Aortic Valve Controversies
Beyond risk assessment: TAVI for Everybody

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9th Interventional Symposium on **High Risk and Innovative Cardiac Interventions**

Meet The Experts **MTE 2016**

Università della Svizzera Italiana
Lugano
Switzerland

21st - 23rd June, 2016

1. Actually Guidelines

2. Change in treated patients

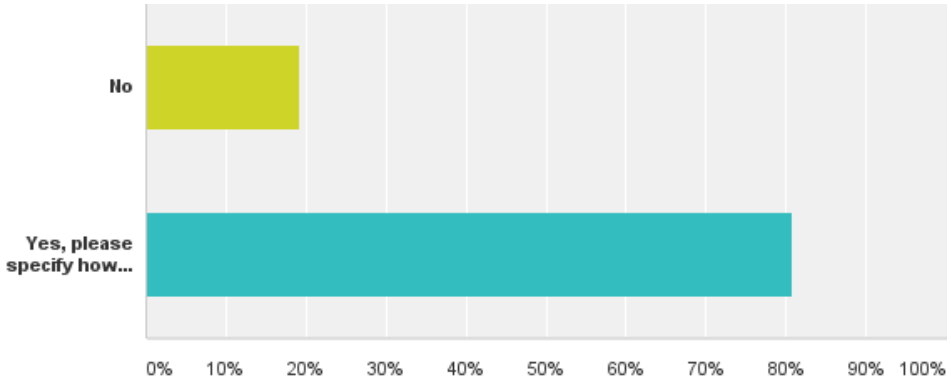
3. Change in guidelines…

Table 11 Recommendations for the use of transcatheter aortic valve implantation

Recommendations	Class [a]	Level [b]	Ref [c]
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	99
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	97

In your Center, are there regularly scheduled heart team meetings to discuss TAVI patient selection?

(EAPCI survey in press)



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The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 OCTOBER 21, 2010 VOL. 363 NO. 17

Transcatheter Aortic-Valve Implantation for Aortic Stenosis in Patients Who Cannot Undergo Surgery

Martin B. Leon, M.D., Craig R. Smith, M.D., Michael Mack, M.D., D. Craig Miller, M.D., Jeffrey W. Moses, M.D., Lars G. Svensson, M.D., Ph.D., E. Murat Tuzcu, M.D., John G. Webb, M.D., Gregory P. Fontana, M.D., Raj R. Makkar, M.D., David L. Brown, M.D., Peter C. Block, M.D., Robert A. Guyton, M.D., Augusto D. Pichard, M.D., Joseph E. Bavaria, M.D., Howard C. Herrmann, M.D., Pamela S. Douglas, M.D., John L. Petersen, M.D., Jodi J. Akin, M.S., William N. Anderson, Ph.D., Duolao Wang, Ph.D., and Stuart Pocock, Ph.D., for the PARTNER Trial Investigators*

STS 11,2%

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 9, 2011 VOL. 364 NO. 23

Transcatheter versus Surgical Aortic-Valve Replacement in High-Risk Patients

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STS 11,8%

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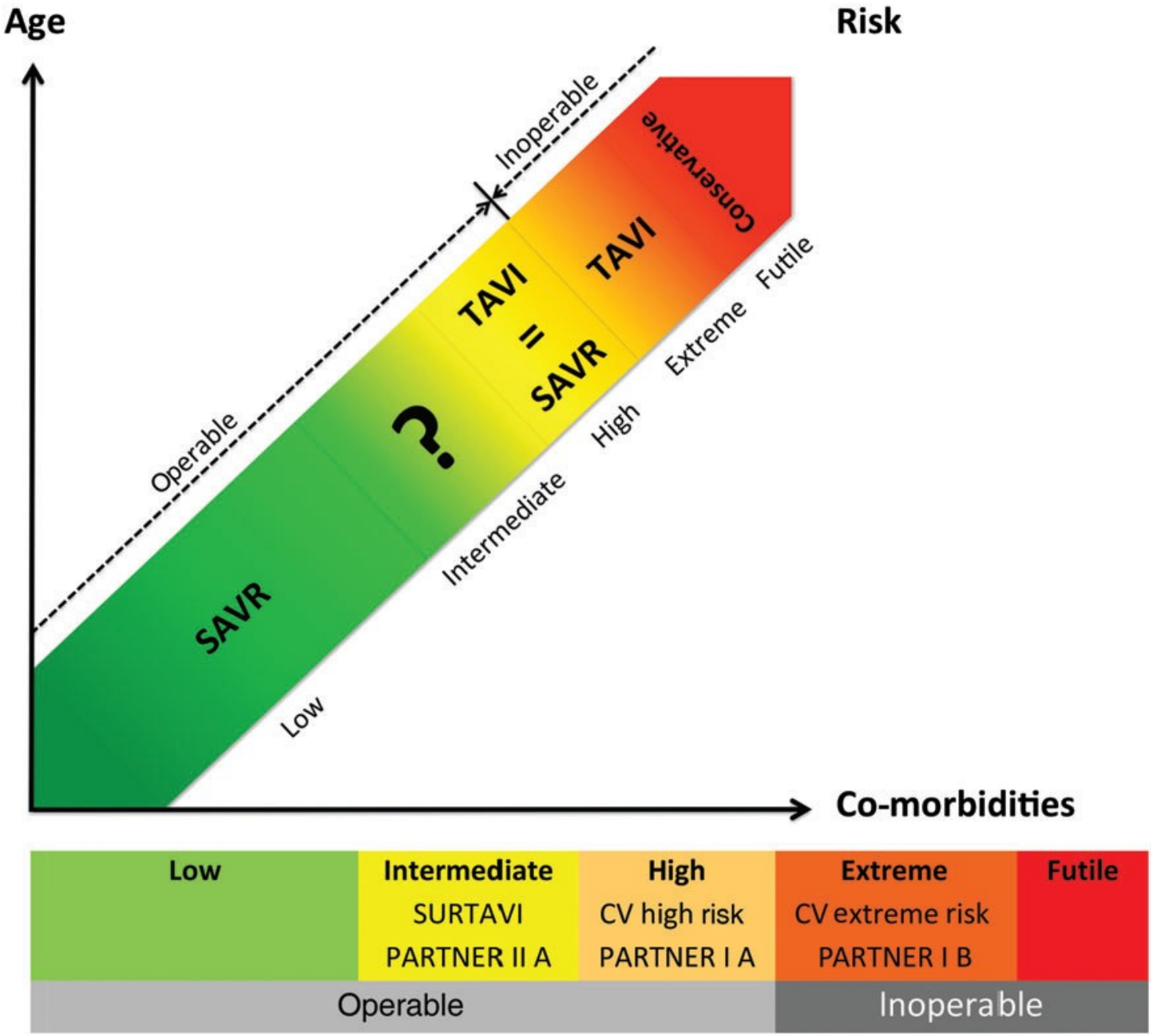
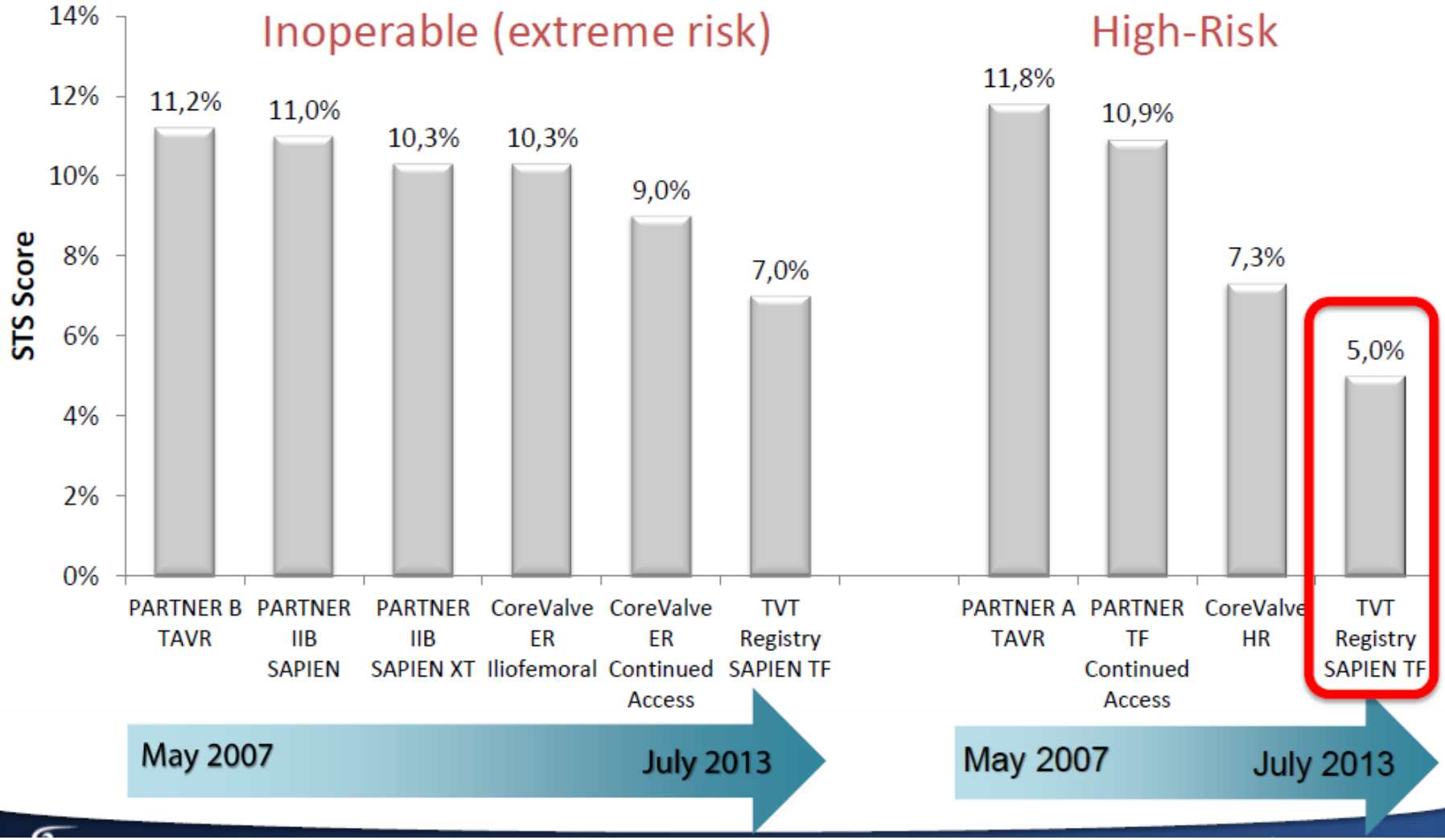
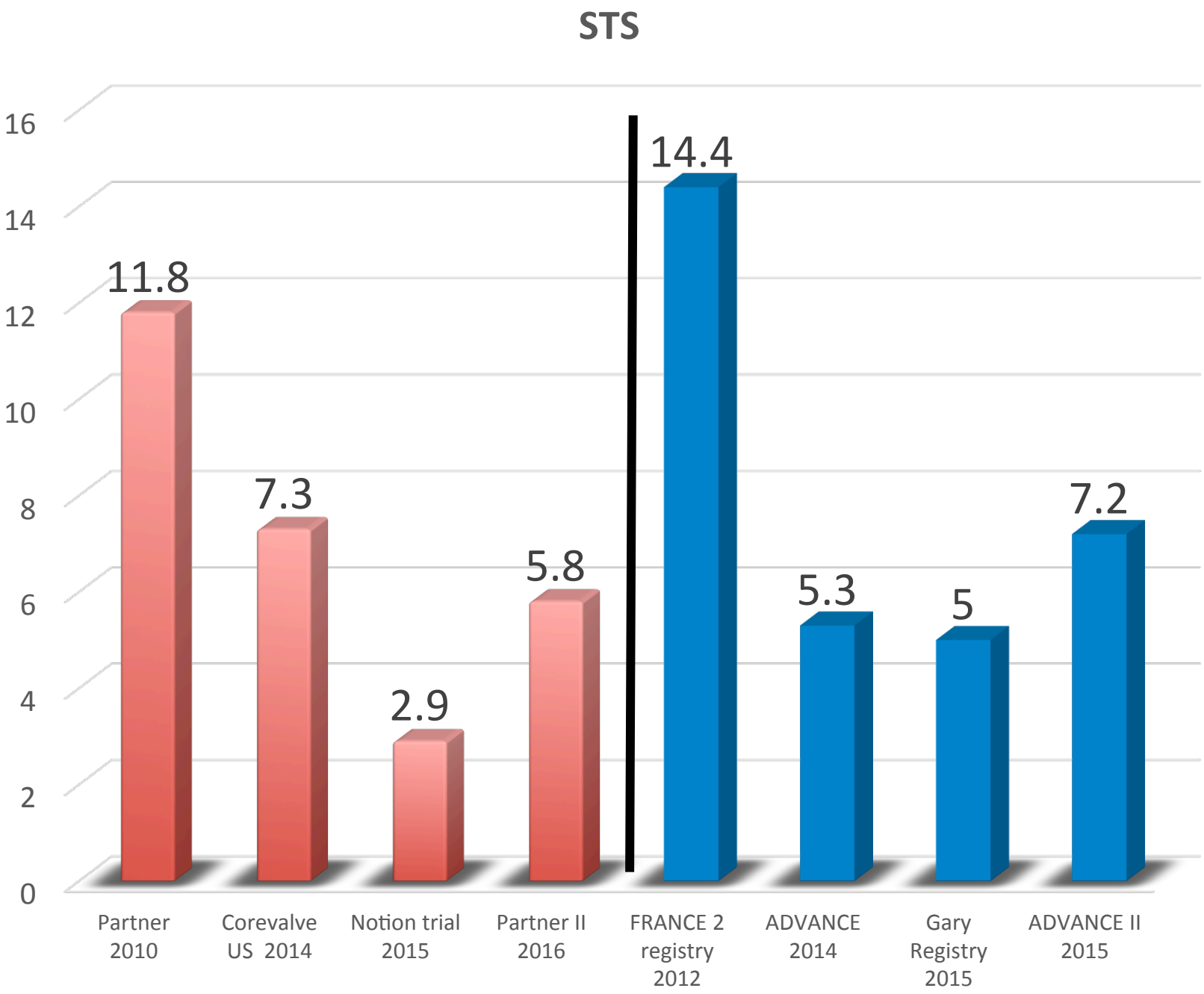

Age
Risk
Inoperable
Conservative
TAVI
TAVI
=
SAVR
?
SAVR
Operable
Low
Intermediate
High
Extreme
Futile
Co-morbidities
Low
Intermediate
SURTAVI
PARTNER II A
High
CV high risk
PARTNER I A
Extreme
CV extreme risk
PARTNER I B
Futile
Operable
Inoperable

Evolution in Patient Selection in U.S. TAVR Clinical Trials




STS
16
14
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10
8
6
4
2
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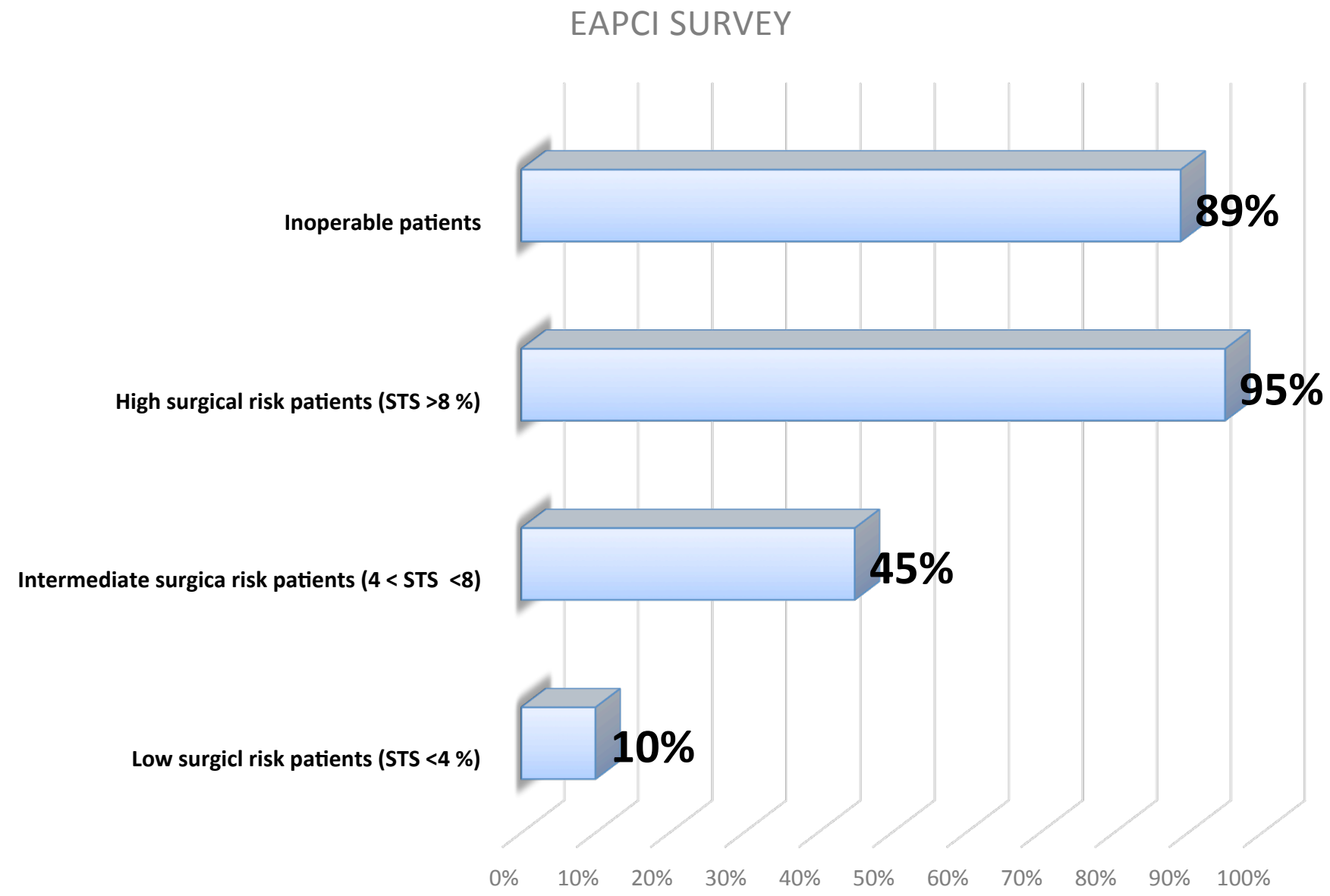
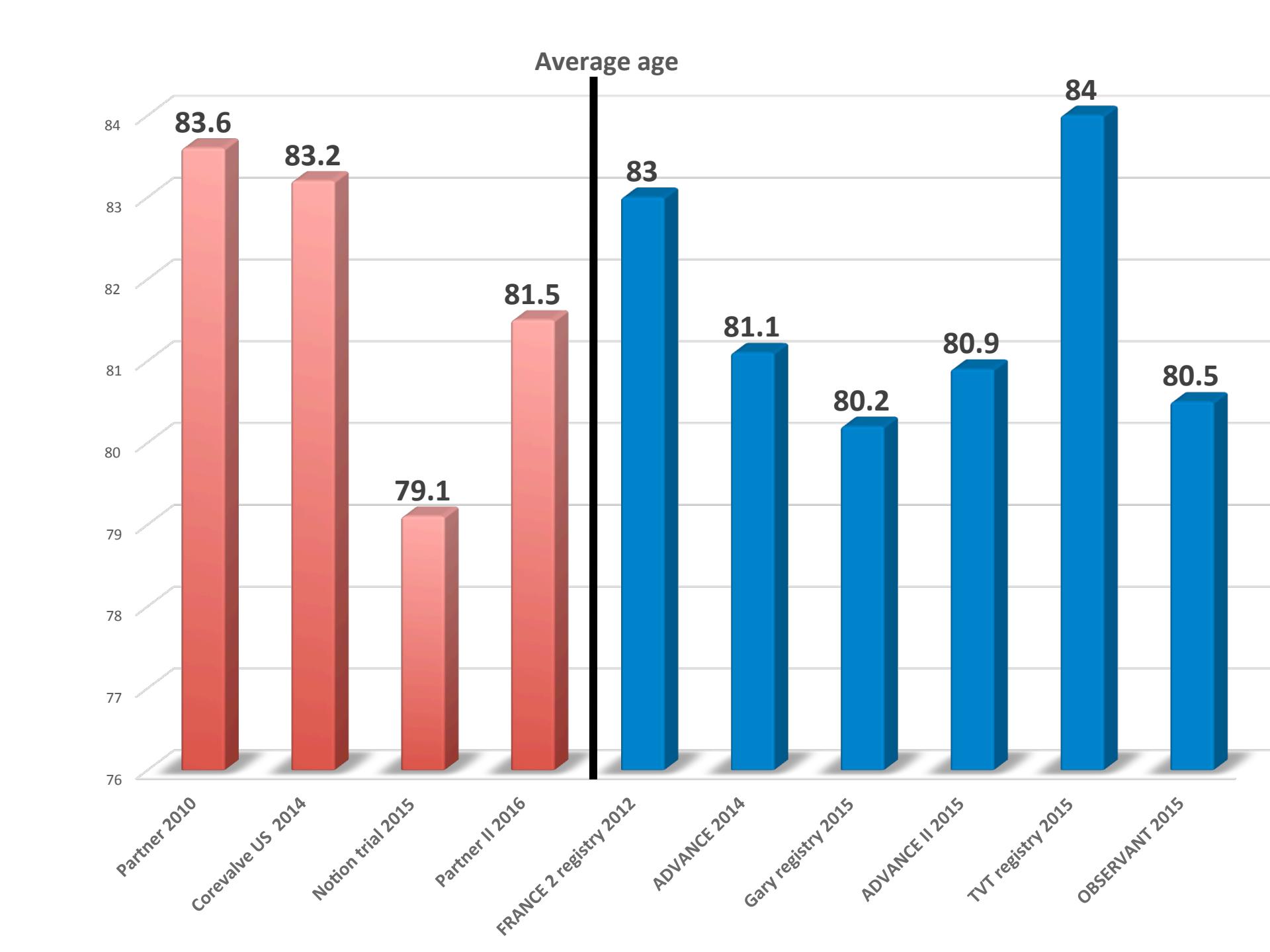
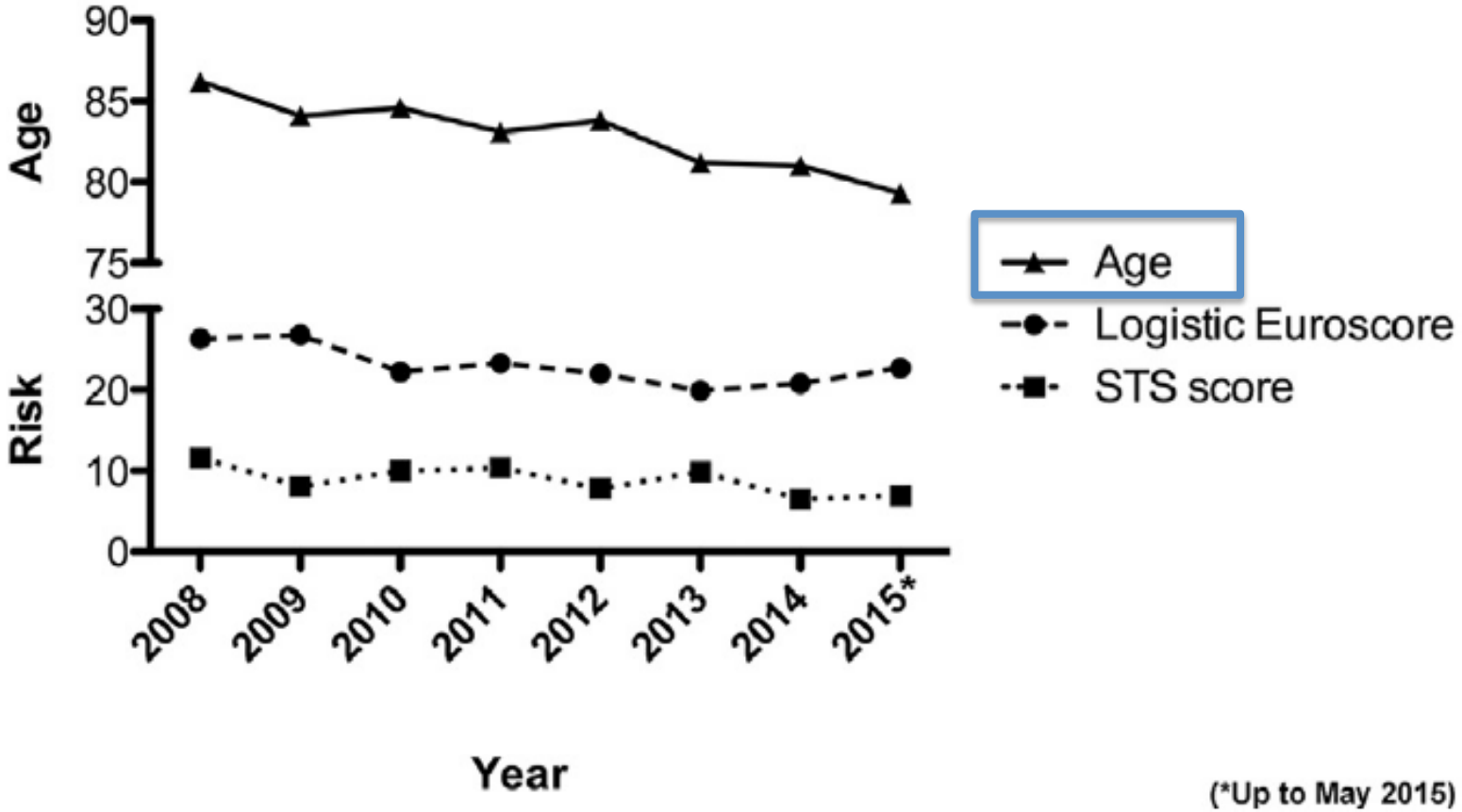
11.8
7.3
2.9
5.8
14.4
5.3
5
7.2
Partner 2010
Corevalve US 2014
Notion trial 2015
Partner II 2016
FRANCE 2 registry 2012
ADVANCE 2014
Gary Registry 2015
ADVANCE II 2015



Petronio et all, in press Eurointervention


Average age
84
83
82
81
80
79
78
77
76
83.6
83.2
79.1
81.5
83
81.1
80.2
80.9
84
80.5
Partner 2010
Corevalve US 2014
Notion trial 2015
Partner II 2016
FRANCE 2 registry 2012
ADVANCE 2014
Gary registry 2015
ADVANCE II 2015
TVT registry 2015
OBSERVANT 2015

Long-Term Outcomes After Transcatheter Aortic Valve Implantation from a Single High-Volume Center (The Milan Experience)



Neil Ruparelia Am J Cardiol 2016

Annual Outcomes With Transcatheter Valve Therapy

From the STS/ACC TVT Registry

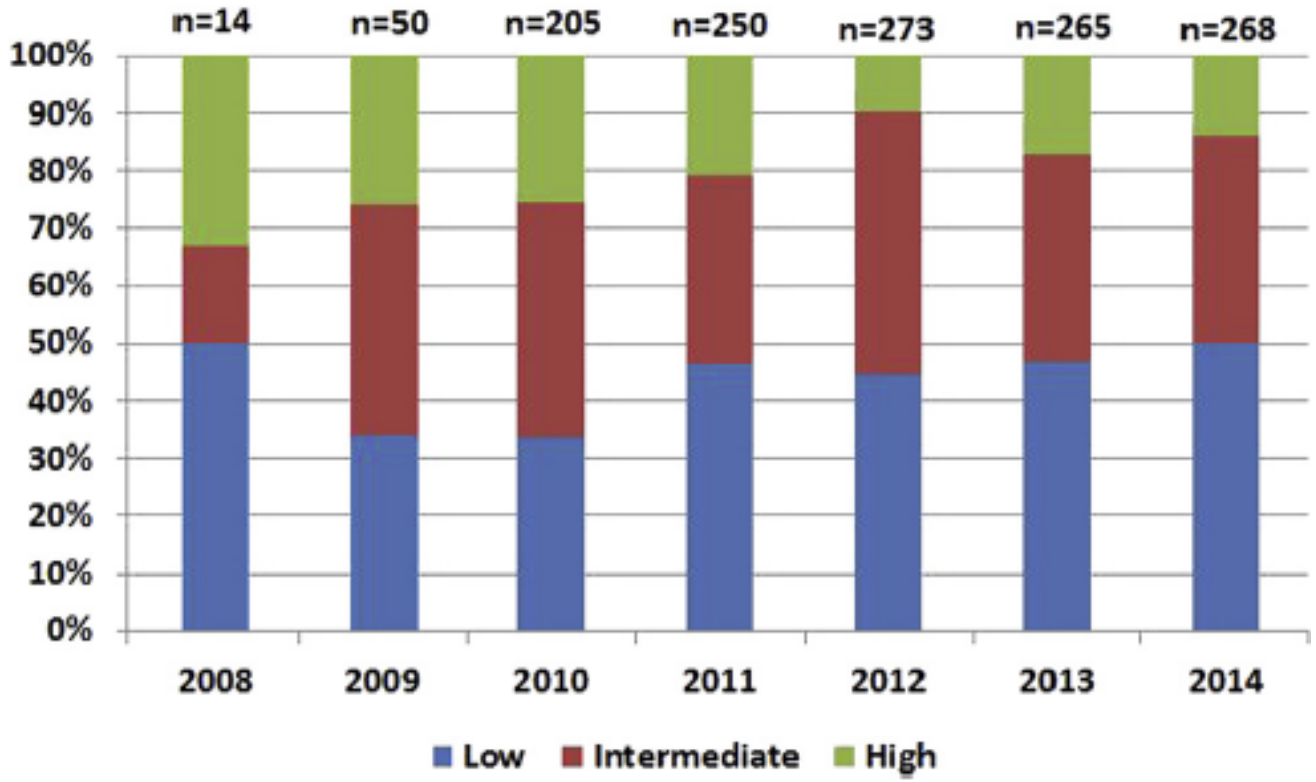
TABLE 1 Patient Demographics and Baseline Characteristics of Patients Undergoing TAVR

	2012-2014 (n = 26,378)	2012-2013 (n = 13,629)	2014 (n = 12,785)	p Value
Demographics				
Sex				<0.0001
Male	50.5	48.8	52.3	
Female	49.5	51.2	47.8	
Age, yrs				<0.0001
Mean	82.0	82.0	81.0	
Median	84.0	84.0	83.0	
Race				
White	93.8	94.2	93.5	0.0155
Black	3.8	3.7	4.0	0.2807
Cardiac history				
Permanent pacemaker	16.8	17.0	16.5	0.2996
Prior ICD	4.3	4.2	4.5	0.3789
Prior PCI	35.6	35.5	35.7	0.7176
Prior CABG	31.4	32.2	30.5	0.0031
Prior cardiac surgeries (open heart)	32.5	33.0	32.0	0.0589
1 previous surgery	27.8	28.0	27.7	
2 previous surgeries	4.0	4.3	3.7	
Prior bioprosthetic aortic valve	2.2	1.9	2.6	<0.0001
Prior aortic valve balloon valvuloplasty	13.8	14.8	12.7	<0.0001
Prior mitral, tricuspid, or pulmonic valve procedure	2.7	2.8	2.6	0.4716

Holmes et al. ; JAAC 2015

Outcomes of Patients at Estimated Low, Intermediate, and High Risk Undergoing Transcatheter Aortic Valve Implantation for Aortic Stenosis

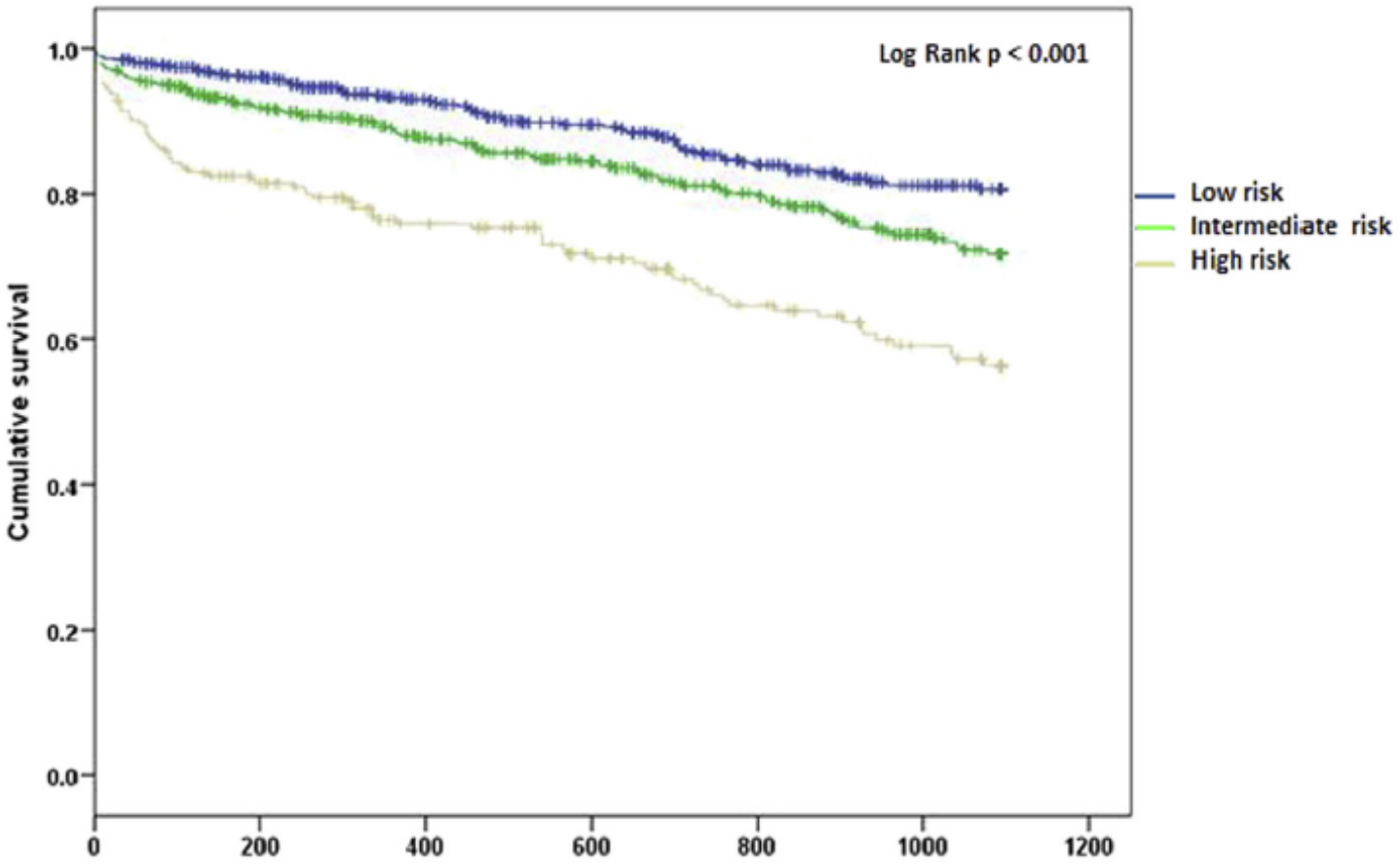
Israel Moshe Barbash, MD[a,b,*], Ariel Finkelstein, MD[b,c], Alon Barsheshet, MD[b,d], Amit Segev, MD[a,b], Arie Steinvil, MD[b,c], Abid Assali, MD[b,d], Yanai Ben Gal, MD[b,c], Hana Vaknin Assa, MD[b,d], Paul Fefer, MD[a,b], Alex Sagie, MD[b,d], Victor Guetta, MD[a,b], and Ran Kornowski, MD[b,d]



N= 1327

P<0.001

(Am J Cardiol 2015;116:1916–1922)



Low	575	489	390	319	244	182	153
Intermediate	495	407	333	276	219	149	124
High	222	172	139	110	88	68	60

(Am J Cardiol 2015;116:1916–1922)

Clinical outcomes of patients with estimated low or intermediate surgical risk undergoing transcatheter aortic valve implantation

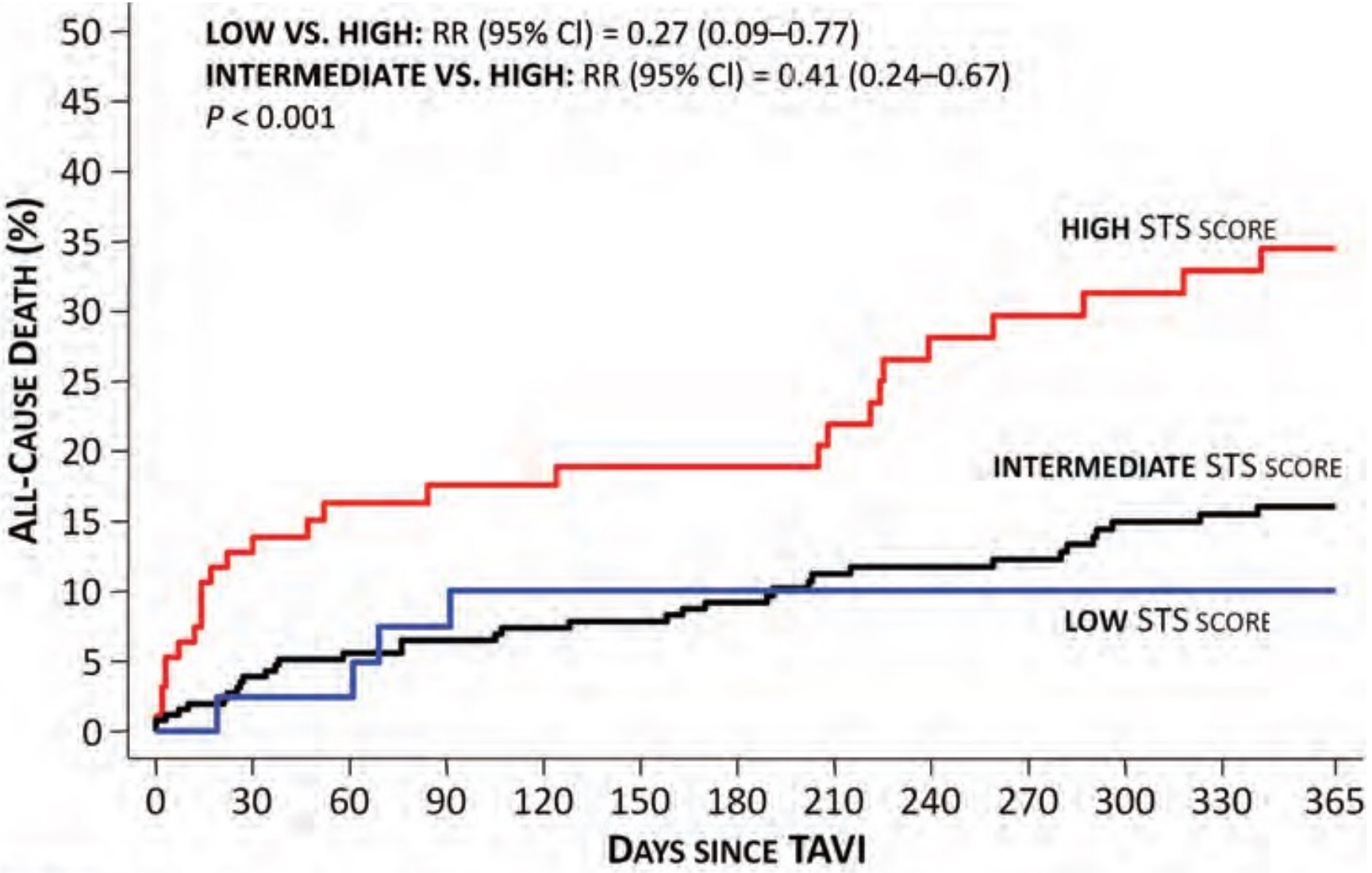
	All patients, N = 389	STS risk group			P-value
		Low, N = 41	Intermediate, N = 254	High, N = 94	
Age (years)	82.5 ± 5.8	78.2 ± 6.7	82.7 ± 5.7	83.7 ± 4.9	<0.001
Female gender, *n* (%)	224 (58%)	20 (49%)	145 (57%)	59 (63%)	0.31
Body mass index (kg/m^2)	26.2 ± 5.1	28.1 ± 6.1	26.5 ± 4.9	24.4 ± 4.6	<0.001
Risk assessment					
Logistic EuroSCORE (%)	24.3 ± 14.2	13.2 ± 7.5	22.1 ± 11.9	35.1 ± 15.7	<0.001
STS score (%)	6.8 ± 5.3	2.1 ± 0.5	5.1 ± 1.4	13.3 ± 7.1	<0.001
Access route					
Transfemoral, *n* (%)	308 (79%)	33 (80%)	200 (79%)	75 (80%)	0.94
Transapical, *n* (%)	76 (20%)	8 (20%)	50 (20%)	18 (19%)	
Transsubclavian, *n* (%)	5 (1%)	0 (0%)	4 (2%)	1 (1%)	
Valve type					
Medtronic CoreValve, *n* (%)	224 (58%)	25 (61%)	148 (58%)	51 (54%)	0.72
Edwards Sapien valve, *n* (%)	165 (42%)	16 (39%)	106 (42%)	43 (46%)	

Low: STS <3

Intermediate: 3≤x ≤ 8

High>8

Wenaweser et al; Eur Heart Journal 2013



Wenaweser et al; Eur Heart Journal 2013

Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients

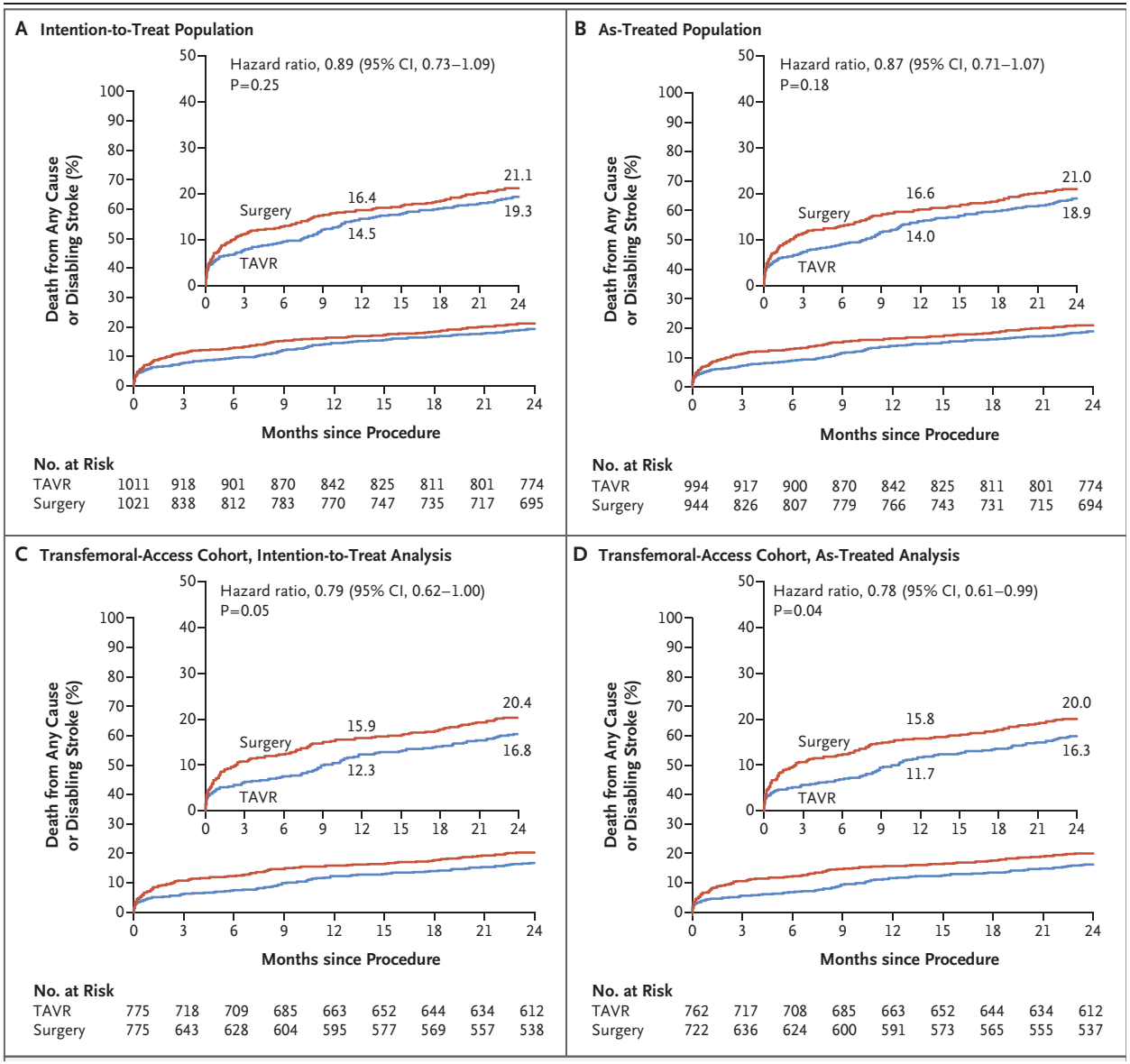
Intermediate risk patients

Table 1. Characteristics of the Patients at Baseline.*

Characteristic	TAVR (N=1011)	Surgery (N=1021)
Age — yr	81.5±6.7	81.7±6.7
Male sex — no. (%)	548 (54.2)	560 (54.8)
Body-mass index†	28.6±6.2	28.3±6.2
STS risk score‡	5.8±2.1	5.8±1.9
NYHA class III or IV — no./total no. (%)	782/1011 (77.3)	776/1020 (76.1)
Coronary artery disease — no. (%)	700 (69.2)	679 (66.5)
Previous myocardial infarction — no. (%)	185 (18.3)	179 (17.5)
Previous CABG — no. (%)	239 (23.6)	261 (25.6)
Previous PCI — no. (%)	274 (27.1)	282 (27.6)
Previous balloon aortic valvuloplasty — no. (%)	51 (5.0)	50 (4.9)
Cerebral vascular disease — no. (%)	325 (32.1)	317 (31.0)
Peripheral vascular disease — no. (%)	282 (27.9)	336 (32.9)
Diabetes mellitus — no. (%)	381 (37.7)	349 (34.2)
COPD — no. (%)		
Any	321 (31.8)	306 (30.0)
Oxygen-dependent	34 (3.4)	32 (3.1)

Leon et al; NEJ 2016

Intermediate risk patients



Leon et al; NEJ 2016

Transcatheter aortic valve replacement versus surgical valve replacement in intermediate-risk patients: a propensity score analysis

	TAVR population (n=1077)	Surgery population (n=944)	p value
Age (years)	81·9 (6·6)	81·6 (6·76)	0·23
Men	665 (62%)	519 (55%)	0·002
Body-mass index (kg/m²)	28·7 (6·1)	28·4 (6·2)	0·32
Society of Thoracic Surgeons score (%)	5·2 (4·3–6·3)	5·4 (4·4–6·7)	0·0002
NYHA class III or IV	781 (73%)	718/943 (76%)	0·07
Coronary artery disease	750 (70%)	628 (67%)	0·14
Previous myocardial infarction	172 (16%)	167 (18%)	0·31
Previous CABG	301 (28%)	243 (26%)	0·27
Previous PCI	344 (32%)	254 (27%)	0·01
Previous BAV	55 (5%)	45 (5%)	0·76
Cerebrovascular disease	97 (9%)	97 (10%)	0·36
Peripheral vascular disease	304 (28%)	304 (32%)	0·052
COPD			
Any	322/1075 (30%)	283/938 (30%)	0·92
Oxygen dependent	54/1070 (5%)	28/931 (3%)	0·02
Creatinine ≥177 µmol/L	81 (8%)	51 (5%)	0·058
Atrial fibrillation	388 (36%)	329 (35%)	0·61
Permanent pacemaker	142 (13%)	113 (12%)	0·42

Thourani et al; Lancet 2016

	30 days						1 year					
	SAPIEN 3 TAVR			Surgical valve replacement			SAPIEN 3 TAVR			Surgical valve replacement		
	Events (n)	Cumulative KM estimates	Numbers at risk	Events (n)	Cumulative KM estimates	Numbers at risk	Events (n)	Cumulative KM estimates	Numbers at risk	Events (n)	Cumulative KM estimates	Numbers at risk
Death												
From any cause	12	1·1%	1063	38	4·0%	902	79	7·4%	963	121	13·0%	795
Cardiac death	10	0·9%	1063	29	3·1%	902	47	4·5%	963	74	8·1%	795
Non-cardiac death	2	0·2%	1063	9	1·0%	902	32	3·1%	963	47	5·3%	795
Neurological events												
Transient ischaemic attack	4	0·4%	1059	4	0·4%	898	18	1·8%	945	15	1·7%	782
Any stroke	29	2·7%	1035	57	6·1%	852	49	4·6%	930	75	8·2%	743
Disabling stroke	11	1·0%	1053	41	4·4%	868	24	2·3%	953	54	5·9%	764
Non-disabling stroke	18	1·7%	1045	16	1·7%	886	25	2·4%	940	22	2·4%	773
Death from any cause or disabling stroke	22	2·0%	1053	75	8·0%	868	90	8·4%	953	155	16·6%	764

Thourani et al; Lancet 2016

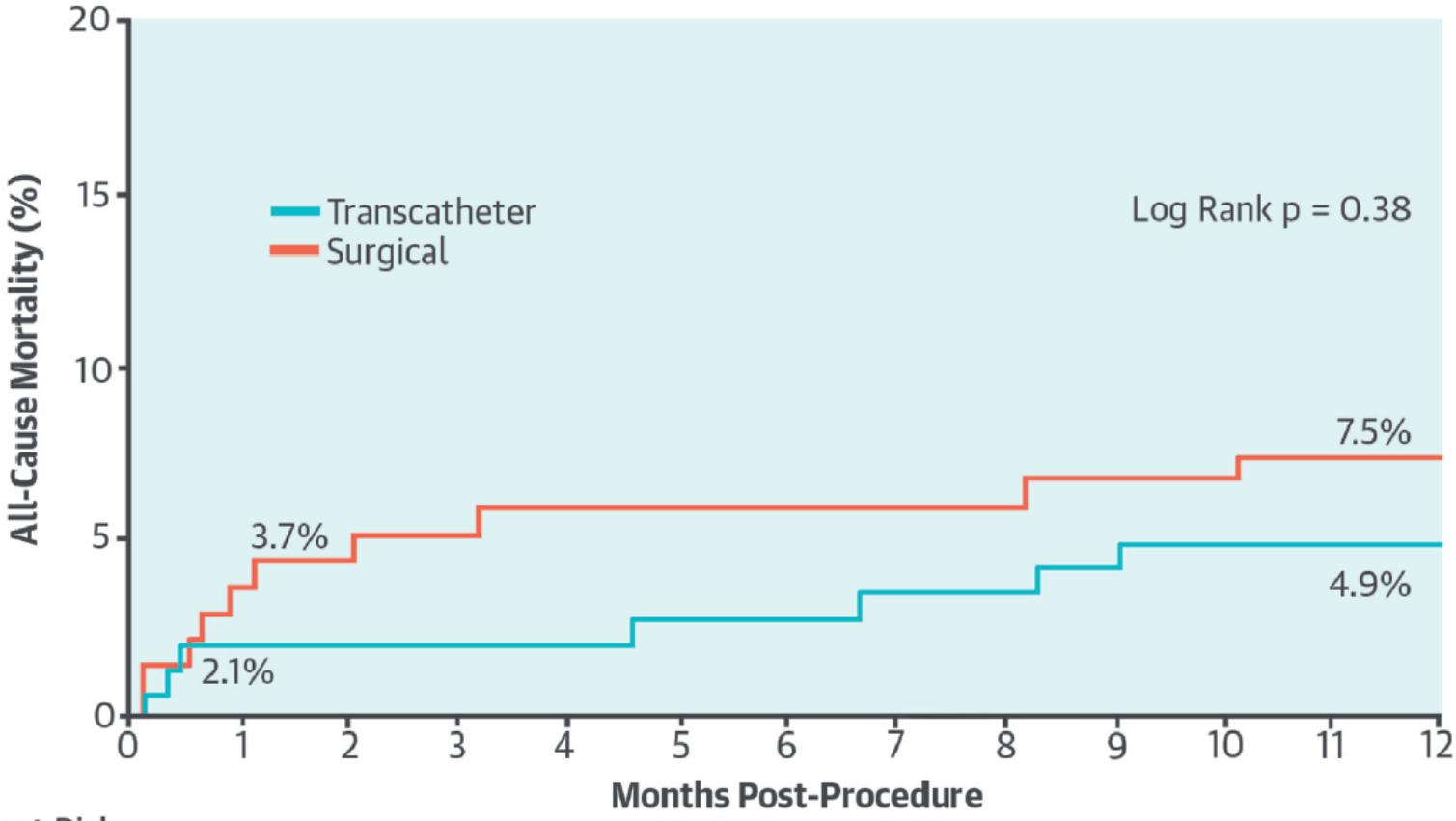
Transcatheter Versus Surgical Aortic Valve Replacement in Patients With Severe Aortic Valve Stenosis

1-Year Results From the All-Comers NOTION Randomized Clinical Trial

Low risk patients

	TAVR* (n = 145)	SAVR* (n = 135)
Age, yrs	79.2 ± 4.9	79.0 ± 4.7
Male	78/145 (53.8)	71/135 (52.6)
NYHA functional classification		
I	7/144 (4.9)	3/134 (2.2)
II	67/144 (46.5)	70/134 (52.2)
III	67/144 (46.5)	57/134 (42.5)
IV	3/144 (2.1)	4/134 (3.0)
STS-PROM score, %	2.9 ± 1.6	3.1 ± 1.7
Logistic EuroSCORE, %	8.4 ± 4.0	8.9 ± 5.5
Logistic EuroSCORE II, %	1.9 ± 1.2	2.0 ± 1.3
Additive EuroSCORE, %	7.4 ± 1.4	7.5 ± 1.4
Diabetes mellitus	26/145 (17.9)	28/135 (20.7)
Creatinine level >2 mg/dl	2/145 (1.4)	1/135 (0.7)
History of hypertension	103/145 (71.0)	103/135 (76.3)
Peripheral vascular disease	6/145 (4.1)	9/135(6.7)
Prior cerebrovascular accident	24/145 (16.6)	22/135 (16.3)
Chronic lung disease	17/145 (11.7)	16/135 (11.9)

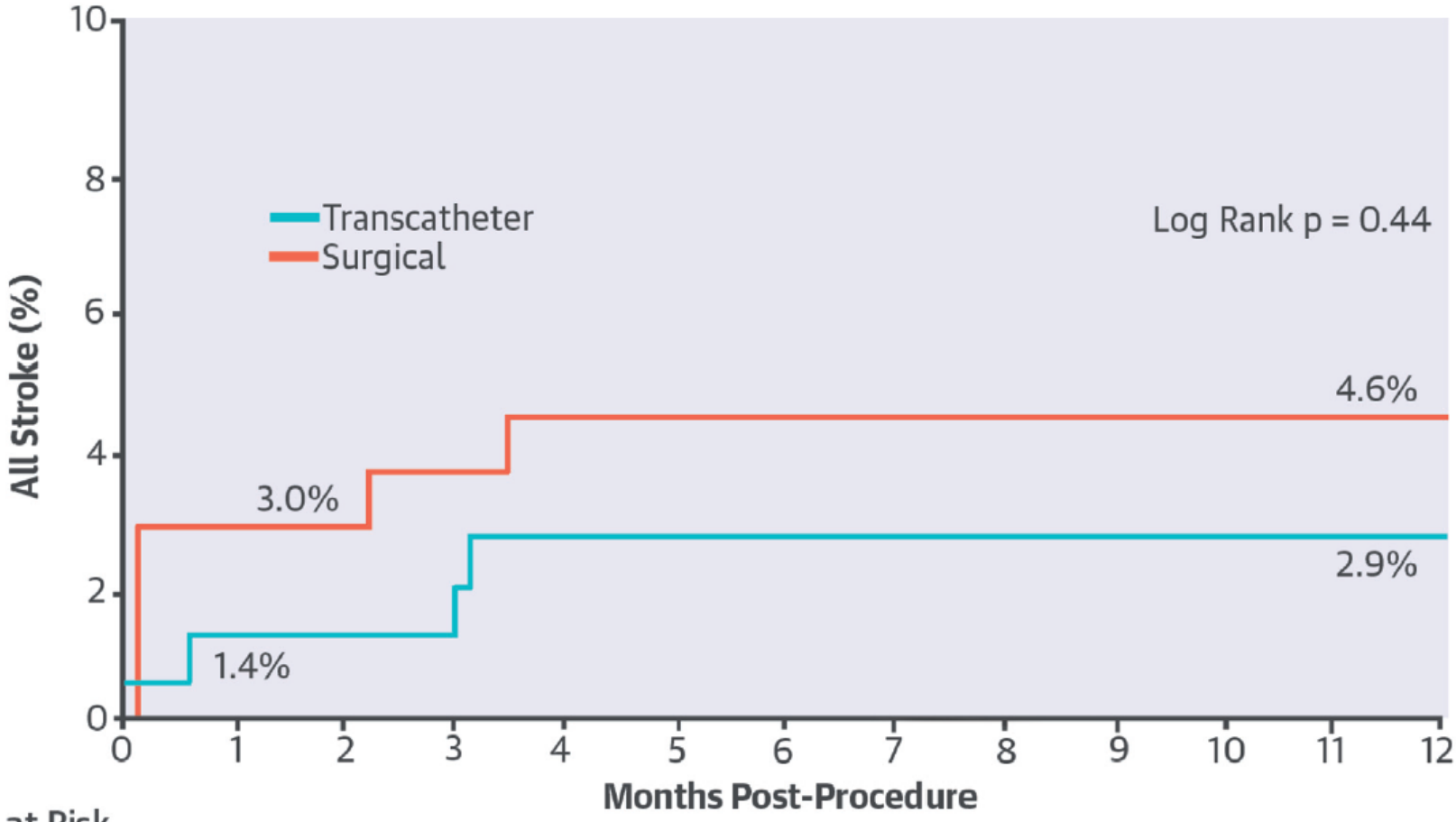
Hans Gustav H. Thyregod et al; JAAC 2015



Patients at Risk

Transcatheter	142	139	137	126
Surgical	134	128	125	115

Hans Gustav H. Thyregod et al; JAAC 2015



Patients at Risk

Transcatheter	142	137	134	123
Surgical	134	124	120	110

Hans Gustav H. Thyregod et al; JAAC 2015

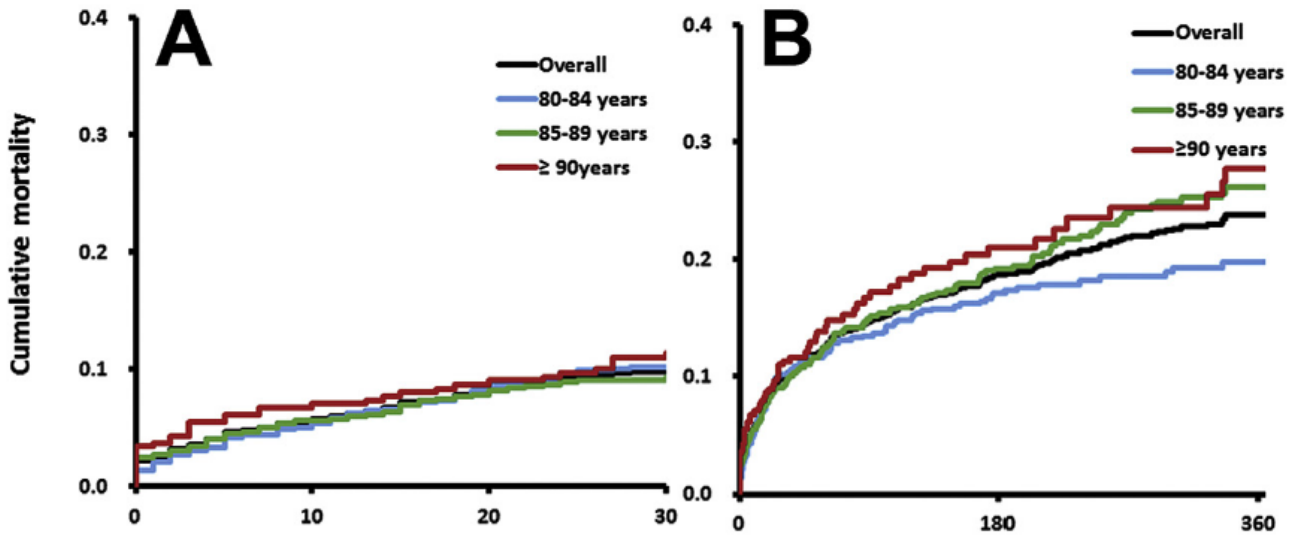
Clinical Results of Transcatheter Aortic Valve Implantation in Octogenarians and Nonagenarians: Insights From the FRANCE-2 Registry

TAVI in very elderly patients???

Variable	Age 80–84 Years (n = 855)	Age 85–89 Years (n = 1,053)	Age ≥90 Years (n = 346)	*p* Value
Baseline clinical characteristics				
Age (years)	82.7 ± 1.4	87.4 ± 1.4	91.9 ± 1.9	<0.001
Sex (female)	388/855 (45.4)	573/1,053 (54.4)	223/346 (64.5)	<0.001
Body mass index (kg/m^2)	26.2 ± 4.7	25.2 ± 4.2	24.5 ± 4.8	<0.001
Logistic EuroSCORE	23.5 ± 14.7	23.3 ± 13.9	24.9 ± 13.4	0.20
Diabetes	232/827 (28.1)	204/1,028 (19.8)	43/335 (12.8)	<0.001
Hypertension	589/827 (71.2)	710/1,028 (69.1)	231/335 (69.0)	0.56
NYHA (III/IV)	645/843 (76.5)	788/1,037 (76.0)	271/344 (78.8)	0.57
Coronary artery disease	444/827 (53.7)	473/1,028 (46.1)	147/335 (43.9)	0.001
Peripheral artery disease	283/849 (24.8)	267/1,037 (25.7)	64/346 (18.5)	<0.001
Renal insufficiency	86/849 (10.1)	94/1,037 (9.1)	20/346 (5.8)	0.057
Hemodialysis	21/827 (2.5)	18/1,028 (1.8)	2/335 (0.6)	0.080
Prior myocardial infarction	158/827 (19.1)	127/1,028 (12.4)	38/335 (11.3)	<0.001
Prior stroke	87/827 (10.5)	96/1,028 (9.3)	23/335 (7.5)	0.27
Prior coronary artery bypass graft surgery	200/827 (24.2)	110/1,028 (10.7)	16/335 (4.8)	<0.001
Prior cardiac surgery	227/849 (26.7)	122/1,037 (11.7)	19/346 (5.5)	<0.001
Acute pulmonary edema within 1 year	340/817 (41.6)	463/1,016 (45.6)	165/334 (49.4)	0.040
COPD	215/849 (25.3)	215/1,037 (20.7)	41/346 (11.8)	<0.001

Yamamoto et al Am J Cardiol 2014

This study revealed acceptable clinical results of transcatheter aortic valve implantation even in very elderly populations

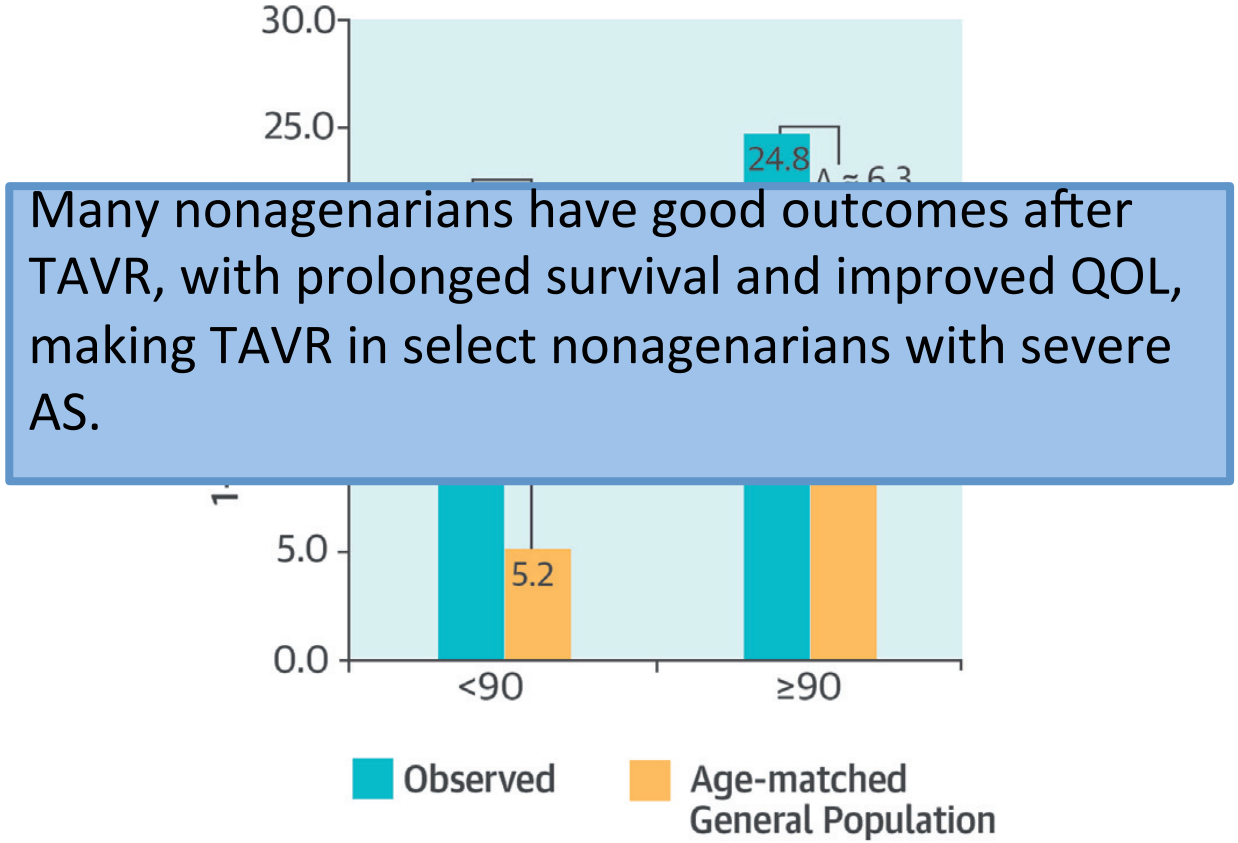


Clinical Finding	Univariate Analysis HR	95% CI	*p* Value	Multivariate Analysis HR	95% CI	*p* Value
Age groups						
80–84 y (reference)	1.00			1.00		
85–89 y	0.92	0.68–1.23	0.56	0.91	0.64–1.29	0.60
≥90 y	1.14	0.77–1.67	0.52	1.16	0.73–1.83	0.54

Yamamoto et al Am J Cardiol 2014

1-Year Mortality Observed Versus Age-matched General Population

TAVI in very elderly patients???



Many nonagenarians have good outcomes after TAVR, with prolonged survival and improved QOL, making TAVR in select nonagenarians with severe AS.

Mani Arsalan et al; JAAC 2016

1. Actually Guidelines

2. Change in treated patients

3. Change in guidelines…

The ideal guidelines in 2016…?

Table 11 Recommendations for the use of transcatheter aortic valve implantation

Recommendations	Class [a]	Level [b]	Ref [c]
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	99
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	97

Recommendations	*TAVI*	*SAVR*
High-risk patients	I - B	IIb - B
Intermediate risk patients	I - A	I - B
Low-risk patients	IIa B	I - B

Partner 1 A-Corevalve US

Corevalve US – Partner II

Notion trial

Thank you

Should Transcatheter Aortic Valve Replacement Be Performed in Nonagenarians?

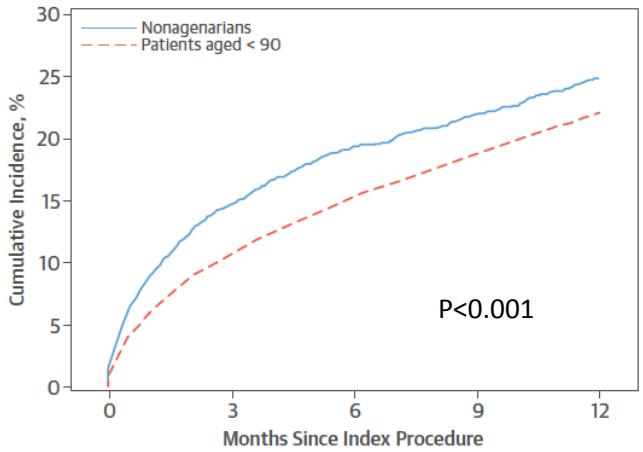
Insights From the STS/ACC TVT Registry

TAVI in very elderly patients???

	Nonagenarians (Age ≥90 yrs) (n = 3,773)	Others (Age <90 yrs) (n = 20,252)	p Value
Age, yrs	92.0 (90.0-93.0)	82.0 (76.0-86.0)	<0.001
Female	1,953 (51.76)	9,976 (49.26)	0.005
STS PROM score	9.22 (6.73-13.25)	6.34 (4.20-9.77)	<0.001
NYHA functional class I and II	670 (17.76)	3,459 (17.08)	0.347
NYHA functional class III and IV	3,055 (80.97)	16,479 (81.37)	
LVEF	58.00 (48.00-65.00)	56.00 (45.00-63.00)	<0.001
Prior CABG	693 (18.37)	6,873 (33.94)	<0.001
Prior other cardiac surgery	150 (3.98)	1,477 (7.29)	<0.001
Prior aortic valve procedure	646 (17.12)	3,239 (15.99)	0.086
Permanent pacemaker/ICD	817 (21.65)	3,209 (15.85)	<0.001
Atrial fibrillation	1,619 (42.91)	8,175 (40.37)	0.004
Prior stroke	352 (9.33)	2,587 (12.77)	<0.001
Transient ischemic attack	394 (10.44)	1,719 (8.49)	<0.001
Peripheral arterial disease	970 (25.71)	6,606 (32.62)	<0.001
Hypertension	3,266 (86.56)	18,077 (89.26)	<0.001
Diabetes mellitus	730 (19.35)	8,179 (40.39)	<0.001
Insulin-dependent diabetes	149 (20.41)	3,192 (39.03)	<0.001
Moderate-severe chronic lung disease	581 (15.40)	6,096 (30.10)	<0.001
Prior MI	786 (20.83)	5,258 (25.96)	<0.001
5-m walk test time, s	8.67 (6.67-11.33)	8.00 (6.00-10.67)	<0.001
KCCQ-12 overall score	41.67 (23.96-59.38)	37.50 (21.88-56.77)	<0.001
BMI, kg/m^2	24.67 (22.20-27.56)	27.25 (23.88-31.77)	<0.001
Currently on dialysis	39 (1.03)	945 (4.67)	<0.001
Creatinine, mg/dl	1.10 (0.90-1.40)	1.10 (0.90-1.50)	0.002
Triple-vessel disease	786 (20.83)	5,709 (28.19)	<0.001
Left main stenosis ≥50%	325 (8.61)	2,241 (11.07)	<0.001
Moderate-severe aortic insufficiency	663 (17.57)	4,171 (20.60)	<0.001

Mani Arsalan et al; JAAC 2016

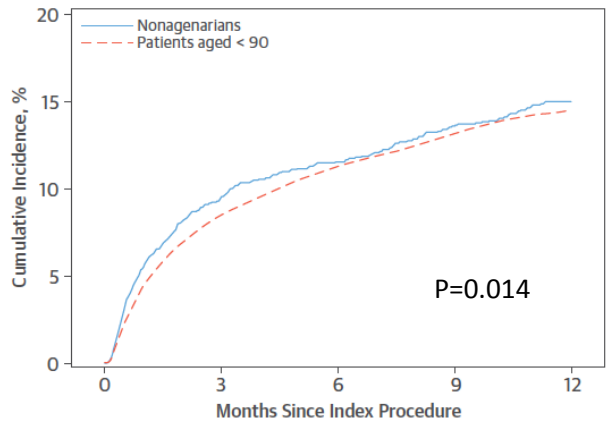
FIGURE 4 Mortality



No. of events / No. at risk

Nonagenarians	39 / 2628	378 / 2020	479 / 1586	526 / 1288	570 / 1054
Patients aged < 90	104 / 12895	1331 / 10080	1804 / 7765	2093 / 6165	2324 / 4989

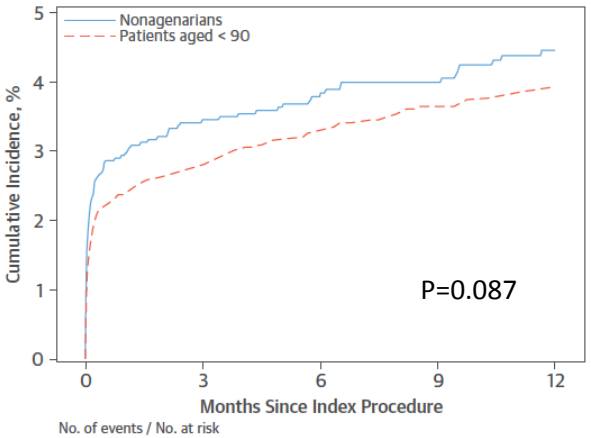
FIGURE 3 Heart Failure Readmission



No. of events / No. at risk

Nonagenarians	0 / 2628	241 / 1825	288 / 1400	324 / 1104	345 / 884
Patients aged < 90	0 / 12895	1054 / 9237	1341 / 6914	1494 / 5368	1588 / 4277

FIGURE 2 Stroke



No. of events / No. at risk

Nonagenarians	21 / 2628	90 / 1957	98 / 1524	101 / 1225	108 / 999
Patients aged < 90	51 / 12895	358 / 9815	408 / 7493	437 / 5895	456 / 4730

Mani Arsalan et al; JAAC 2016

The ideal guidelines in 2016…?

Table 11 Recommendations for the use of transcatheter aortic valve implantation

Recommendations	Class [a]	Level [b]	Ref [c]
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	99
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	97

Recommendations	*TAVI*	*SAVR*
High-risk patients	I - B	IIb - B
Intermediate risk patients	I - A	I - B
Low-risk patients	IIa B	I - B

Partner 1 A

Corevalve US – Partner II

Notion trial

Thank you

Procedural characteristics of TAVI patients stratified according to patient STS risk score

Variable	All (n=1,327)	Patient risk			P value
		Low (n=576)	Intermediate (n=496)	High (n=223)	
Approach					
Transfemoral	1160 (89%)	544 (95%)	428 (88%)	181 (81%)	<0.001*
Transapical	101 (7.7%)	17 (3%)	39 (8%)	27 (12%)	
Other	50 (3.8%)	10 (1.8%)	20 (4.1%)	15 (6.7%)	
Anesthesia					
General	301 (26%)	93 (19%)	121 (28%)	62 (31%)	<0.001*
Conscious sedation	853 (74%)	402 (81%)	310 (72%)	138 (69%)	
Valve type					
SAPIEN XT	398 (31%)	169 (30%)	151 (31%)	62 (28%)	0.25
CoreValve	893 (69%)	396 (70%)	325 (67%)	160 (72%)	
Other	13 (1%)	5 (0.9%)	8 (1.7%)	0	
Valve size (mm)					
23	200 (16%)	59 (11%)	91 (19%)	42 (19%)	<0.001
25	6 (0.5%)	2 (0.4%)	3 (0.6%)	0	
26	637 (50%)	268 (48%)	247 (52%)	109 (50%)	
29	413 (32%)	218 (39%)	127 (27%)	62 (28%)	
31	25 (2%)	12 (2.1%)	8 (1.7%)	5 (2.3%)	
Valve-in-valve procedure	61 (4.6%)	10 (1.7%)	20 (4%)	16 (7.2%)	0.001
Fluoroscopy time; median (IQR)	15.5 (12.6-20)	15.2 (12.9-19.8)	16.1 (12.5-19.5)	17.1 (12.6-22.8)	0.64
Contrast Volume; median (IQR)	152 (121-188)	150 (125-180)	154 (120-191)	150 (111-200)	0.63
Procedure success	1251 (94%)	544 (94%)	467 (94%)	209 (94%)	0.924

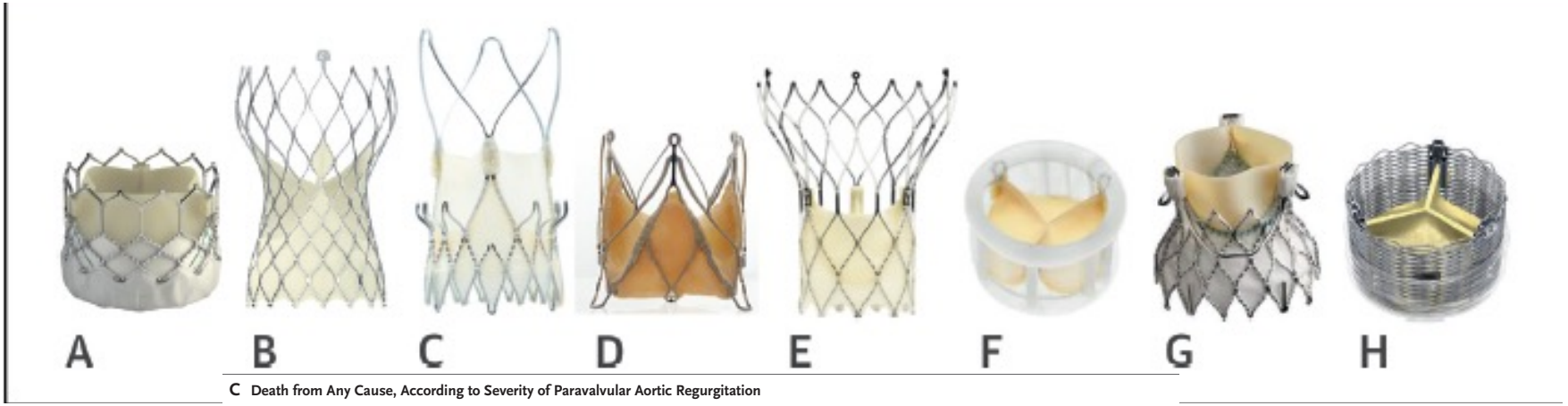
(Am J Cardiol 2015;116:1916−1922)

1. *Actually Guidelines*

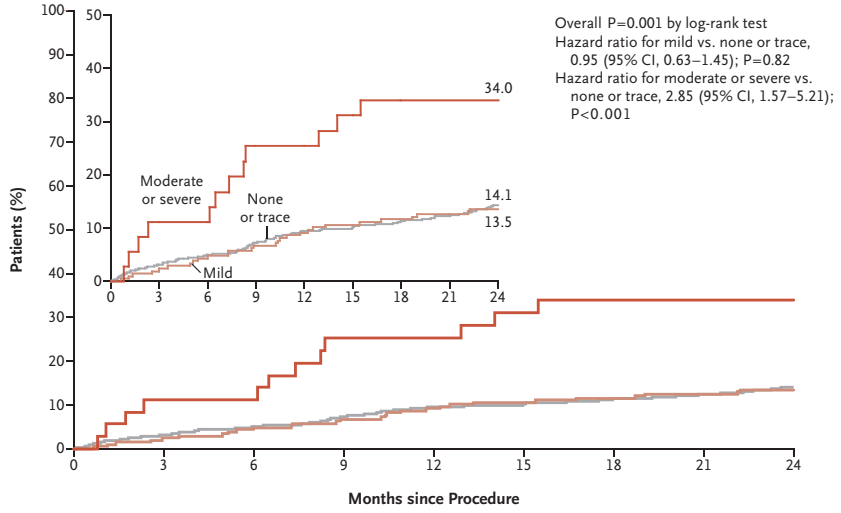
2. *Change in treated patients*

3. *Change in device and rate of complications*

4. *Change in guidelines…*



C Death from Any Cause, According to Severity of Paravalvular Aortic Regurgitation



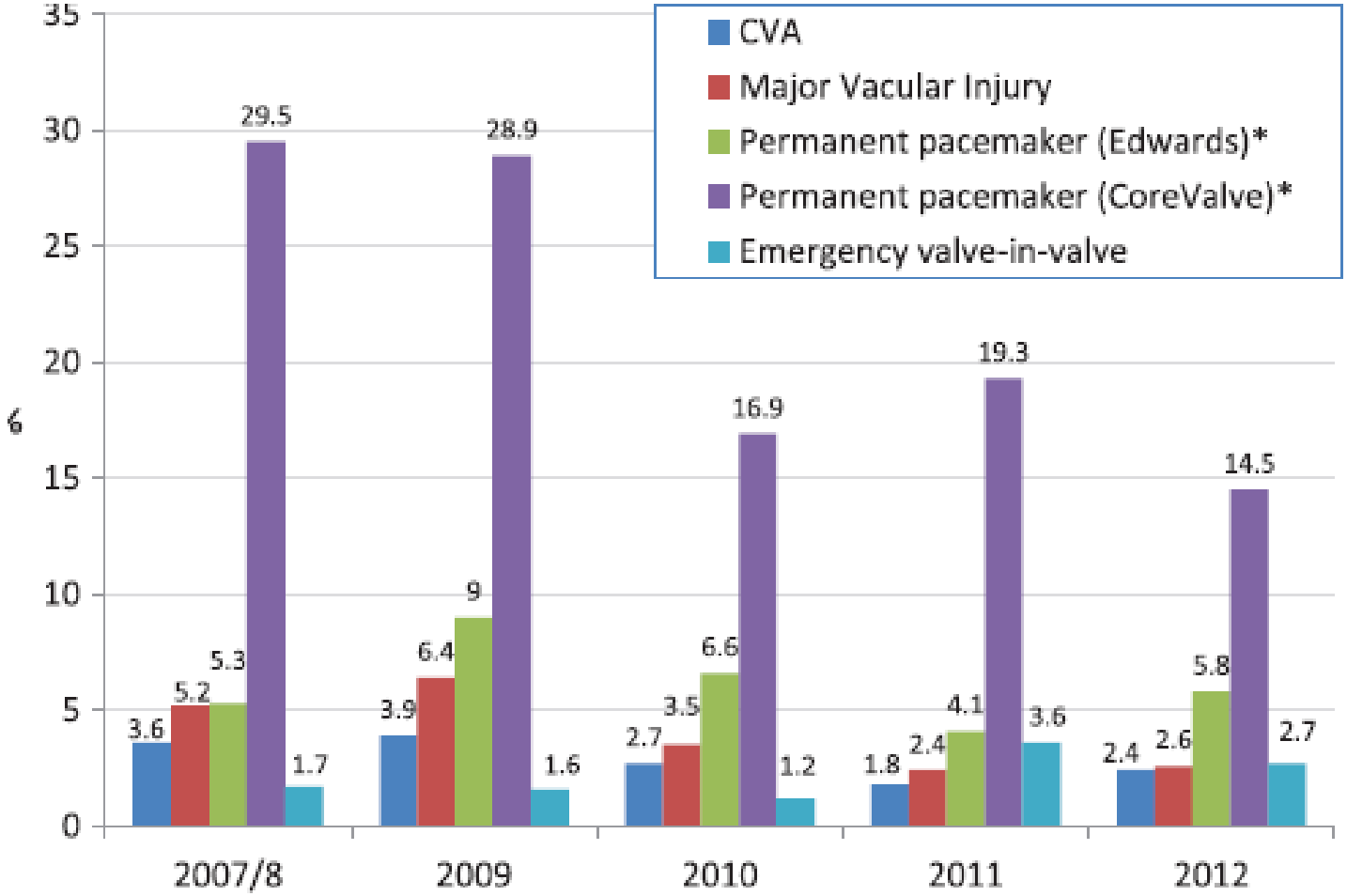
No. at Risk

None or trace	701	678	664	647	628	621	612	605	585
Mild	210	204	199	194	188	184	182	180	175
Moderate or severe	36	32	32	26	26	24	22	22	21

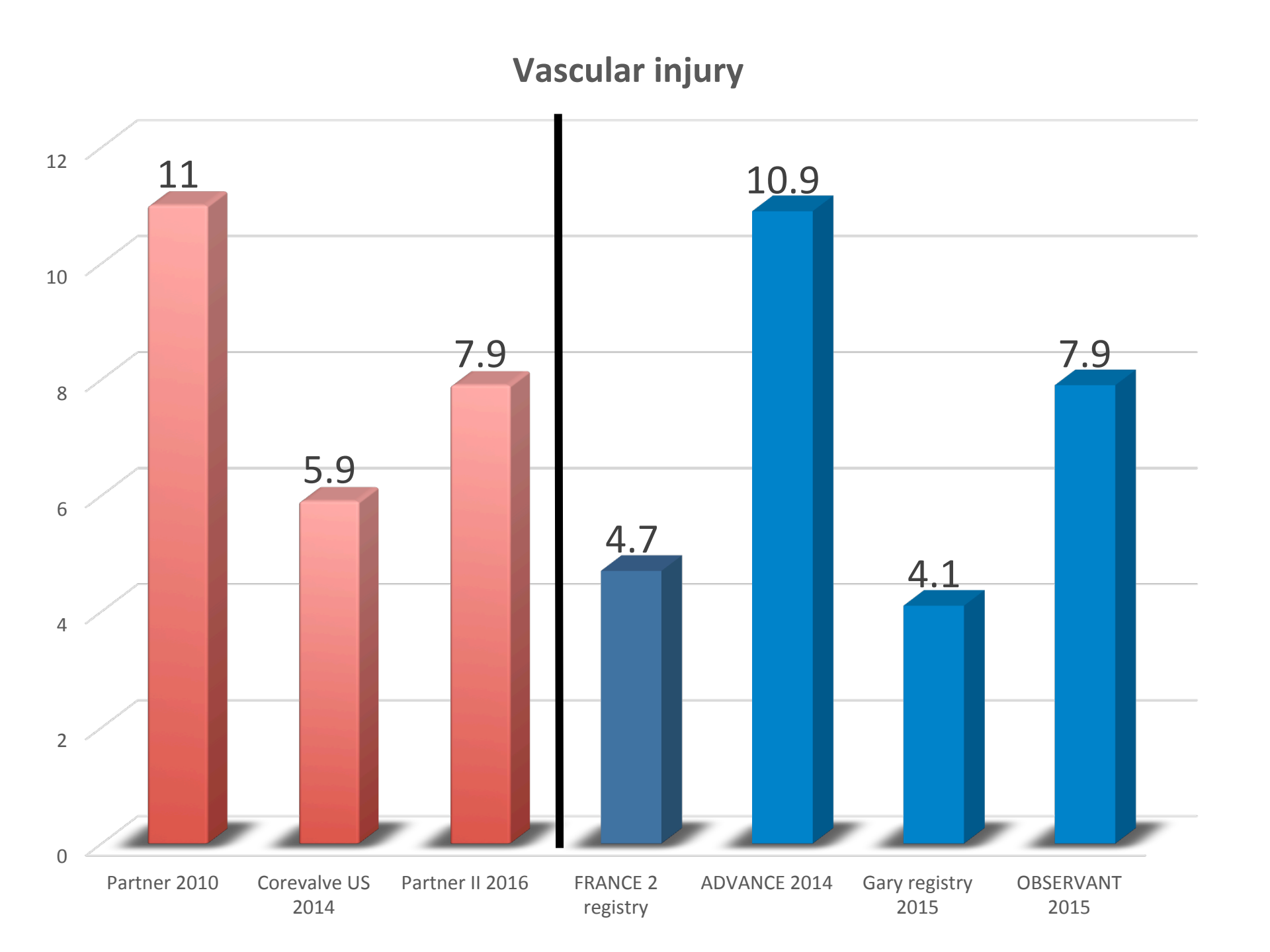
- *New devices, with low profile (22/18F 14 F)*
- *Retriveal and repositioning device (reduce % PVL)*

Transcatheter Aortic Valve Implantation in the United Kingdom

Temporal Trends, Predictors of Outcome, and 6-Year Follow-Up: A Report From the UK Transcatheter Aortic Valve Implantation (TAVI) Registry, 2007 to 2012



Circulation 2015


Vascular injury
12
10
8
6
4
2
0
11
5.9
7.9
4.7
10.9
4.1
7.9
Partner 2010
Corevalve US 2014
Partner II 2016
FRANCE 2 registry
ADVANCE 2014
Gary registry 2015
OBSERVANT 2015

Potential conflicts of interest

Speaker's name: Anna Sonia Petronio

☑ **I have the following potential conflicts of interest to report:**

Consultant: ABBOTT VASCULAR, BOSTON SCIENTIFIC, MEDTRONIC