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The Global Burden of Valvular Heart Disease in Europe



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Disclosures

• None



• Unbiased estimations of the prevalence and incidence of valvular heart disease (VHD) need to be performed in representative populations in the community.

• A reliable detection of VHD requires systematic echocardiography, which is difficult to implement in large population samples.

• Data from hospital setting are more complete but select only the most severe presentations of the disease.

Prevalence of Valvular Heart Disease in the Community

- 11 911 randomly selected patients with echo
- Age-adjusted prevalence of VHD 2.5% [95% CI 2.2-2.7]



• Prevalence 1.8% in a community-based study

(Nkomo et al. Lancet 2006;368:1005-11)

Prevalence of Heart Valve Disease OxVALVE Population Cohort Study

- Prospective echocardiographic screening in 2500 Oxfordshire inhabitants aged ≥ 65 years in primary care practice
- At least mild valvular disease:
 - 51% newly diagnosed
 - 31% aortic sclerosis, 1.3% AS
- Moderate or severe valvular disease:
 - 4.9% previously diagnosed
 - 6.4% newly diagnosed (0.7% AS)

(D'Arcy et al. Eur Heart J 2016;37:3515-22)



OxVALVE Population Cohort Study

Variables associated with a new diagnosis of valvular heart disease



Global Burden of Disease of Non-Rheumatic VHD

Analysis of calcific aortic valve disease and degenerative mitral valve disease in 195 countries between 1990 and 2017.

- Prevalence increase of 124% for CAVD and 94% for degenerative mitral valve disease
- Age-standardized mortality rates



(Yadgir et al. Circulation 2020;141:1670-80) Age-standardized prevalence (/100,000) in 2017

Calcific aortic valve disease



Degenerative mitral valve disease

 <50</td>
 200 to

 50 to 100
 250 to

 100 to 150
 300 to

 150 to 200
 >350

(Yadgir et al. Circulation 2020;141:1670-80)

Global Prevalence of Valvular Disease



Prevalence (per 100,000 population)

(Coffey et al. Nat Rev Cardiol 2021 Online 25 June)



Prevalence of Moderate/Severe AS

Calcific aortic stenosis

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Prevalence of Severe AS in the Elderly

Severe AS in patients>75y old Random-effects model



- Estimated prevalence: 3.4% severe AS after 75
- 76% symptomatic (prevalence 2.6%)

(Osnabrugge et al. J Am Coll Cardiol 2013;62:1002-12)

Perspectives in the Burden of Severe Symptomatic AS

Million of patients



(Osnabrugge et al. J Am Coll Cardiol 2013;62:1002-12)

Cumulative burden of clinically significant aortic stenosis

- 5778 patients aged ≥ 65 yrs recruited in the Cardiovascular Health Study (1989-1990 and 1994-1995) with echocardiography at baseline.
- Clinical follow-up up to 25 years with >90% evaluation of AS severity available in patients who experienced AS-related events.
- 20-year cumulative frequency 3.7% for probable or definite clinically significant AS (cumulative incidence 2.9% per year).



(Owens et al. Heart 2021; online June 2)

Prevalence of Mitral and Tricuspid Valve Disease OxVALVE Population Cohort Study

- 4755 subjects ≥ 65 years undergoing echocardiographic screening (n=4009) or with pre-existing valve disease (n=745) between 2009 and 2016.
- Prevalence of ≥ moderate mitral or tricuspid regurgitation with 95% confidence intervals

	65-74 years	≥ 75 years
Primary MR	1.3 [0.9-1.8]	4.8 [3.9-5.8]
Secondary MR	0.6 [0.4-0.9]	2.0 [1.4-2.7]
TR	1.1 [0.8-1.6]	6.6 [5.5-7.8]

(Cahilll et al. Heart 2021;107:1003-9)

EORP VHD II Survey on Valvular Disease

7247 patients included in 28 countries (January-August 2017)



Northern = 503

North African = 218

Eastern = 2418

Aetiologies of Native Valve Disease

Euro Heart Survey (2001)

VHD II (2017)



Patient Characteristics

	AS	AR	MS	MR	Multiple left	Isolated right	Previous Interv.
Age (years)	76 [67-83]	58 [48-69]	59 [45-68]	68 [60-77]	75 [65-82]	74 [65-81]	70 [59-78]
≥ 80 yrs (%)	38	6	6	17	33	26	36
Female (%)	43	19	75	44	54	59	21
HF < 1 yr. (%)	16	11	17	27	24	25	17
NYHA III-IV (%)	37	19	45	47	50	52	26
A. Fib (%)	14	6	46	35	30	57	32
Charlson index	4 [3-6]	2 [1-3]	2 [1-3]	3 [2-5]	4 [3-6]	4 [3-6]	3 [2-5]
Euroscore II	1.9 [1.1-3.4]	1.0 [0.6-1.9]	1.2 [0.8-2.2]	2.0 [1.0-4.0]	2.3 [1.3-4.7]	2.3 [1.4-4.3]	3.0 [1.6- 6.0]

Age

VHD II (2017)

Euro Heart Survey (2001)



Swedish Nationwide Registry

- Diagnosis of valvular disease (ICD codes) in patients hospitalized between 2003 and 2010 in the Swedish population (10 million inhabitants)
- Overall incidence 64 per 100 000 pt/yr





(Andell et al. Heart 2017;103:1696-1703)

Endocarditis in France in 2008

Age: 62 ± 16 years (18-96) Standardized incidence: 31.7 [29.0-34.7] per million

Incidence of infective endocarditis in the study population, by age and by microoraganism



(Selton Suty et al. Clin Infect Dis 2012;54:1230-9)

Incidence of Endocarditis / Predisposing Conditions



(Thornhill et al. Eur Heart J 2018;39:586-95 Østergaard et al. Eur Heart J 2018;39:623-9 Østergaard et al. Eur Heart J 2019;40:1355-61)

Incidence of IE : Temporal Trends





60-National Institute for Health and Lancet 2015; 385: 1219-28 Care Excellence guidance change data to March, 2013 from March, 2008 50 n of 40 ns per <u>s</u>i 30. ditis ^o 20-Infec 10 1.08 2⁰ and only Time (years)

> (Thornhill et al. Lancet 2020;395:1325-7)

(Slipczuk et al. PLoS One 2013;8:e82665)

EORP EuroENDO Registry

3116 patients included in 40 countries (2016-2018)







	Total	Prosthesis+Repair	Native	PM/ICD	
	(n =3116)	(n = 939)	(n =1764)	(n = 308)	P-value
Demography					
Age (years)					
Ν	3116	939	1764	308	
Mean ± SD	59.25 ±18.03	63.36 ±16.81	55.61 ±18.45	66.77 ±14.11	<0.0001
Age >= 65 years	1443/3116 (46.3%)	538 / 939 (57.3%)	662 / 1764 (37.5%)	194 / 308 (63.0%)	<0.0001
Age >= 80 years	375 / 3116 (12.0%)	141 / 939 (15.0%)	163 / 1764 (9.2%)	56 / 308 (18.2%)	<0.0001
Females (%)	969 / 3116 (31.1%)	292 / 939 (31.1%)	553 / 1764 (31.3%)	86 / 308 (27.9%)	0.4901

(Habib et al. Eur Heart J 2019)



- Population-based studies now allow reliable estimations of the prevalence and incidence of VHD, and show that they were previously underestimated.
- There is a high and increasing burden of non-rheumatic VHD in industrialized countries, closely related to population ageing and socio-economic status.
- There is a steep increase in the prevalence and incidence of VHD in the elderly.
- The incidence of infective endocarditis is increasing and presentation is changing.

➤Consequences:

- Expected increase in the burden of VHD in the next decades.
- More complex decision-making for indications of interventions.