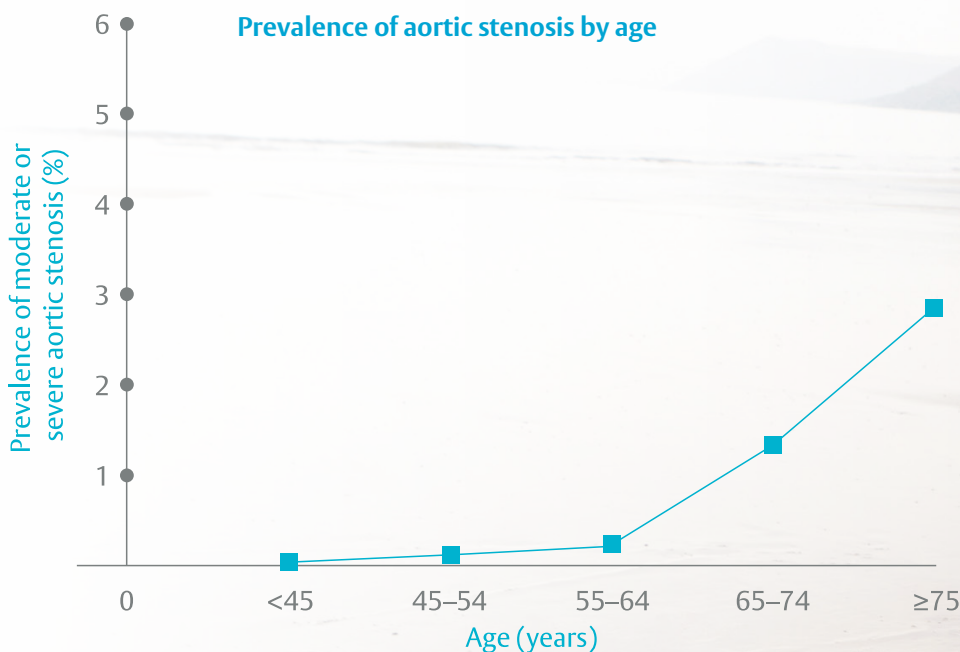


Figure adapted from²

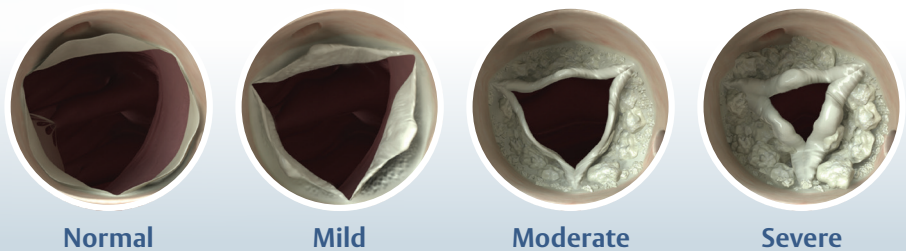
The prevalence of aortic stenosis increases with aging, and is notably higher in the elderly population (65 years and older). Epidemiological studies including people older than 80 years show the prevalence of aortic stenosis to rise to even higher levels; one in eight people are living with aortic stenosis.³



Progression of aortic stenosis

Aortic stenosis is most commonly caused by a degenerative process resulting in calcification, lipid deposition and inflammatory infiltration of the valve leaflets (a process very similar to atherosclerosis). The leaflets become progressively stiff and this can lead to a narrowing of the valve opening which obstructs blood flow and forces the heart to pump harder.⁴

When this increasing pressure load on the heart manifests symptomatically, patient life-expectancy is significantly reduced and assessment for aortic valve replacement should be undertaken promptly.^{5,6}



Survival rates in patients with severe aortic stenosis are as low as 50% at two years and 20% at five years following the onset of symptoms.⁵

Typical natural history and survival rate in patients with aortic stenosis

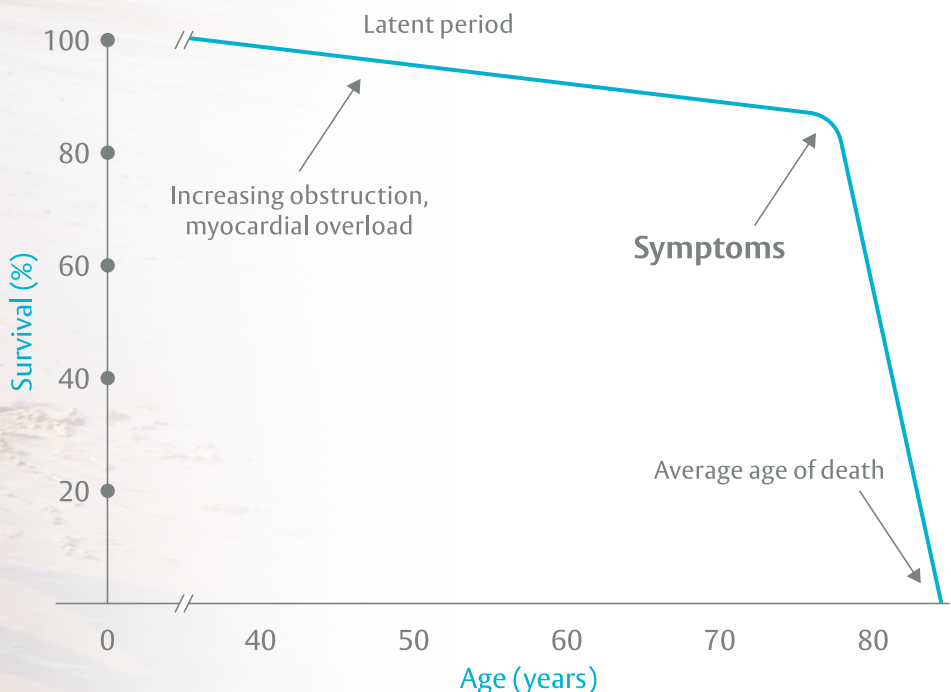


Figure adapted from⁷



Diagnosis of aortic stenosis

Symptoms

Aortic stenosis is often asymptomatic when mild to moderate in severity. As the symptoms often progress gradually, they may be mistaken for 'normal' signs of aging⁸ and patients very often adapt their lifestyle accordingly to become more sedentary.⁹

Symptoms of severe aortic stenosis include:^{7,10}



Chest pain or tightness



Shortness of breath



Reduced physical activity level



Fatigue



Dizziness, feeling faint or fainting upon exertion



Palpitations

Many patients with aortic stenosis initially appear asymptomatic as they tend to adapt their lifestyle to minimize the impact of symptoms. An exercise test, however, can unmask symptoms in up to 37% of patients with severe aortic stenosis.¹¹

Risk factors

Factors associated with the highest risk of developing aortic stenosis include:¹²

- Advancing age (≥ 65 years)²
- Cardiovascular risk factors, including hypertension, diabetes and smoking
- Other comorbidities, including chronic kidney disease, coronary artery disease



Auscultation: the importance of screening

Aortic stenosis may be difficult to identify, even when it becomes symptomatic. Reasons for this include a lack of patient education and awareness of its symptoms,^{4,13} the potential for confusion with concurrent cardiac conditions, infrequent contact between patients and GPs, and a lack of regular auscultation.¹³

As the symptoms of aortic stenosis may not present until it becomes severe, a detailed physical examination should be performed in those with suspected valve disease. Indeed most patients with aortic stenosis are first diagnosed following auscultation.⁹

The murmur typically associated with aortic stenosis is:^{4,9}

- A harsh systolic ejection murmur
- A single or paradoxically split second heart sound
- Usually heard best at the right sternal border, 2nd intercostal space
- Often radiates to both carotid arteries

When aortic stenosis progresses from mild to severe, the frequency and duration of the murmur increases due to the increasing calcification and narrowing of the valve resulting in worsening turbulent blood flow.¹⁵

Special examination findings for aortic stenosis¹⁶

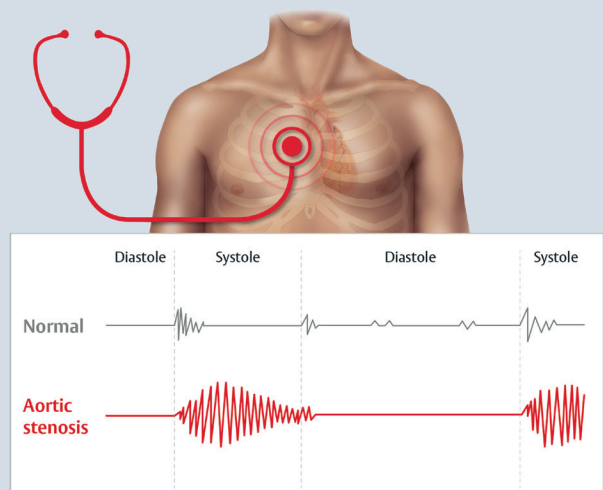
- Rate and rhythm of pulse: typically low amplitude and slow rise of arterial pulse (slow-rising pulse)
- Low blood pressure with a narrow pulse pressure
- Palpable prominent cardiac apex beat
- Possible signs of cardiac decompensation, e.g. basal lung crepitations

HOPE FOR HEARTS

Aortic Stenosis Education

“Clinical examination, particularly auscultation, is the first step towards the diagnosis of valvular heart disease and the assessment of its severity, always bearing in mind that even faint cardiac murmur may be associated with a relevant valvular disease, especially where there is concomitant heart failure.”

Mangner and Schuler, *Herz* 2013¹⁴



Treatment options

Due to the almost inevitable worsening cardiac decompensation,⁴ and significantly higher risk of sudden death in those who do not receive treatment, a timely intervention is strongly recommended in patients with severe symptomatic aortic stenosis.^{6,7} Medical therapy may provide temporary relief of symptoms, but does not improve outcomes.⁶ Balloon valvuloplasty may be considered as a bridge to valve replacement, but is usually followed by restenosis and deterioration within 6–12 months.⁶ Aortic valve replacement is regarded as the definitive therapy for severe aortic stenosis.⁶

The 10-year survival of patients with symptomatic severe aortic stenosis was 62% for those receiving aortic valve replacement (AVR), and was greatly reduced to 2% in those without AVR.¹⁷

Survival of patients with severe symptomatic aortic stenosis

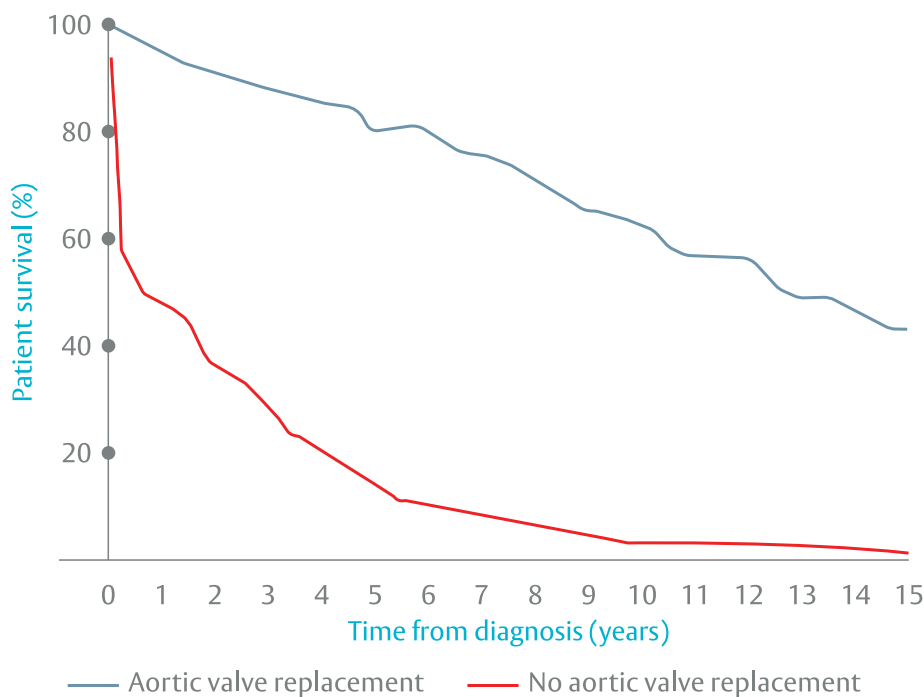


Figure adapted from¹⁷



Example of a mechanical heart valve: bileaflet design



Example of a biological heart valve

Surgical aortic valve replacement

In the absence of serious comorbid conditions, surgical aortic valve replacement (sAVR) is indicated in the majority of symptomatic patients with severe aortic stenosis.⁶ sAVR is performed through an open-heart procedure in which the surgeon removes the diseased narrowed valve and replaces it with either a mechanical or a biological valve.

Each year, more than 200,000 surgical heart valve procedures are performed across the world.¹⁸ For decades sAVR has produced consistently excellent results in terms of both patient survival and improving quality of life.^{7,19-21}

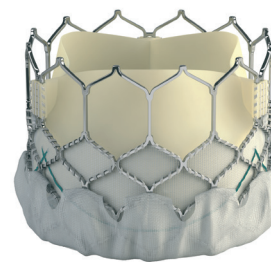
However, a third of patients are not referred for sAVR due to their high surgical risk.²²



Transcatheter aortic valve implantation

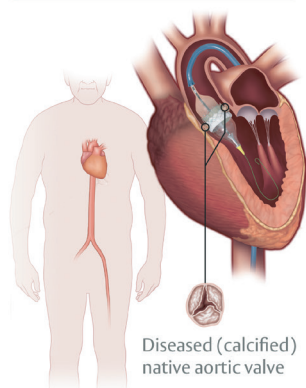
Transcatheter aortic valve implantation (TAVI) is recommended in patients with severe symptomatic aortic stenosis who are, according to a multidisciplinary heart team (usually at least a surgeon, anaesthetist and cardiologist), considered unsuitable for conventional surgery because of severe comorbidities increasing their risk score.⁶

TAVI enables a percutaneous replacement of the aortic valve and can be performed under local or general anaesthesia.²³ In this less invasive procedure, the valve is compressed down onto a catheter that is then inserted into the body via different access routes and tracked through the native aortic valve for implantation. Once the TAVI valve is precisely positioned, it is released or expanded to anchor properly within the calcified aortic valve.

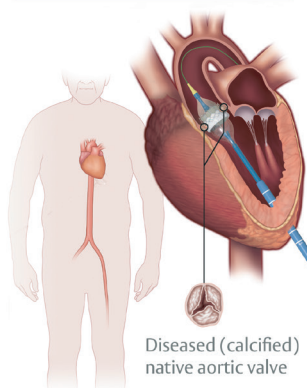


Example of transcatheter heart valve

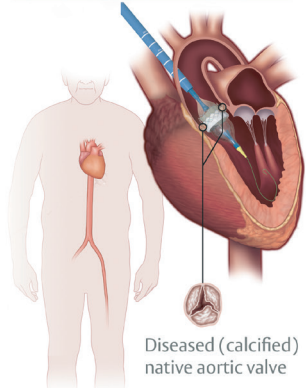
Transfemoral approach



Transapical approach



Transaortic approach



TAVI is most commonly performed via the femoral artery, but may be precluded in some patients with severe peripheral arterial disease. Other options include access via the heart apex (transapical) or via the aorta following a small chest incision (transaortic).²⁴

As with sAVR, TAVI provides both short- and long-term relief of symptoms as well as improvement in life expectancy and quality of life. The principal benefits of TAVI include a shorter procedure,²⁵ less pain and a shorter stay in the hospital.²⁶ Furthermore, TAVI is less invasive than open-heart procedures,²⁷ and shortens the recovery time compared with sAVR.²⁸

Quality of life after TAVI



Sue's story: a patient with aortic stenosis¹

Sue was diagnosed with aortic stenosis and referred for aortic valve replacement. The heart team decided on a TAVI procedure due to her high surgical risk and a previous open-heart surgery.

Life before the procedure

"Before my procedure, I had been struggling to play sports with my grandchildren and some days I was very breathless when climbing the stairs. As an avid golf player, I was very upset that I felt too breathless to play."

Life after the procedure

"I had no symptoms when I woke up and I wasn't sure if that was because of the anaesthetic – but it was in fact because the procedure was so minimally invasive. I was in and out of hospital within 2 days."

"My recovery was just unbelievable; I felt so well so quickly. Once the aortic valve replacement had been completed, I became active again within a short space of time. Every day I noticed I could breathe a bit more easily until I didn't really notice I was breathless at all. I am a busy grandmother to six grandchildren so I was very grateful to be back to normal, playing football with them and enjoying this new lease of life."



Screen for aortic stenosis and save lives

As a common, life-threatening disease, aortic stenosis does not receive the attention it deserves. Many patients remain undiagnosed while others who are diagnosed do not receive a valve replacement – despite the poor prognosis and availability of effective treatments.

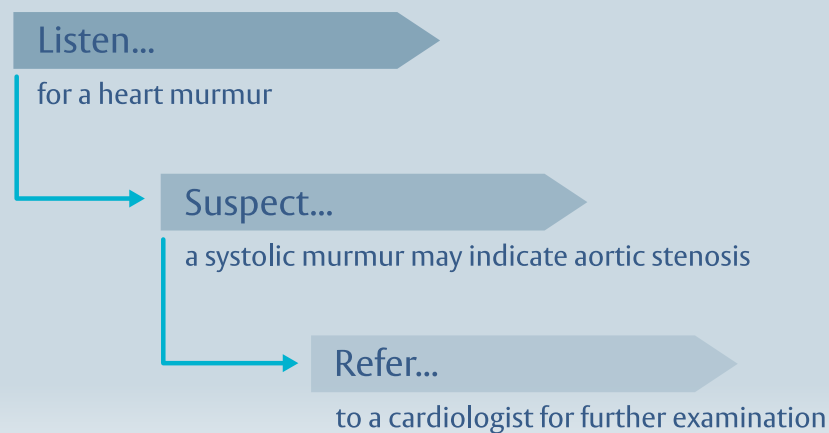
You, as a General Practitioner play a key role in the identification of patients with aortic stenosis, firstly by routinely auscultating at-risk patients for a heart murmur, and then referring those with suspected AS for further evaluation by echocardiography with a cardiologist.

Sue's story: a patient with aortic stenosis¹

“Before my diagnosis I had never had my heart checked with a stethoscope by my doctor. I have learnt that this is a really easy way to check for heart valve disease, so I think it would be really beneficial for all patients over 60 to have their heart listened to regularly, and for more people to be aware of heart valve disease and its potential risks if left untreated.”



If you have a patient at risk of aortic stenosis, take the following steps:



Newcastle Heart
64 Denison St
Hamilton East NSW 2302
T 02 4929 2444
F 02 4929 2449



References

1. <http://www.heartvalvevoice.com/stories/sue-jardines-heart-valve-disease-story>. Accessed August 12, 2016
2. Nkomo VT, Gardin JM, Skelton TN *et al.* Burden of valvular heart diseases: a population-based study. *Lancet* 2006;368:1005–11.
3. Osnabrugge RLJ, Mylotte D, Head SJ *et al.* Aortic stenosis in the elderly: disease prevalence and number of candidates for transcatheter aortic valve replacement: a meta-analysis and modeling Study. *J Am Coll Cardiol* 2013;62:1002–12.
4. Grimard BH, Larson JM. Aortic stenosis: diagnosis and treatment. *Am Fam Physician* 2008;78:717–24.
5. Ross J Jr, Braunwald E. Aortic stenosis. *Circulation* 1968;38:61–7.
6. Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC); European Association for Cardio-Thoracic Surgery (EACTS), Vahanian A, Alfieri O, Andreotti F *et al.* Guidelines on the management of valvular heart disease (version 2012). *Eur Heart J* 2012;33:2451–96.
7. Carabello BA. Introduction to aortic stenosis. *Circ Res* 2013;113:179–85.
8. Alliance for Aging Research. Aortic Stenosis: Under-Diagnosed and Under-Treated. 2010. <https://www.agingresearch.org/newsletters/view/36>. Accessed August 12, 2016.
9. Nishimura RA, Otto CM, Bonow RO *et al.* 2014 AHA/ACC Guideline for the management of patients with valvular heart disease: executive summary. *Circulation* 2014;129:2440–92.
10. Mayo Clinic Staff. www.mayoclinic.com <http://www.mayoclinic.org/diseases-conditions/aortic-stenosis/basics/symptoms/con-20026329>. Accessed August 12, 2016.
11. Das P. Exercise testing to stratify risk in aortic stenosis. *Eur Heart J* 2005;26:1309–13.
12. Kamath AR, Pai RG. Risk factors for progression of calcific aortic stenosis and potential therapeutic targets. *Int J Angiol* 2008;17:63–70.
13. Gaede L, Di Bartolomeo R, van der Kley F *et al.* Aortic valve stenosis: what do people know? A heart valve disease awareness survey of over 8,800 people aged 60 or over. *EuroIntervention: journal of EuroPCR in collaboration with the Working Group on Interventional Cardiology of the European Society of Cardiology*. 2016;12:883–9.
14. Mangner N, Schuler G. ESC guidelines on the management of valvular heart disease. What has changed and what is new? *Herz*. 2013;38:828–37.
15. Das P, Pocock C, Chambers J. The patient with a systolic murmur: severe aortic stenosis may be missed during cardiovascular examination. *QJM* 2000;93:685–8.
16. Morris P, Warriner D, Morton A. In: *Eureka: Cardiovascular Medicine*. JP Medical Ltd. 2015. London, England.
17. Brown ML, Pellikka PA, Schaff HV *et al.* The benefits of early valve replacement in asymptomatic patients with severe aortic stenosis. *J Thorac Cardiovasc Surg* 2008;135:308–15.
18. Brown JM, O'Brien SM, *et al.* Isolated aortic valve replacement in North America comprising 108,687 patients in 10 years: changes in risks, valve types, and outcomes in the Society of Thoracic Surgeons National Database. *J Thorac Cardiovasc Surg* 2009;137:82–90.
19. Conti V, Lick SD. Cardiac surgery in the elderly: indications and management options to optimize outcomes. *Clin Geriatr Med* 2006;22:559–74.
20. Sundt TM, Bailey MS, Moon MR *et al.* Quality of life after aortic valve replacement at the age of >80 years. *Circulation* 2000;102(suppl.): 70–4.
21. Chiappini B, Camurri N, Loforte A *et al.* Outcome after aortic valve replacement in octogenarians. *Ann Thorac Surg* 2004;78:85–9.
22. van Geldorp MW, van Gameren M, Kappetein AP *et al.* Therapeutic decisions for patients with symptomatic severe aortic stenosis: room for improvement? *Eur J Cardiothorac Surg* 2009;35:953–7.
23. Fröhlich GM, Lansky AJ, Webb J. Local versus general anesthesia for transcatheter aortic valve implantation (TAVR) – systematic review and meta-analysis. *BMC Med* 2014;12:41.
24. Stortecky S, O'Sullivan CJ, Buellesfeld L *et al.* Transcatheter aortic valve implantation: the transfemoral access route is the default access. *EuroIntervention* 2013;9:S14–S18.
25. Hamm CW, Möllmann H, Holzhey D *et al.* The German Aortic Valve Registry (GARY): in-hospital outcome. *Eur Heart J* 2014;35:1588–98.
26. Minutello RM, Wong SC, Swaminathan RV *et al.* Costs and in-hospital outcomes of transcatheter aortic valve implantation versus surgical aortic valve replacement in commercial cases using a propensity score matched model. *Am J Cardiol* 2015;115:1443–7.
27. Raiten JM, Gutsche JT, Horak J *et al.* Critical care management of patients following transcatheter aortic valve replacement. *F1000Research* 2013;2:62.
28. Kleczyński P, Bagiński M, Sorysz D *et al.* Short- and intermediate-term improvement of patient quality of life after transcatheter aortic valve implantation: a single-centre study. *Kardiol Pol* 2014;72:612–6.

HOPE FOR HEARTS

Aortic Stenosis Education

www.hopeforhearts.com.au



The clinical information about aortic stenosis in this document has been proudly supplied by Edwards LifeSciences as part of an Aortic Stenosis medical education program for healthcare professionals and practitioners in training. For professional use only. See instructions for use for full prescribing information, including indications, contraindications, warnings, precautions and adverse events.

This brochure has been prepared for healthcare professionals only.

Edwards Lifesciences devices placed on the European market meeting the essential requirements referred to in Article 3 of the Medical Device Directive 93/42/EEC bear the CE marking of conformity. Any quotes used in this material are taken from independent third-party publications and are not intended to imply that such third party reviewed or endorsed any of the products of Edwards Lifesciences. Edwards, Edwards Lifesciences, the stylized E logo, Edwards SAPIEN, Edwards SAPIEN 3, Magna, Magna Ease, PARTNER, PERIMOUNT, PERIMOUNT Magna, SAPIEN and SAPIEN 3 are trademarks of Edwards Lifesciences Corporation. © 2023 Edwards Lifesciences Corporation. All rights reserved. Edwards Lifesciences, Unit 2, 40 Talavera Road, Macquarie Park NSW 2113 Australia. edwards.com