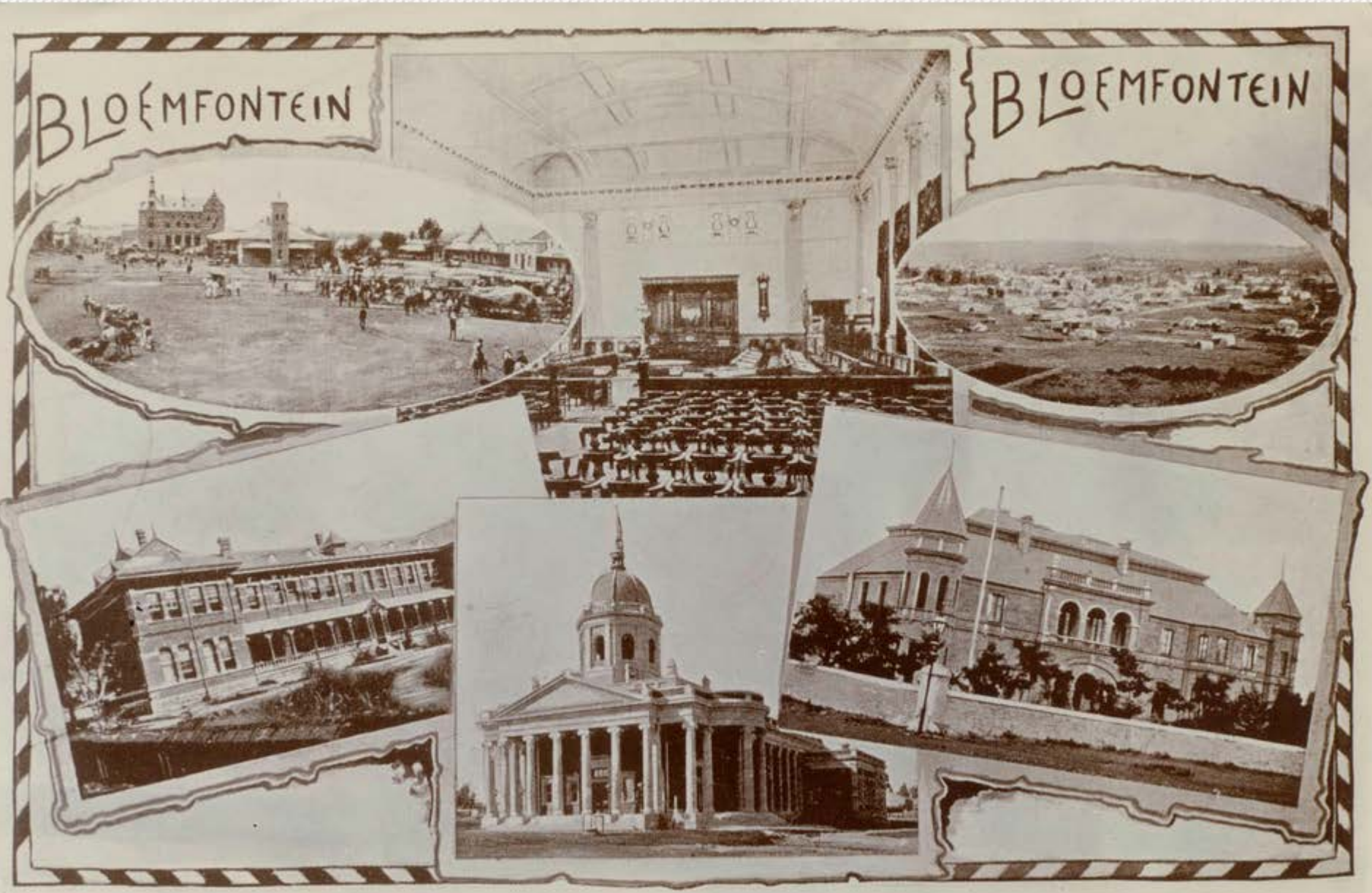
“Low flow low gradient and What I Really Need to Know from the 2014 Guidelines for the Management of Patients with Valvular Heart Disease”

Pieter Kappetein,
Dept Cardio-thoracic Surgery
Erasmus University Medical Center
Rotterdam, The Netherlands

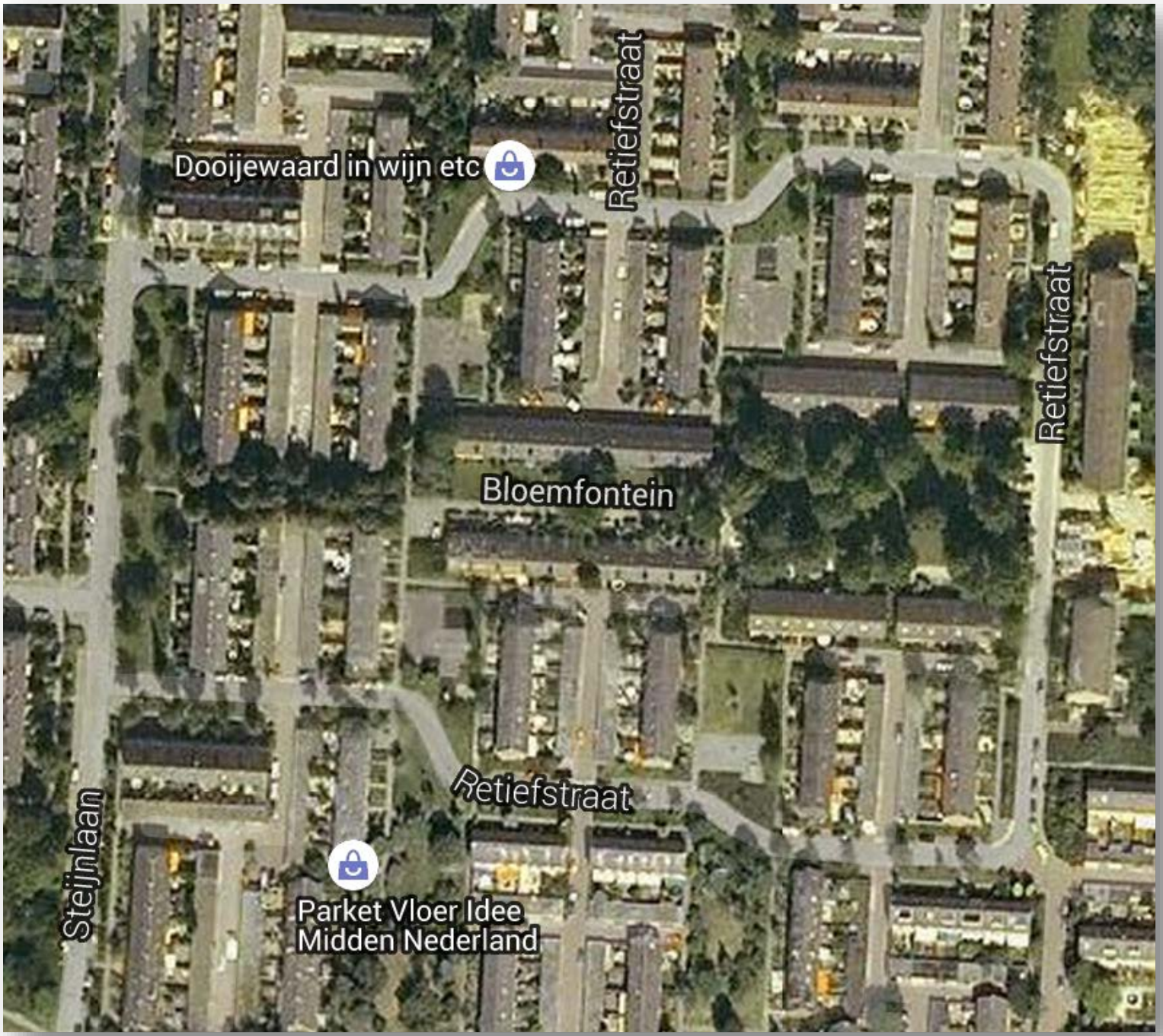

BLOEMFONTEIN
BLOEMFONTEIN

Martinus Theunis Steyn

6th State President of the Orange Free State

In office

4 March 1896 – 30 May 1902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Retiefstraat
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Midden Nederland

European Heart Journal
doi:10.1093/eurheartj/ehs109

ESC/EACTS GUIDELINES

Guidelines on the management of valvular heart disease (version 2012)

The Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

Authors/Task Force Members: Alec Vahanian (Chairperson) (France), **Ottavio Alfieri (Chairperson)** (Italy), Felicita Andreotti (Italy), Manuel J. Antunes (Portugal), Gonzalo Barón-Esquivias (Spain), Helmut Baumgartner (Germany), Michael Andrew Borger (Germany), Thierry P. Carrel (Switzerland), Michele De Bonis (Italy), Arturo Evangelista (Spain), Volkmar Falk (Switzerland), Bernard Iung (France), Patrizio Lancellotti (Belgium), Luc Pierard (Belgium), Susanna Price (UK), Hans-Joachim Schäfers (Germany), Gerhard Schuler (Germany), Janina Stepinska (Poland), Karl Swedberg (Sweden), Johanna Takkenberg (The Netherlands), Ulrich Otto Von Oppell (UK), Stephan Windecker (Switzerland), Jose Luis Zamorano (Spain), Marian Zembala (Poland)

ESC Committee for Practice Guidelines (CPG): Jeroen J. Bax (Chairperson) (The Netherlands), Helmut Baumgartner (Germany), Claudio Ceconi (Italy), Veronica Dean (France), Christi Deaton (UK), Robert Fagard (Belgium), Christian Funck-Brentano (France), David Hasdai (Israel), Arno Hoes (The Netherlands), Paulus Kirchhof (United Kingdom), Juhani Knuuti (Finland), Philippe Kolh (Belgium), Theresa McDonagh (UK), Cyril Moulin (France), Bogdan A. Popescu (Romania), Željko Reiner (Croatia), Udo Sechtem (Germany), Per Anton Sirnes (Norway), Michal Tendera (Poland), Adam Torbicki (Poland), Alec Vahanian (France), Stephan Windecker (Switzerland)

Document Reviewers: Bogdan A. Popescu (ESC CPG Review Coordinator) (Romania), **Ludwig Von Segesser** (EACTS). Review Coordinator) (Switzerland), Luigi P. Badano (Italy), Matjaž Bunc (Slovenia), Marc J. Claeys (Belgium), Niksa Drinkovic (Croatia), Gerasimos Filippatos (Greece), Gilbert Habib (France), A. Pieter Kappetein (The Netherlands), Roland Kassab (Lebanon), Gregory Y.H. Lip (UK), Neil Moat (UK), Georg Nickenig (Germany), Catherine M. Otto (USA), John Pepper, (UK), Nicolo Piazza (Germany), Petronella G. Pieper (The Netherlands), Raphael Rosenhek (Austria), Naltin Shuka (Albania), Ehud Schwammenthal (Israel), Juerg, Schwitter (Switzerland), Pilar Tornos Mas (Spain), Pedro T.Trindade (Switzerland), Thomas Walther (Germany).

www.escardio.org/guidelines

European Heart Journal 2012 - doi:10.1093/eurheartj/ehs109 &
European Journal of Cardio-Thoracic Surgery 2012 -
doi:10.1093/ejcts/ezs455).

What Causes Aortic Stenosis in Adults?

Age-Related Calcific Aortic Stenosis

Aortic stenosis in patients over the age of 65 is usually caused by calcific (calcium) deposits associated with aging

Rheumatic Fever

Adults who have had rheumatic fever may also be at risk for aortic stenosis

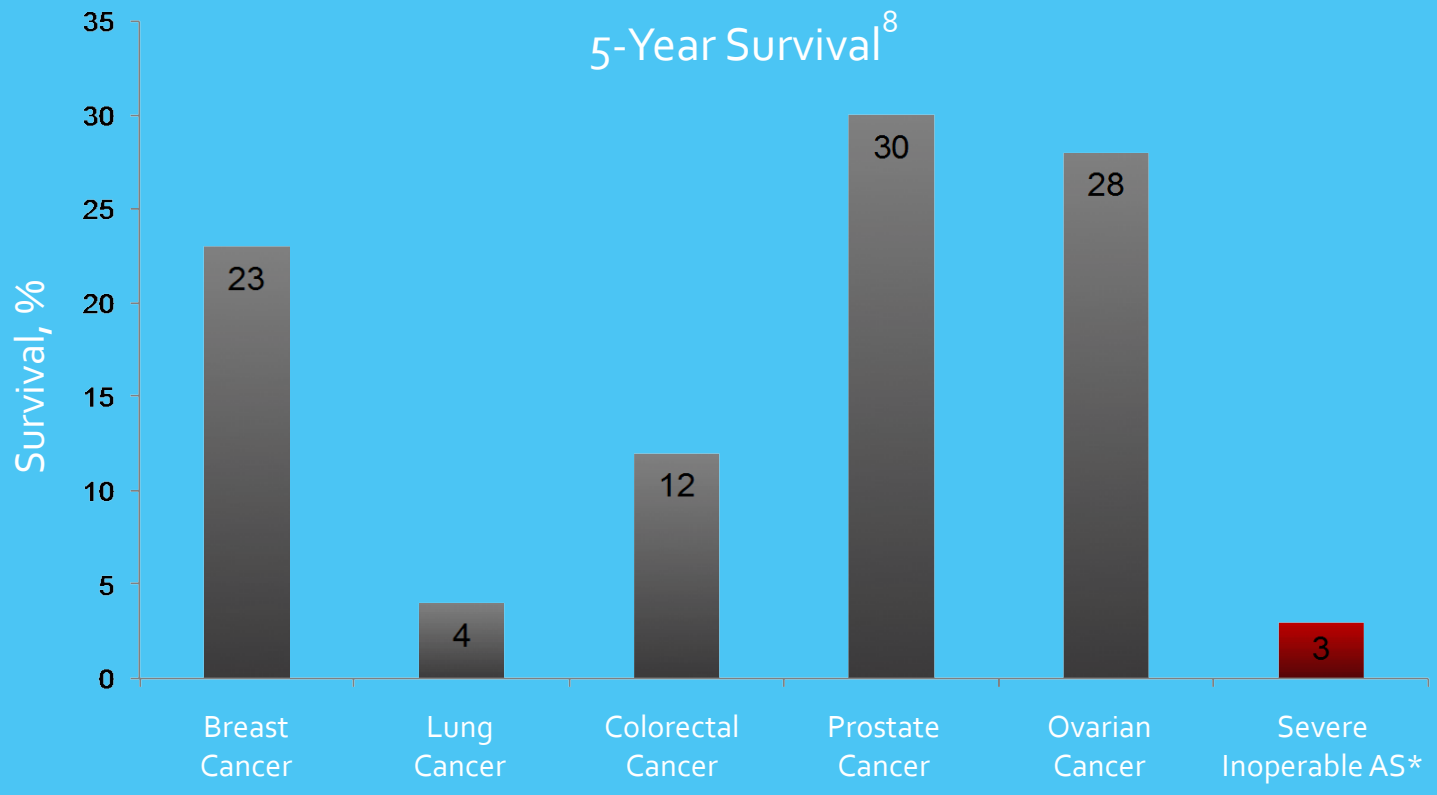
Congenital Abnormality

In some cases adults may develop aortic stenosis resulting from a congenital abnormality

Independent Risk Factors associated with degenerative aortic valve disease

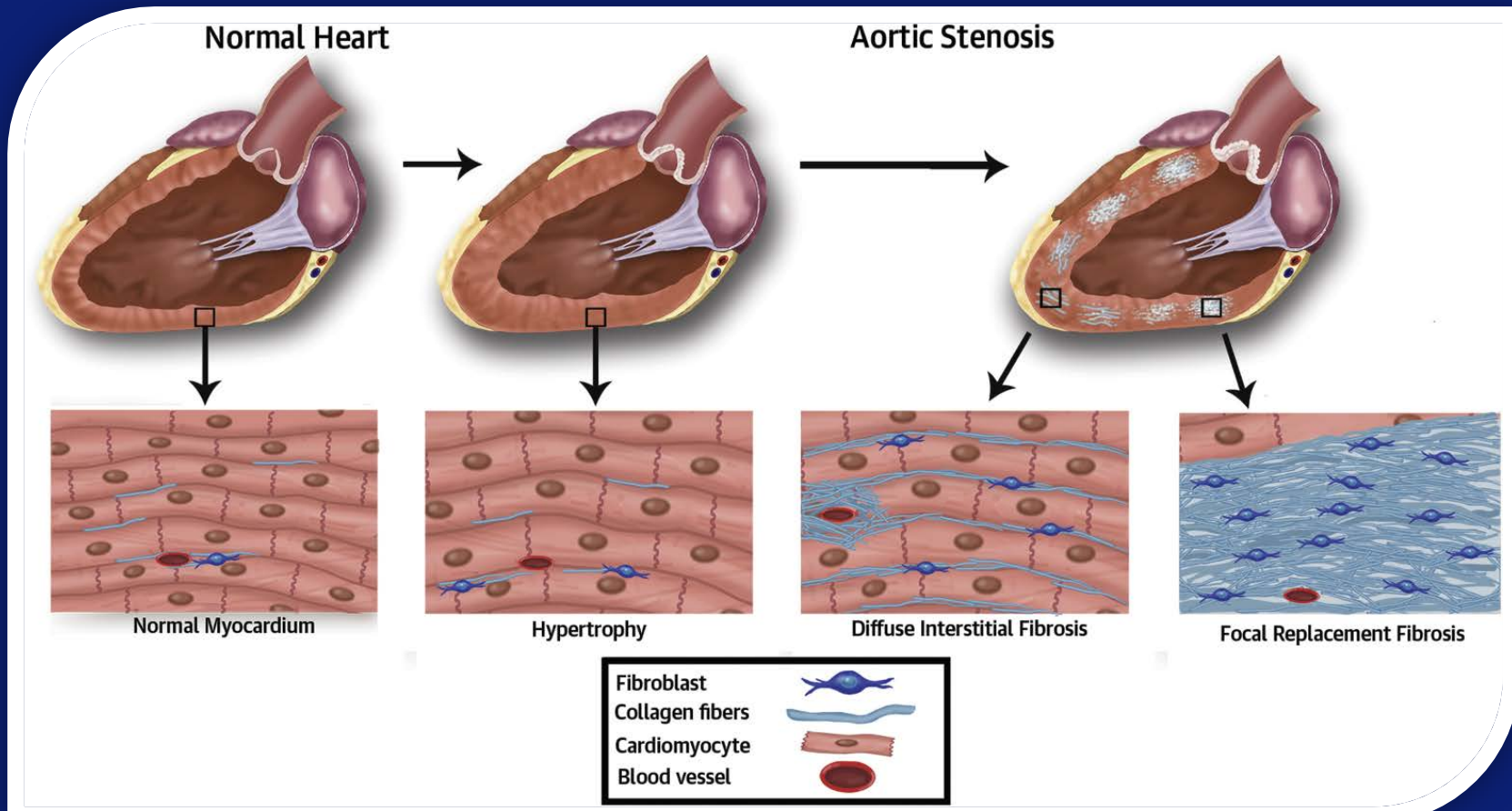
- Increasing age
- Male gender
- Hypertension
- Smoking
- Elevated lipoprotein A
- Elevated LDL cholesterol

Sobering Perspective



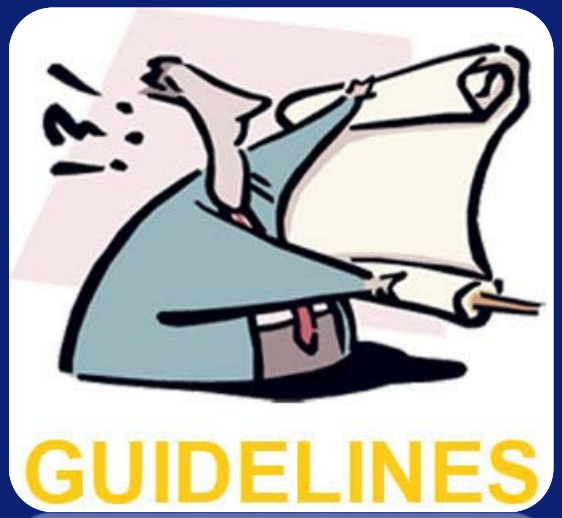
*Using constant hazard ratio. Data on file, Edwards Lifesciences LLC. Analysis courtesy of Murat Tuczu, MD, Cleveland Clinic

5 year survival of breast cancer, lung cancer, prostate cancer, ovarian cancer and severe inoperable aortic stenosis


Normal Heart
Aortic Stenosis
Normal Myocardium
Hypertrophy
Diffuse Interstitial Fibrosis
Focal Replacement Fibrosis
Fibroblast
Collagen fibers
Cardiomyocyte
Blood vessel

Indications for AVR in symptomatic AoS

Severe AS and any symptom related to AS	I	B
Severe AS undergoing CABG, surgery Asc Ao, any other valve	I	C
Should be considered in symptomatic patients with low flow, low gradient (<40 mmHg) AS with normal EF only after careful confirmation of severe AS	IIa	C
Should be considered in high risk patients with severe symptomatic AS who are suitable for TAVI, but in whom surgery is favoured by a 'heart team' based on the individual risk profile and anatomic suitability	IIa	B
Should be considered in asymptomatic patients with severe AS and abnormal exercise test showing fall in blood pressure below baseline.	IIa	C

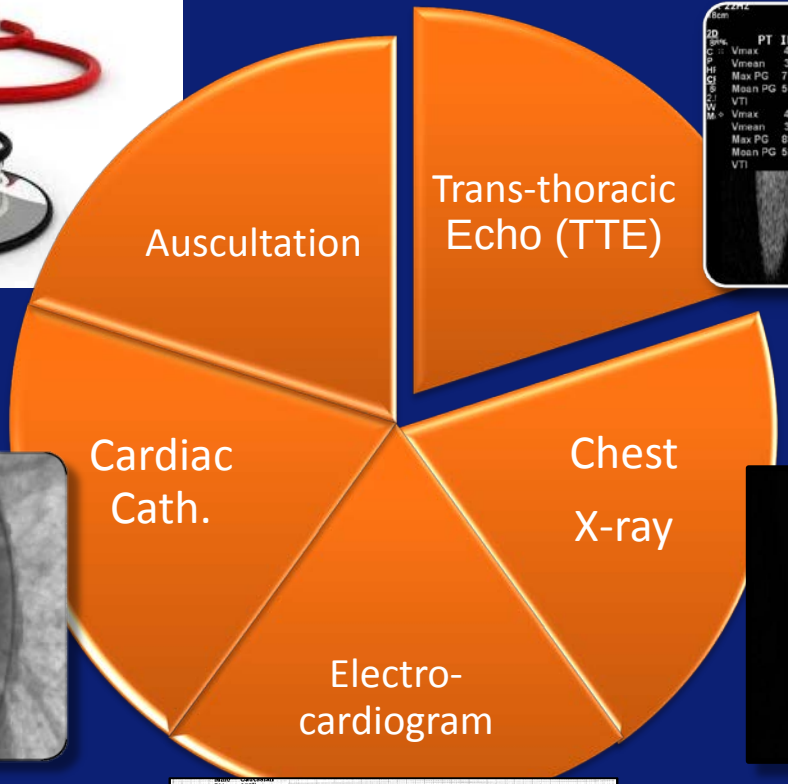


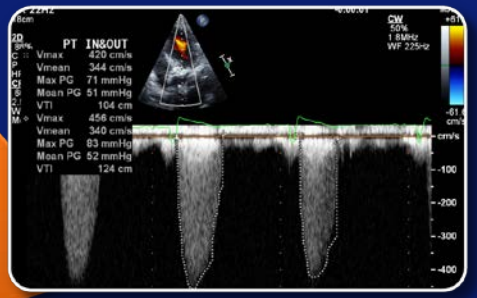
Patient Assessment

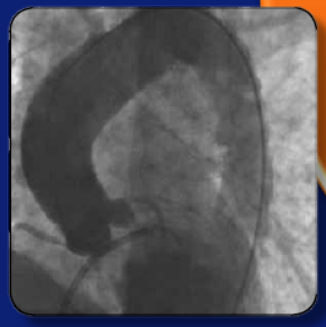
1

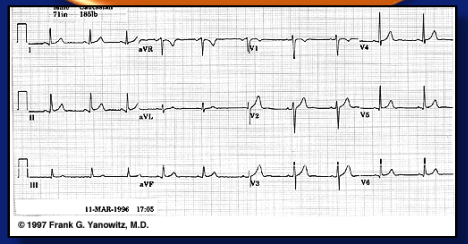
- Is valvular heart disease severe?

Multiple Modalities May Be Used to Diagnose Severe Aortic Stenosis

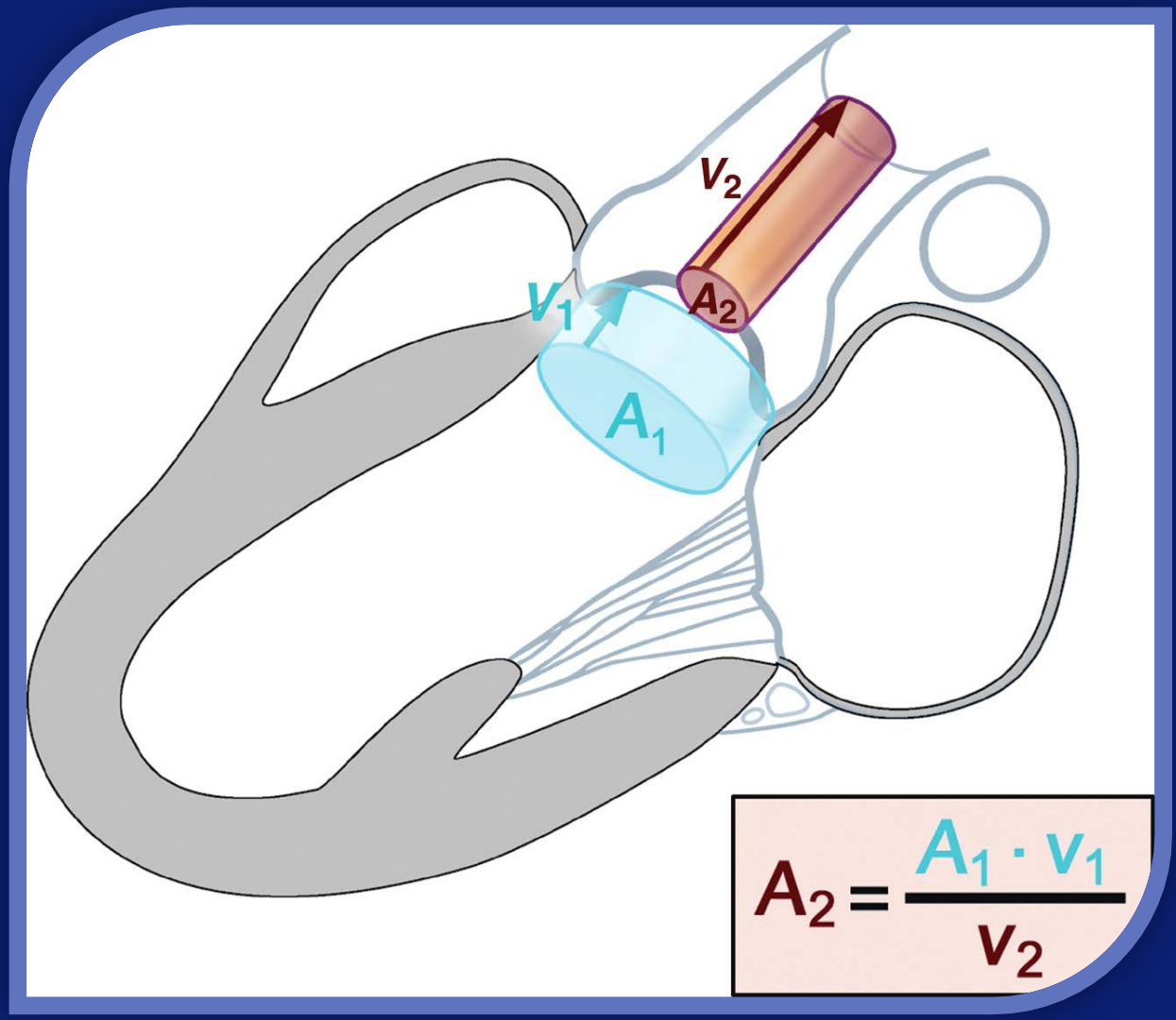








Schematic diagram of continuity equation



Echocardiographic criteria for the definition of Severe Aortic Valve stenosis

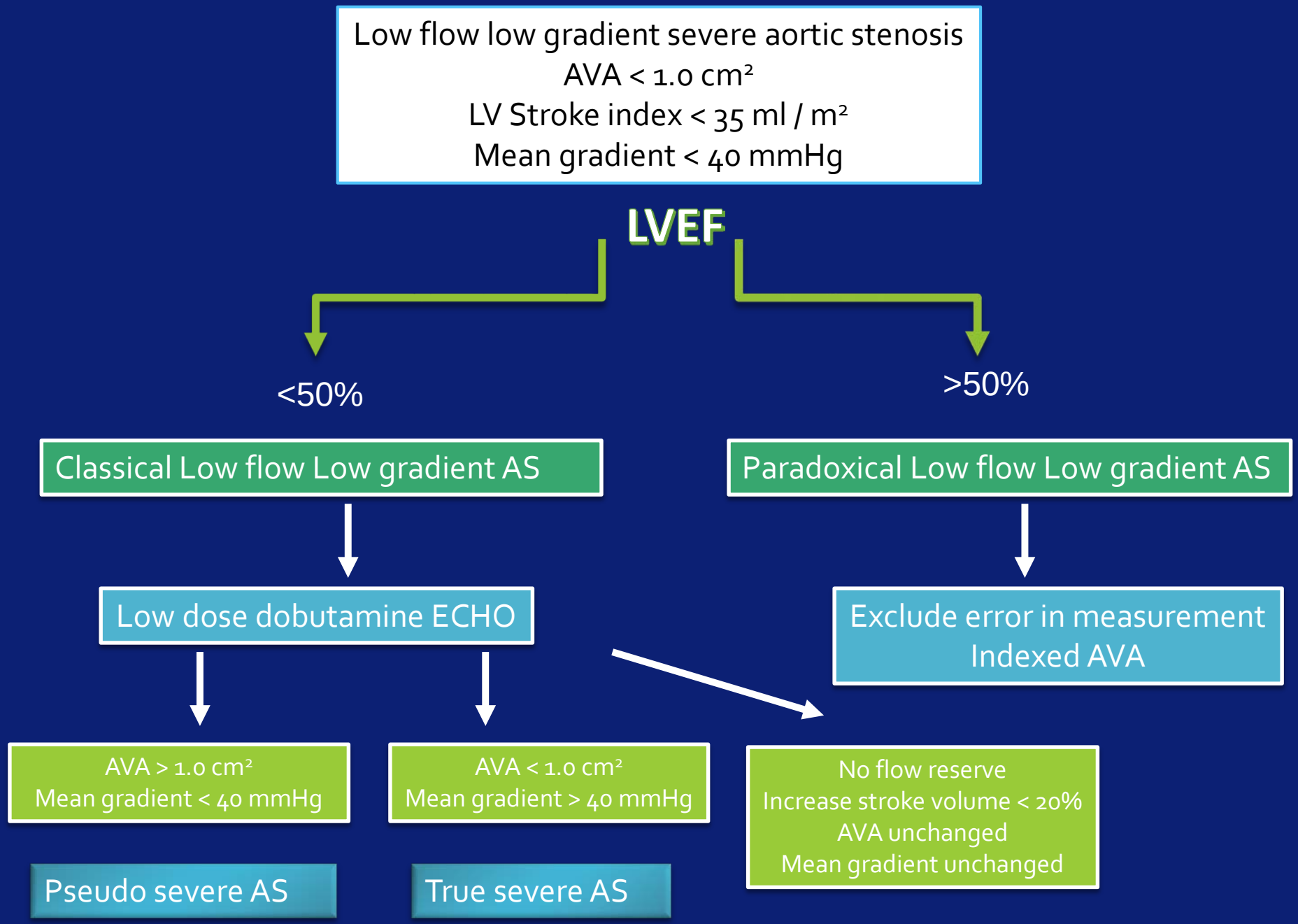
	Aortic stenosis
Valve area (cm^2)	< 1.0
Indexed valve area (cm^2/m^2 BSA)	< 0.6
Mean gradient (mmHg)	> 40
Maximum jet velocity (m/s)	> 4.0
Velocity ratio	< 0.25

European Heart Journal 2012 **- doi:10.1093/eurheartj/ehs109 & European Journal of Cardio-Thoracic Surgery 2012 - doi:10.1093/ejcts/ezs455).**

(Adapted from Baumgartner, EAE/ASE recommendations. Eur J Echocardiogr. 2010;10:1-25)

Low Flow, Low Gradient AS

- Low gradient with a small calculated valve area in the setting of poor systolic function. This may result in lack of referral for AVR because of the low gradient.
- Dobutamine Stress Echo:
  - By increasing cardiac output, we can determine if the AS is severe by reassessing the gradient across the aortic valve (increases) AND the aortic valve area (decreases).
  - Assess myocardial contractile reserve
    - Does the cardiac output improve by 20% or more.
  - Critical for decision making regarding aortic valve replacement.


Low flow low gradient severe aortic stenosis
AVA < 1.0 cm²
LV Stroke index < 35 ml / m²
Mean gradient < 40 mmHg
LVEF
<50%
>50%
Classical Low flow Low gradient AS
Paradoxical Low flow Low gradient AS
Low dose dobutamine ECHO
Exclude error in measurement
Indexed AVA
AVA > 1.0 cm²
Mean gradient < 40 mmHg
AVA < 1.0 cm²
Mean gradient > 40 mmHg
No flow reserve
Increase stroke volume < 20%
AVA unchanged
Mean gradient unchanged
Pseudo severe AS
True severe AS

1

- Is valvular heart disease severe?

2

- s?

3

- r

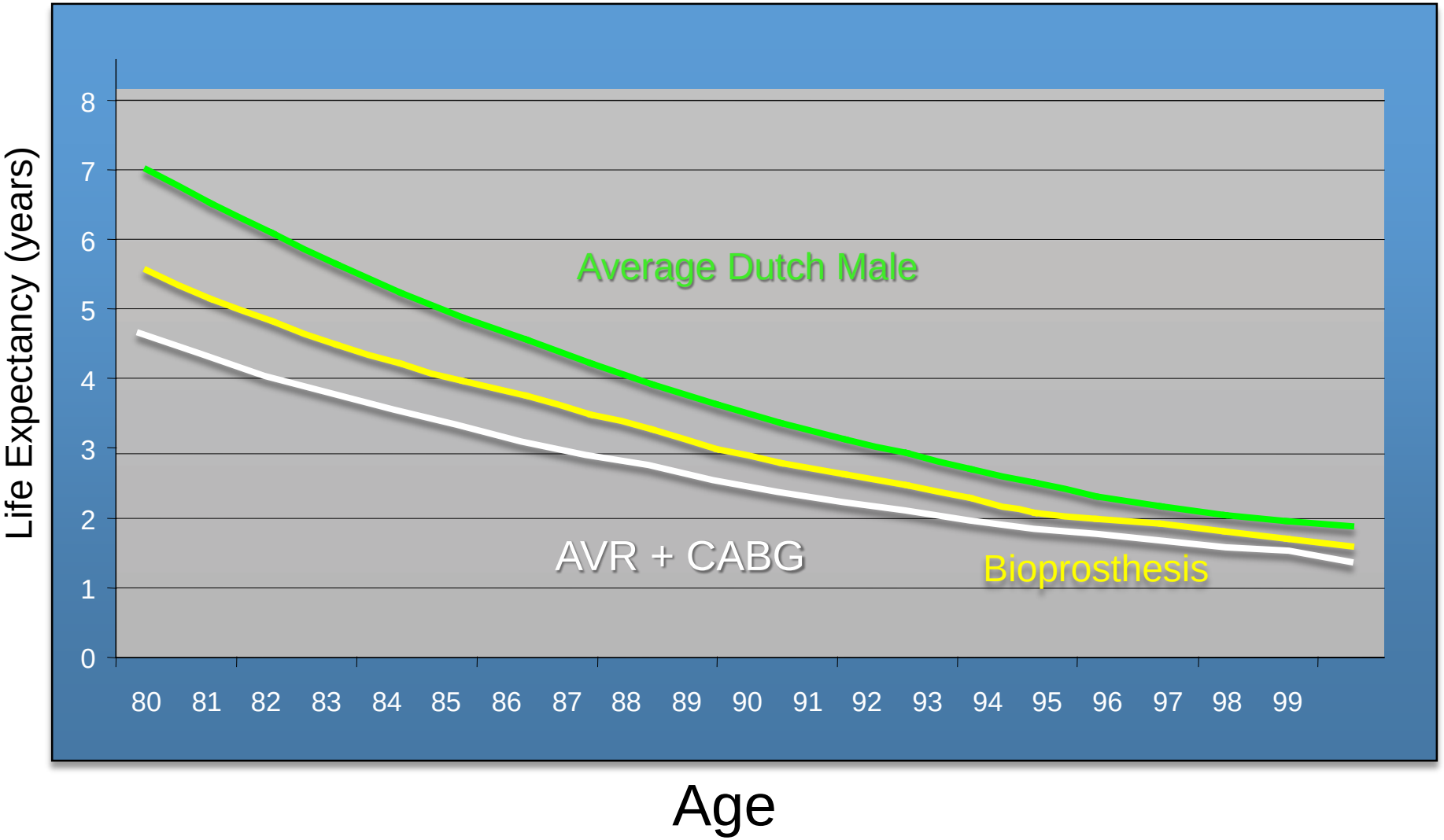
↑ Mortality Elderly Patients

1. •Cognitive impairment: 5 - 25%
2. • Functional impairment: 8 - 25%
3. • Malnutrition: 5 - 13%
4. • Frailty: 17 – 22%

Oresanya, L. B., Lyons, W. L., & Finlayson, E. (2014). Preoperative Assessment of the Older Patient. JAMA, 311(20), 2110.

1. Is valvular heart disease severe?
2. Does the patient have symptoms?
3. Are symptoms related to valvular disease?
4. What is life expectancy and expected QOL?

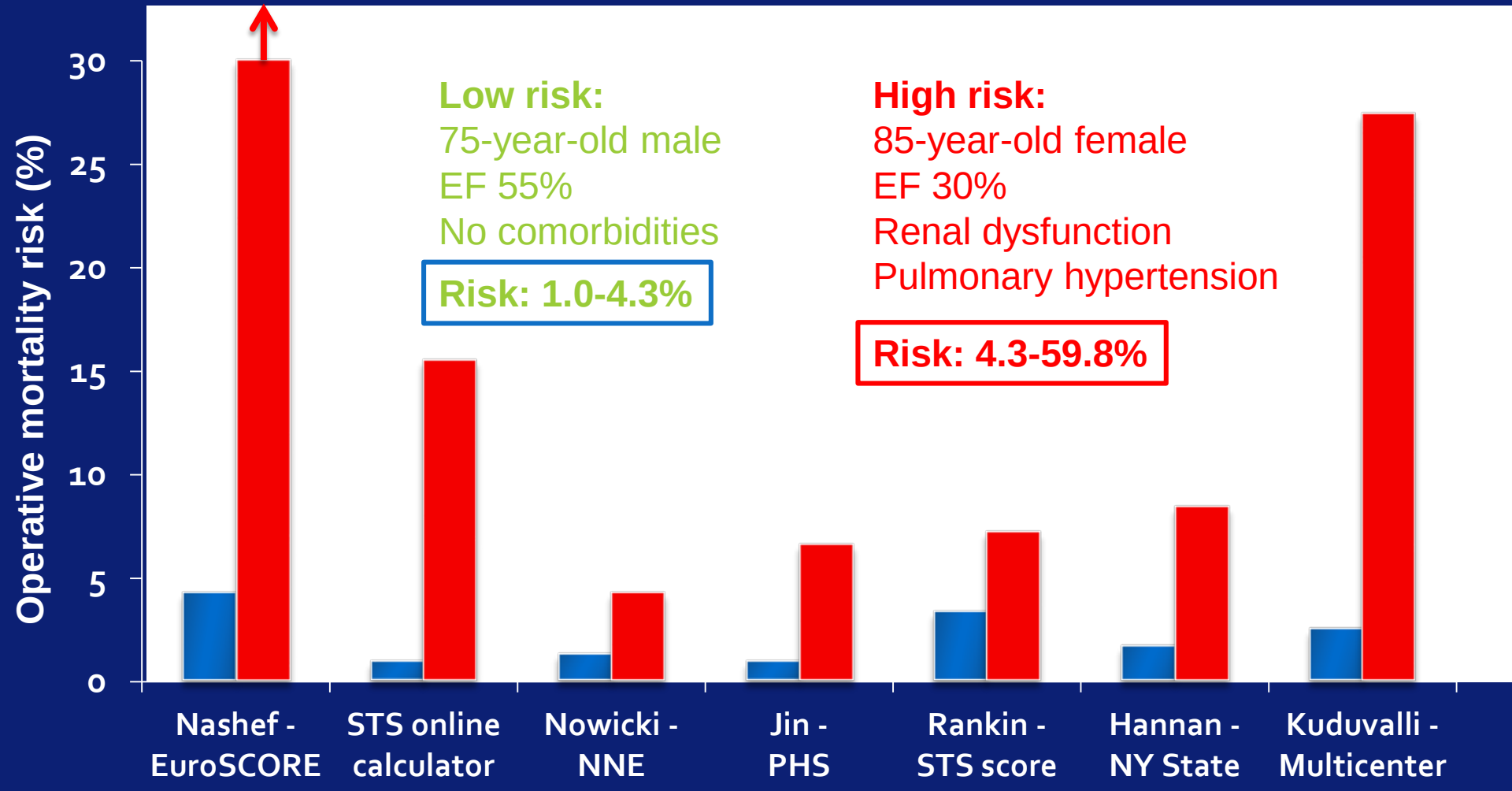
Life expectancy in elderly patients



1	• Is valvular heart disease severe?
2	• Does the patient have symptoms?
3	• Are symptoms related to valvular disease?
4	• What is life expectancy and expected QOL?
5	• What is the risk / benefit ratio?

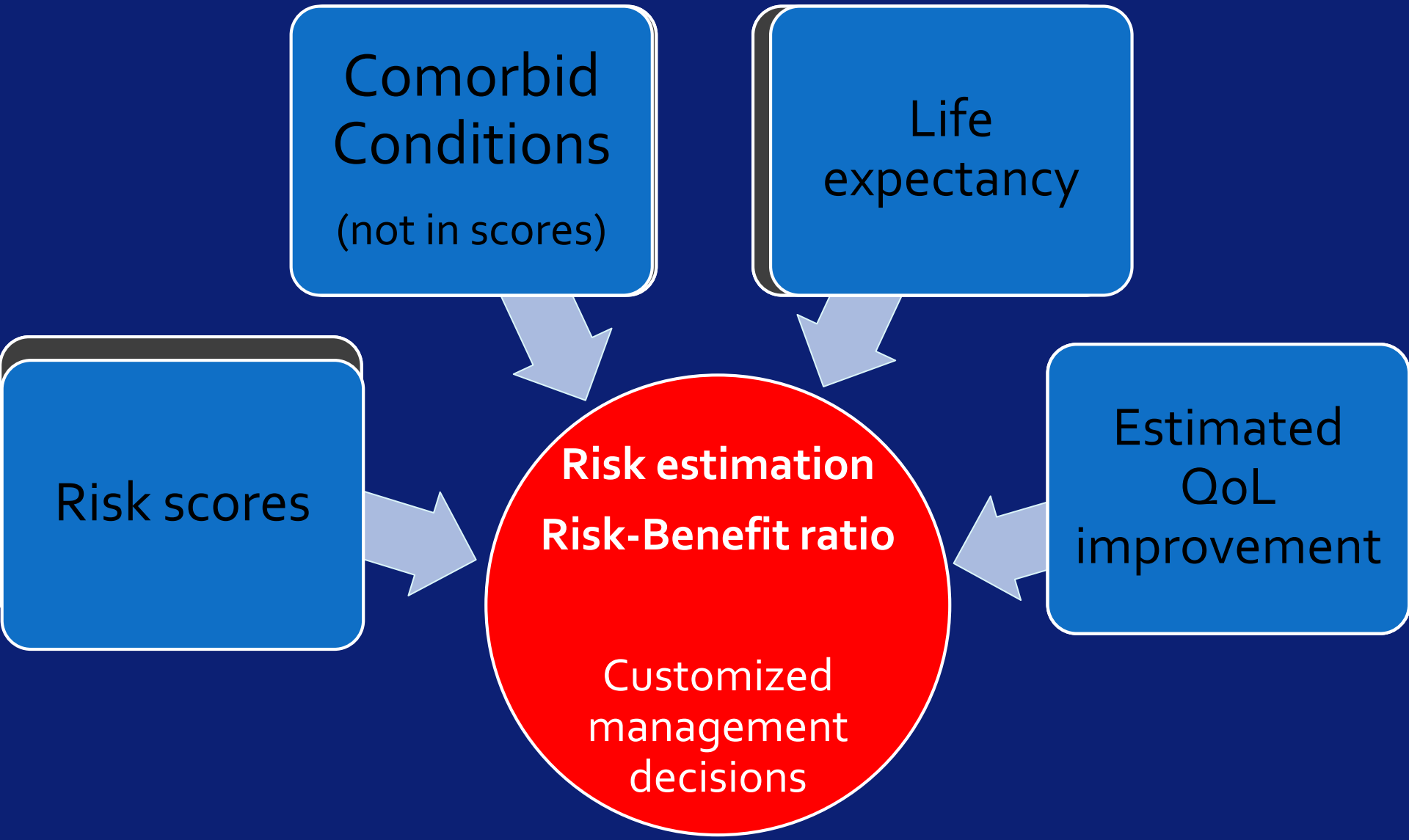
Heart

Risk scoring systems

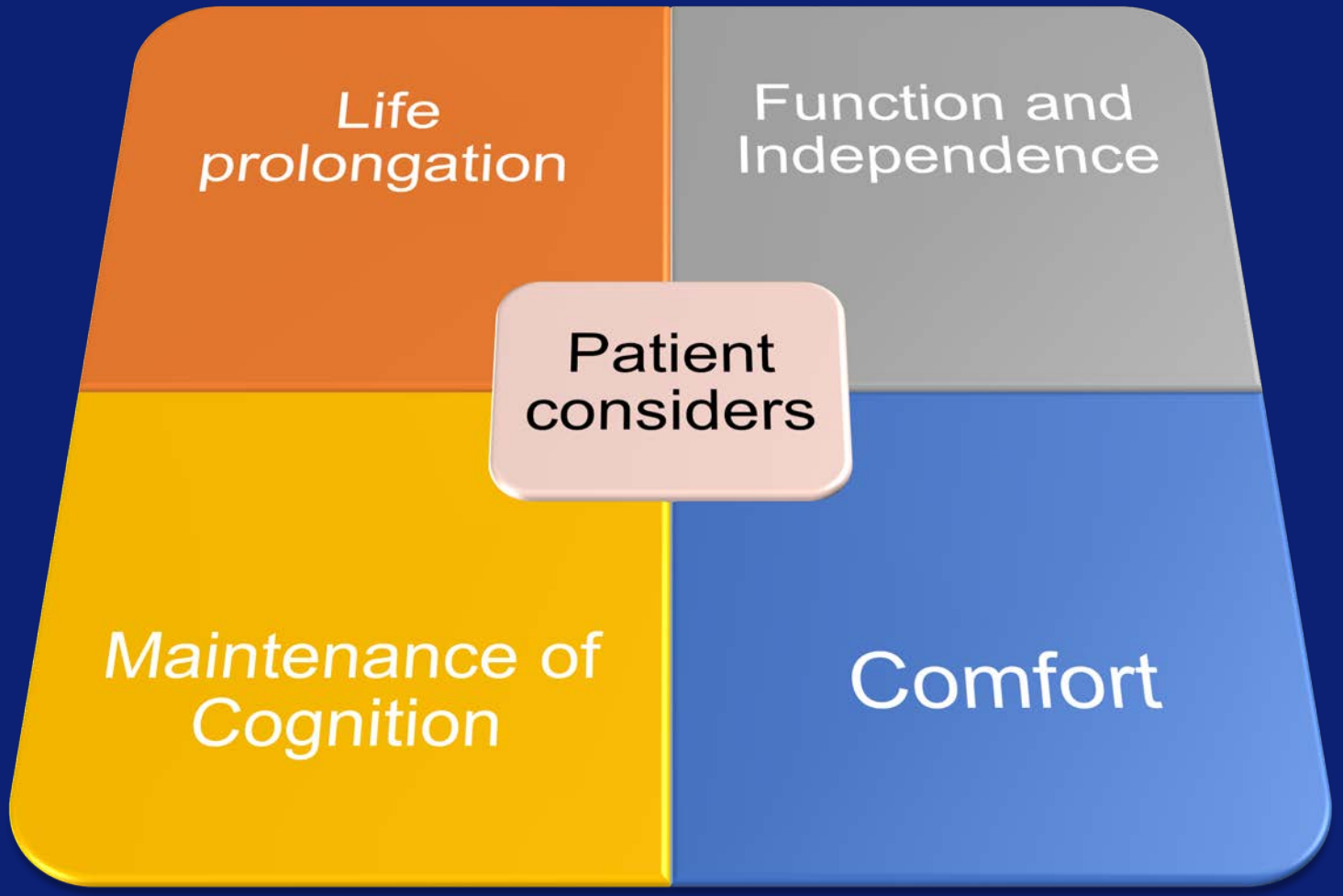


Van Gameren et al. *Heart* 2009;95:1958-63

"In the absence of a perfect quantitative score, ***the risk assessment should mostly rely on the clinical judgment of the 'heart team'****, in addition to the combination of scores."*


Comorbid Conditions
(not in scores)
Life expectancy
Risk scores
Risk estimation
Risk-Benefit ratio
Customized management decisions
Estimated QoL improvement

1	• Is valvular heart disease severe?
2	• Does the patient have symptoms?
3	• Are symptoms related to valvular disease?
4	• What is life expectancy and expected QOL?
5	• What is the risk / benefit ratio?
6	• What does the patient want?


Life prolongation
Function and Independence
Patient considers
Maintenance of Cognition
Comfort

1. Complex decisions

2. Great quantity of information

3.Susceptibility to framing effects increases with age

Framing effect is an example of cognitive bias, in which people react differently to a particular choice depending on whether it is presented as a loss or as a gain

1	• Is valvular heart disease severe?
2	• Does the patient have symptoms?
3	• Are symptoms related to valvular disease?
4	• What is life expectancy and expected QOL?
5	• What is the risk / benefit ratio?
6	• What does the patient want?
7	• Local circumstances for treatment choice

2012 ESC/EACTS Guidelines
2014 AHA/ACC Guidelines

Recommendation	Class	Level
For patients in whom TAVR or high-risk surgical AVR is being considered, members of a Heart Valve Team should collaborate to provide optimal patient care	I	C

Vahanian & Alfieri et al. *Eur Heart J* 2012;33:2451-96
Nishimura RA et al. *Circulation* 129:e521-643

Valve + Coronary disease

Management of patients with coronary artery disease

Diagnosis of coronary artery disease	Class	Level
Coronary angiography is recommended before valve surgery • History of coronary artery disease • Suspected myocardial ischemia • Left ventricular dysfunction • Men age > 40 • Postmenopausal women • ≥1 cardiac risk factor	I	C

Indications for Transcatheter Aortic valve implantation

	Class	Level
TAVI should only be undertaken with a multidisciplinary “heart team” including cardiologists and cardiac surgeons and other specialists if necessary.	I	C
TAVI should only be performed in hospitals with cardiac surgery on-site.	I	C
TAVI is indicated in patients with severe symptomatic AS who are not suitable for AVR as assessed by a “ heart team” and who are likely to gain improvement in their quality of life and to have a life expectancy of more than 1 year after consideration of their comorbidities.	I	B
TAVI should be considered in high risk patients with severe symptomatic AS who may still be suitable for surgery, but in whom TAVI is favoured by a “heart team” based on the individual risk profile and anatomic suitability.	IIa	B

« At the present stage, TAVI should not be performed in patients at intermediate risk for surgery and trials are required in this population. »

European Heart Journal 2012 - doi:10.1093/eurheartj/ehs109 &
European Journal of Cardio-Thoracic Surgery 2012 -
doi:10.1093/ejcts/ezs455).

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Contraindications for transcatheteter aortic valve implantation

Absolute contraindications

Absence of a “heart team” and no cardiac surgery on the site.
Appropriateness of TAVI, as an alternative to AVR, not confirmed by a “heart team”.

Clinical

- Estimated life expectancy < 1 year.
- Improvement of quality of life by TAVI unlikely because of comorbidities.
- Severe primary associated disease of other valves with major contribution to the patient’s symptoms that can be treated only by surgery.

Anatomical

- Inadequate annulus size (< 18 mm, > 29 mm).
- Th
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We need evidence in patients with « relative contra indications »

ulus and

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Relative contraindications

- Bicuspid or non-calcified valves.
- Untreated coronary artery disease requiring revascularization.
- Haemodynamic instability.
- LVEF < 20%.
- For transapical approach: severe pulmonary disease, LV apex not accessible.

European Heart Journal 2012 - doi:10.1093/eurheartj/ehs109 & European Journal of Cardio-Thoracic Surgery 2012 - doi:10.1093/ejcts/ezs455).

ESC/ EACTS Guidelines for the Management of Valvular Heart Disease

« Treating bioprosthetic failure by transcatheter valve-in-valve implantation cannot be considered as a valid alternative to surgery except in inoperable or high-risk patients as assessed by a ‘heart team’. »

(Eur Heart J 2012;33: 2451–2496.)

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"I'm not here for committing a crime — I'm here for failing to comply with a guideline."

1. Scientific evidence is often lacking (subgroups)

2. Findings may be misleading because of design flaws → bias or poor generalizability

3. Guideline development groups often lack the time, resources, and skills to gather and scrutinise every last piece of evidence

4. Recommendations involve subjective value judgments when the benefits are weighed against the harms

5. What is best for patients overall, may be inappropriate for individuals

6. Guidelines encompass recommendations for which evidence is extrapolated from clinical trials

Take Home Message

- Aging population: more complex patients
- Shortcomings of Guidelines and Risk scores
- Heart-team should estimate risk-benefit ratio: cardiac-intensivist involvement
- Low flow low gradient AoS: TAVI an alternative

What looks safe .....

Patient with severe Aortic Stenosis

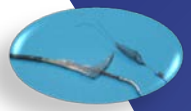
75 year old male, EF 55%, no co-morbidities

- STS score: 1%
- Euroscore I: 4%
- Euroscore II: 1%

85 year old female, EF 30%, renal insufficiency, pulmonary hypertension

- STS score: 12%
- Euroscore I: 50%
- Euroscore II: 6%

Newer devices, less complications



Durability issue: both for surgical AVR and TAVI

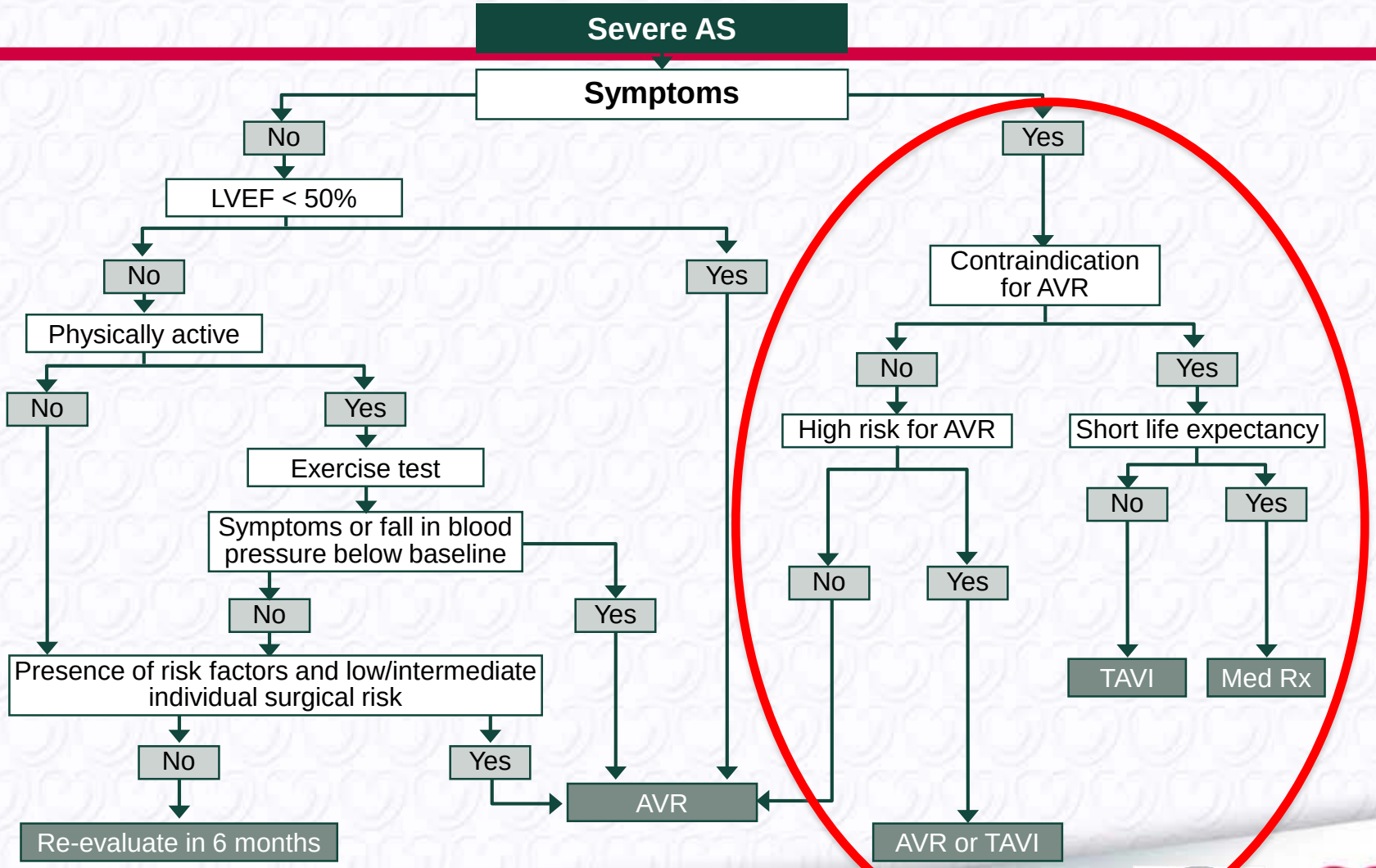
Heart-team should estimate risk-benefit ratio

Patients first opt for the less invasive option

Advantages Heart-team

One	• Decision-making more accurate according to guidelines
Two	• Team has more knowledge than an individual
Three	• Higher ratings of patients' experience of care
Four	•Physicians "share the burden"
Five	• Liability
Six	• Increased trial recruitment
Seven	• Adjustment of the limitations of Risk scores

Management of severe aortic stenosis



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Risk factors not in scores

1. Hostile chest
2. Liver cirrhosis
3. Porcelain aorta
4. Frailty
5. Hospital / surgeon experience

Surgeon

Cardiologist

Pulmonologist

Patient

Anesthesiologist

Geriatrician

“No off course no Heart team”

Because:

- Time consuming: money!
- We have trials / guidelines
- Heart-team → Delay in treatment

Advancements in TAVI