

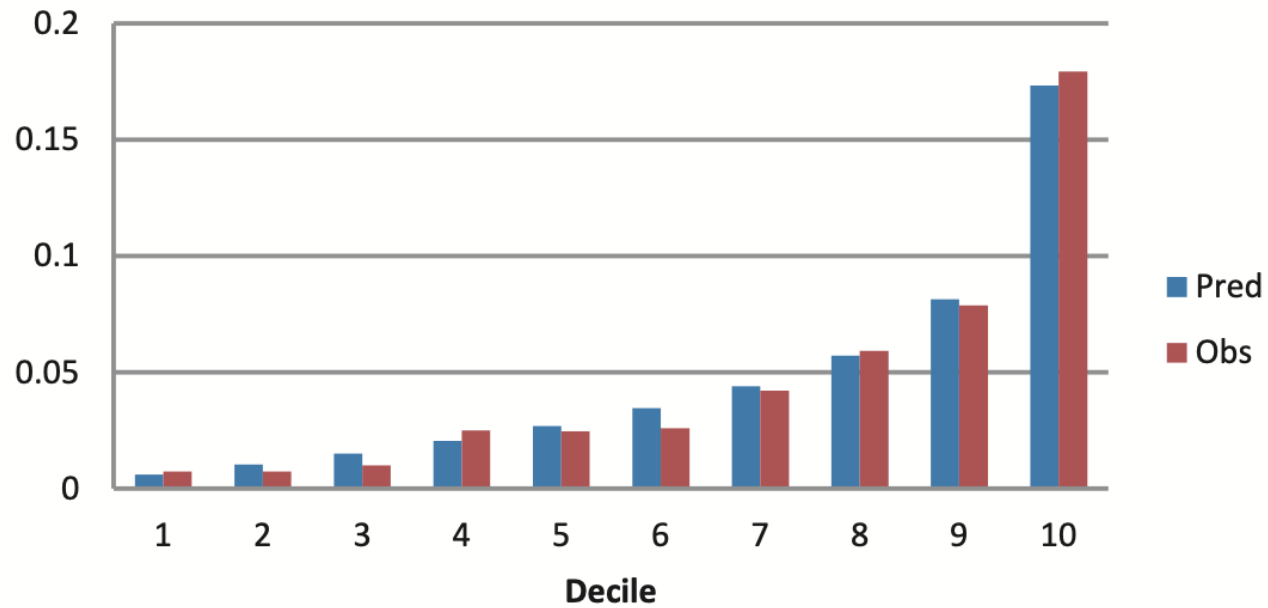
**VALUTAZIONE DEL RISCHIO
DI FIBRILLAZIONE ATRIALE
PER LA DISCRIMINAZIONE
DEGLI ICTUS DI ORIGINE
CARDIOEMBOLICA**

BACKGROUND

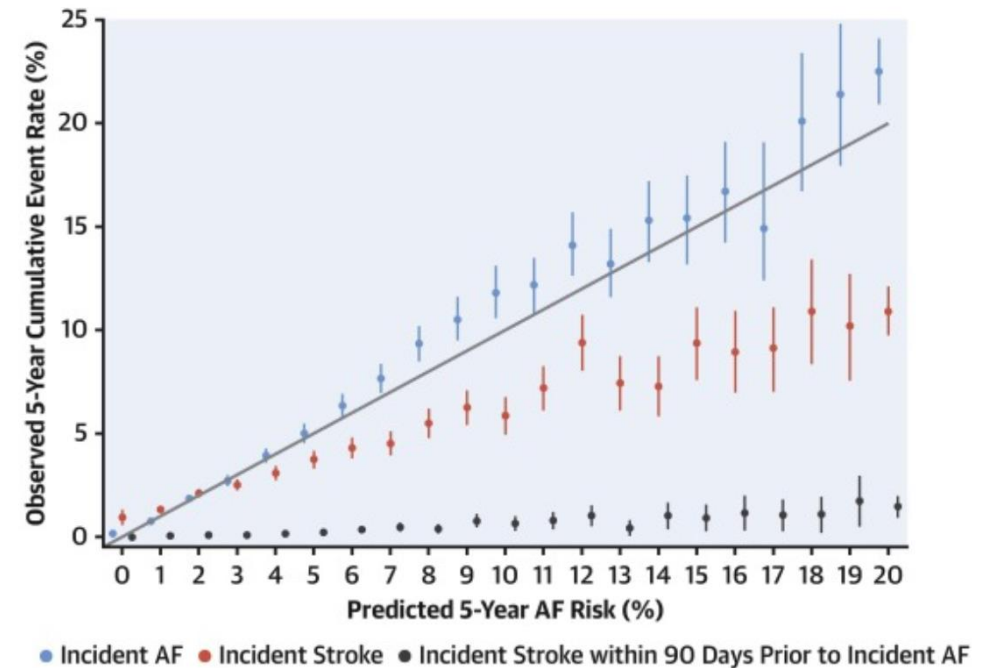
- Atrial fibrillation (AF) is the leading cause of cardioembolic stroke and is associated with substantial morbidity and economic cost.
- Identification of AF as the etiology of stroke is critical, since anticoagulation can prevent recurrent stroke.
- AF is frequently unrecognized at the time of stroke and is often detected only after long-term monitoring.
- The use of extended monitoring is expensive, utilization remains limited, and most patients who receive monitoring do not have AF.

AF RISK SCORES

CHARGE-AF score



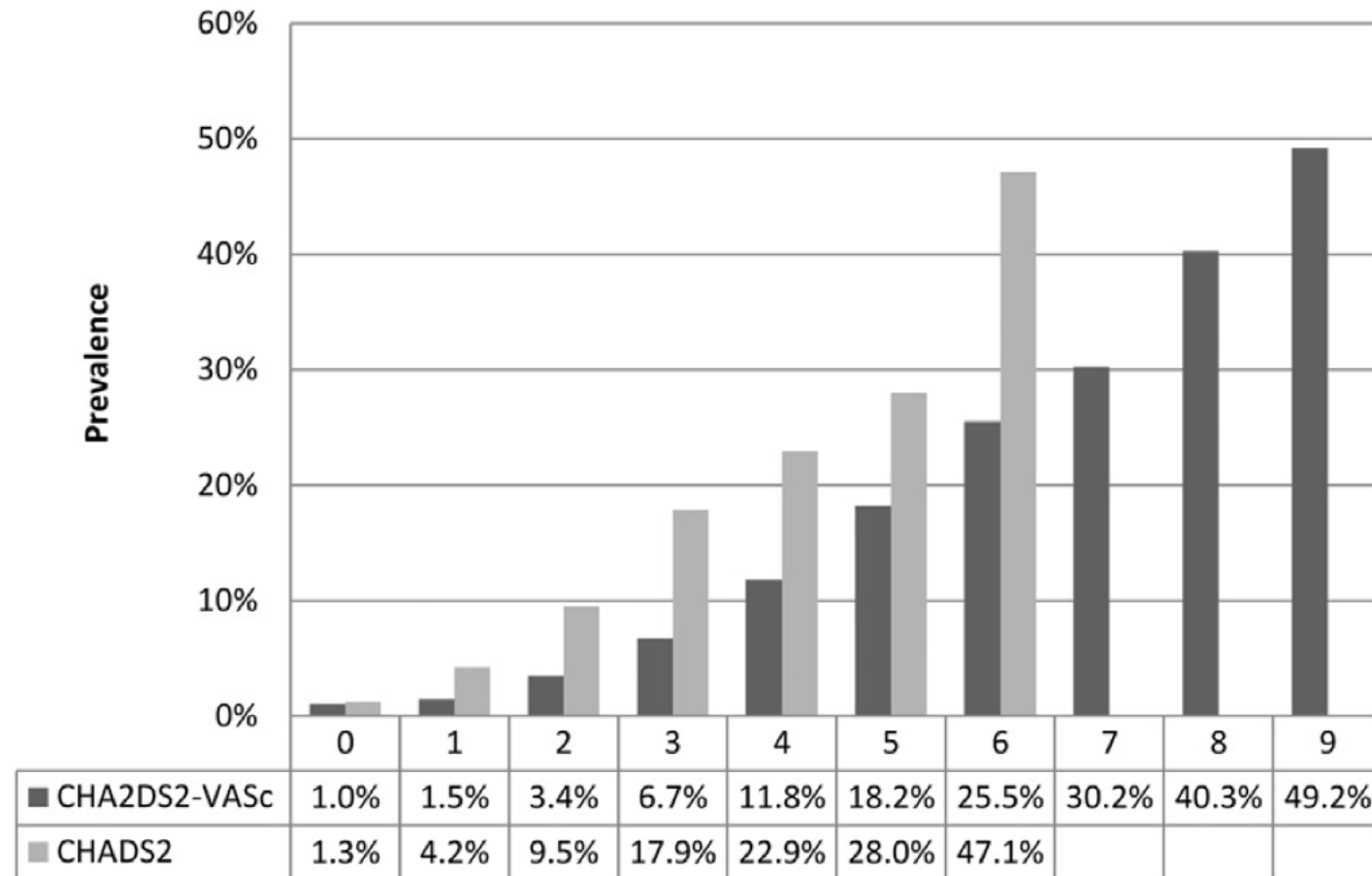
EHR-AF score



AF RISK SCORES



CHA₂DS₂-VASc

Prevalence of atrial fibrillation according to CHA₂DS₂-VASc and CHADS₂ scores categories

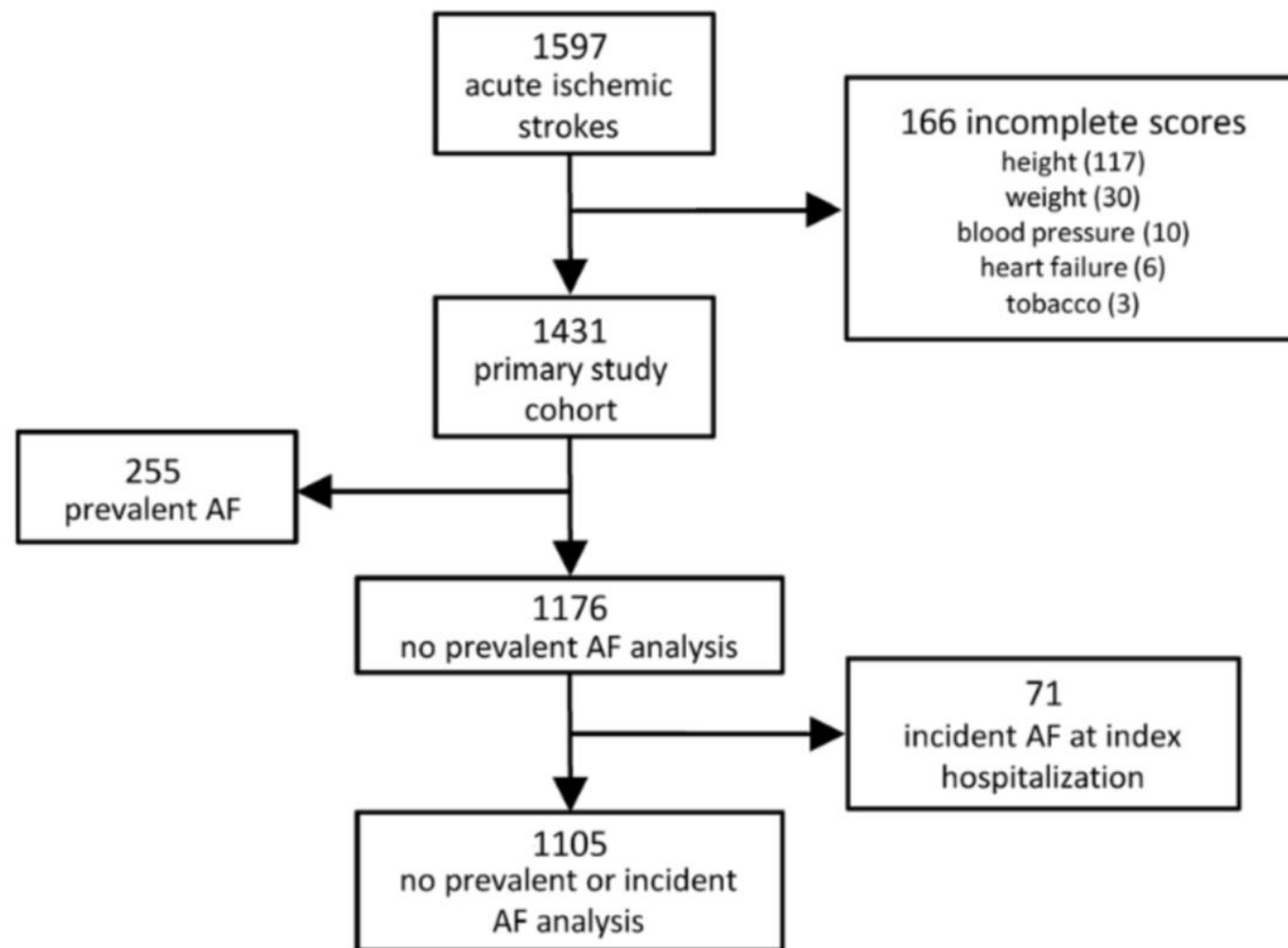




Atrial Fibrillation Risk and Discrimination of Cardioembolic From Noncardioembolic Stroke

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METHODS



BASELINE CHARACTERISTICS OF STROKE SAMPLE

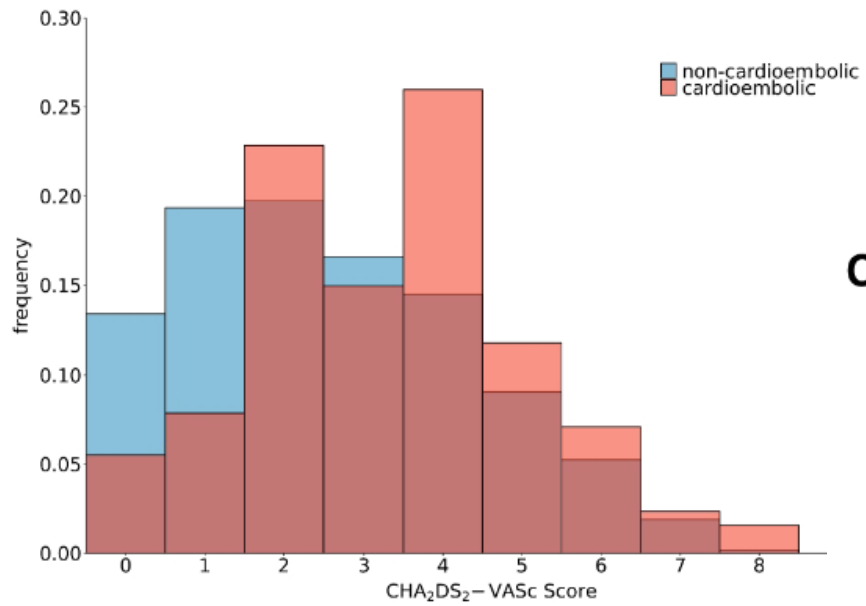
	n (%) or Mean±SD			P Value
	Total Cohort	Cardioembolic	Noncardioembolic	
Demographics	n=1431	n=323	n=1108	
Women*†‡	578 (40.4%)	149 (46.1%)	429 (38.7%)	0.02
Age, y*†‡	65.1±15.3	72.4±13.2	63.0±15.3	<0.01
White race†‡	1328 (92.8%)	303 (93.8%)	1025 (92.5%)	0.47
Stroke characteristics				
NIH Stroke Scale	4.90±5.95	7.30±7.00	4.21±5.42	<0.01
Antiplatelet at discharge	989 (69.1%)	178 (55.1%)	811 (73.2%)	<0.01
Anticoagulant at discharge	530 (37.0%)	202 (62.5%)	328 (29.6%)	<0.01
Statin at discharge	889 (62.1%)	200 (61.9%)	689 (62.2%)	0.95

BASELINE CHARACTERISTICS OF STROKE SAMPLE STRATIFIED BY MECHANISM

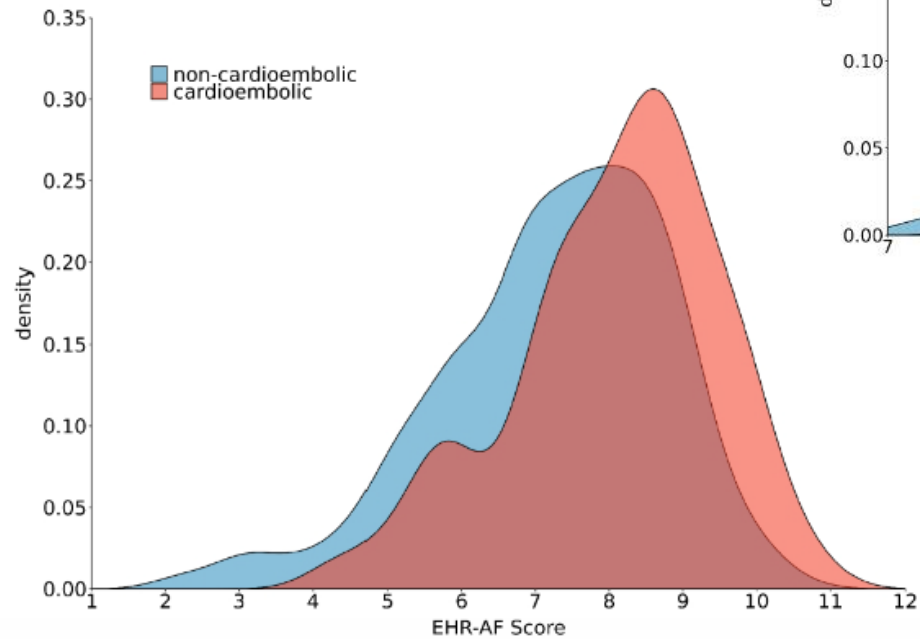
	n (%) or Mean±SD			P Value
	Total Cohort	Cardioembolic	Noncardioembolic	
Demographics	n=1431	n=323	n=1108	
Potential AF risk factors				
Height, cm††	170.6±10.7	170.0±11.4	170.8±10.5	0.29
Weight, kg††	81.4±19.0	79.6±18.5	81.9±19.2	0.05
Current smoking††	274 (19.1%)	42 (13.0%)	232 (20.9%)	<0.01
Systolic blood pressure, mm Hg†	151±29	150±28	151±29	0.63
Diastolic blood pressure, mm Hg††	80±16	79±17	80±15	0.30
Hypertension*†	891 (62.3%)	213 (65.9%)	678 (61.2%)	0.13
Antihypertensive medication†	857 (59.9%)	235 (72.8%)	622 (56.1%)	<0.01
Diabetes mellitus*††	302 (21.1%)	71 (22.0%)	231 (20.8%)	0.70
Hyperlipidemia†	594 (41.5%)	140 (43.3%)	454 (41.0%)	0.48
Previous stroke/TIA*†	310 (21.7%)	74 (22.9%)	236 (21.3%)	0.54
Heart failure*††	193 (13.5%)	98 (30.3%)	95 (8.57%)	<0.01
Valvular disease†	183 (12.8%)	110 (34.0%)	73 (6.59%)	<0.01
Hypothyroidism†	132 (9.22%)	37 (11.4%)	95 (8.57%)	0.13
Vascular disease*				
Coronary heart disease†	301 (21.0%)	100 (31.0%)	201 (18.1%)	<0.01
Carotid artery disease	83 (5.80%)	13 (4.02%)	70 (6.31%)	0.14
Peripheral artery disease†	141 (9.85%)	30 (9.29%)	111 (10.0%)	0.75
Myocardial infarction†	175 (12.2%)	67 (20.7%)	108 (9.75%)	<0.01
Chronic kidney disease†	534 (37.3%)	172 (53.3%)	362 (32.7%)	<0.01
CHA ₂ DS ₂ -VASc score	2.89±1.9	3.66±1.8	2.67±1.9	<0.01
CHARGE-AF score	13.1±1.8	14.0±1.4	12.8±1.8	<0.01
EHR-AF score	7.57±1.6	8.44±1.2	7.32±1.6	<0.01

DISTRIBUTION OF SCORES STRATIFIED BY STROKE MECHANISM

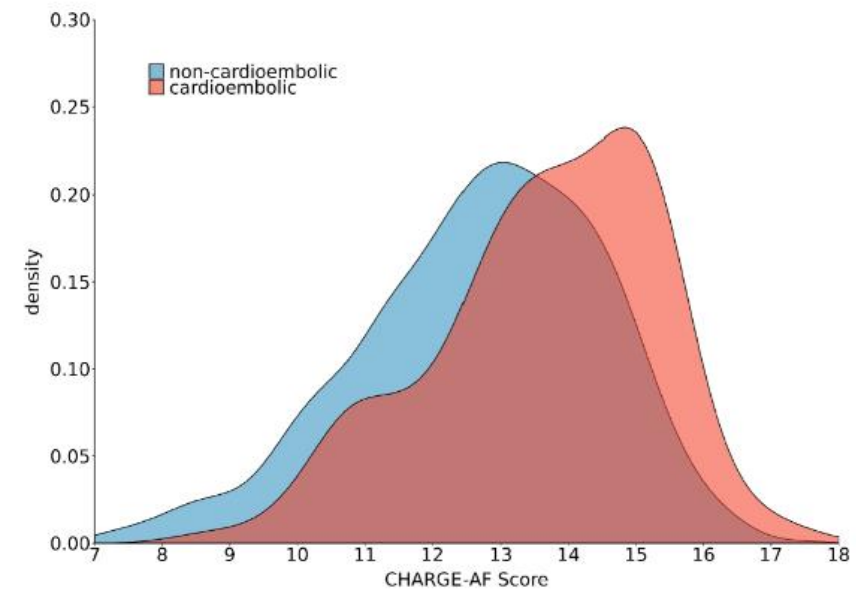
A



C



B



ASSOCIATIONS BETWEEN AF RISK AND CARDIOEMBOLIC STROKE

Score	Odds Ratio (95% CI)	<i>P</i> Value	C Index (95% CI)
CHA ₂ DS ₂ -VASc (per 1 SD increase)	1.69 (1.49–1.93)	<0.01	0.651 (0.619–0.683)
CHARGE-AF (per 1 SD increase)	2.22 (1.90–2.60)	<0.01	0.695 (0.663–0.726)
EHR-AF (per 1 SD increase)	2.55 (2.16–3.04)	<0.01	0.713 (0.681–0.744)

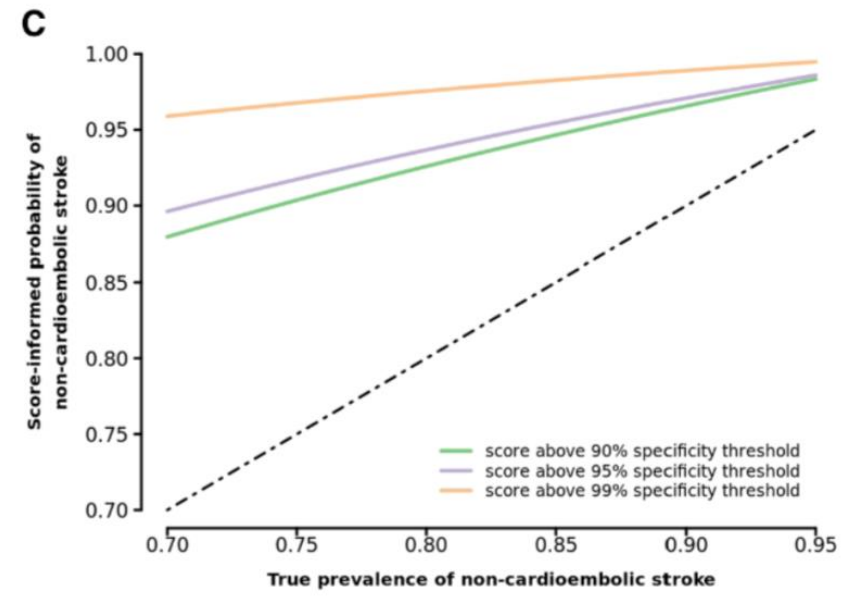
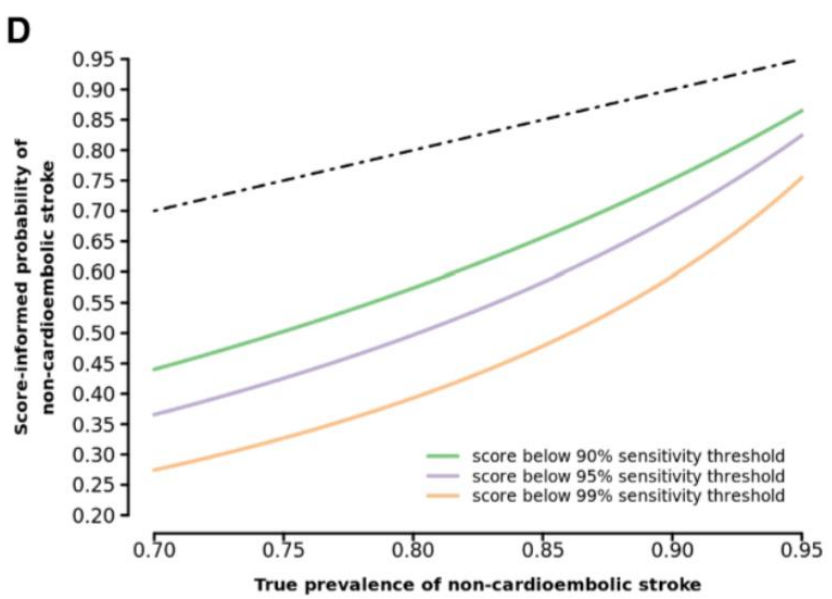
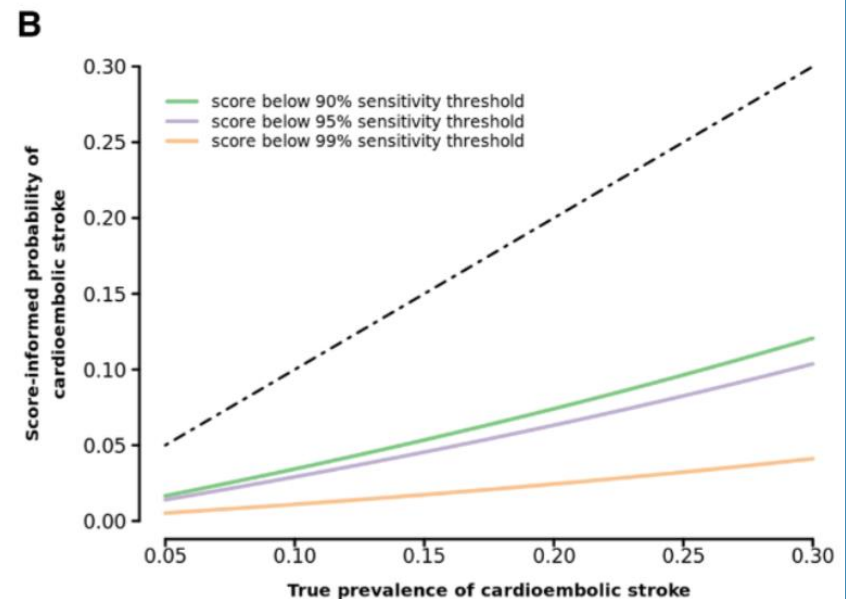
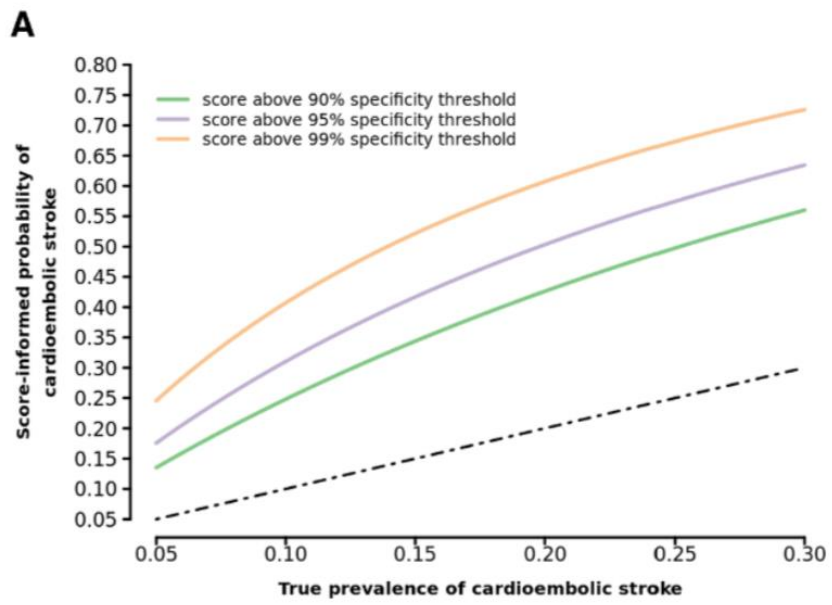
AF RISK SCORE PERFORMANCE FOR CARDIOEMBOLIC STROKE AT SELECTED SENSITIVITY AND SPECIFICITY CUTOFFS

Score (CE, 323; NCE, 1109)	Sensitivity Threshold	Corresponding Specificity	LR+	LR-	Score Value	#CE Above/ Below Threshold	#NCE Above/ Below Threshold	Specificity Threshold	Corresponding Sensitivity	LR+	LR-	Score Value	#CE Above/ Below Threshold	#NCE Above/ Below Threshold
CHA ₂ DS ₂ -VASc*	70%	50.5%	1.47	0.53	3	236/87	549/599	70%	56.7%	1.73	0.64	4	94/229	197/911
	80%	50.5%	1.47	0.53	3	236/87	549/599	80%	29.1%	1.64	0.86	5	47/276	90/1017
	90%	31.3%	1.28	0.39	2	284/39	761/347	90%	14.6%	1.77	0.93	6	21/302	28/1080
	95%	12.9%	1.11	0.29	1	311/12	965/143	95%	6.50%	2.57	0.96	7	6/317	4/1104
	99%	...	1.00	...	0	323/0	1109/0	99%	1.86%	5.15	0.98	8	0/323	1/1107
CHARGE-AF	70%	58.9%	1.71	0.50	13.37	227/96	455/653	70%	57.3%	1.91	0.61	13.90	185/138	332/776
	80%	47.3%	1.52	0.42	12.85	259/64	584/524	80%	44.3%	2.20	0.70	14.39	143/180	223/885
	90%	30.4%	1.29	0.33	11.97	291/32	771/337	90%	25.4%	2.56	0.83	15.00	82/241	110/998
	95%	18.2%	1.16	0.27	11.17	307/16	906/203	95%	12.7%	2.56	0.92	15.46	41/282	55/1053
	99%	9.93%	1.10	0.09	10.30	320/3	998/110	99%	2.48%	2.49	0.99	16.20	8/315	11/1097
EHR-AF	70%	59.5%	1.72	0.50	7.90	226/96	449/659	70%	59.1%	1.96	0.58	8.32	191/132	332/776
	80%	48.7%	1.55	0.41	7.45	259/64	572/536	80%	45.8%	2.25	0.68	8.67	148/175	224/884
	90%	32.4%	1.31	0.31	6.75	292/31	765/343	90%	30.0%	2.97	0.78	9.13	97/226	111/997
	95%	20.2%	1.16	0.27	5.93	307/16	905/203	95%	20.7%	4.05	0.83	9.50	67/256	56/1052
	99%	9.21%	1.09	0.10	5.16	320/3	1006/102	99%	5.88%	6.18	0.95	10.15	19/304	10/1098

RULE-IN

RULE-OUT

PREDICTIVE VALUE OF
EHR-AF SCORE FOR
CARDIOEMBOLIC AND
NONCARDIOEMBOLIC
STROKE IN A
SIMULATED
UNDIFFERENTIATED
ISCHEMIC STROKE
COHORT



LIMITATIONS

- Retrospective analysis with ascertainment guided by clinical need introduces selection bias.
- Prevalent AF in the primary analysis.
 - However, the association between AF risk and cardioembolic stroke persisted in individuals without prevalent AF or AF diagnosed during the index hospitalization, as well as within individuals who developed AF after stroke.
- Misclassification of subtype remains possible.
- Not specifically assess the role of echocardiography for cardioembolism classification.
- Sample is largely of European ancestry, hails from a single New England metropolitan area, and has a lower proportion of females than previous stroke cohorts, emphasizing the need for replication in other populations.

CONCLUSIONS

- Clinical AF risk determined at the time of acute stroke using the CHA2DS2-VASc, CHARGE-AF, and EHR-AF scores is associated with the cardioembolic subtype.
- Discrimination for cardioembolism was best using CHARGE-AF and EHR-AF, with over 70% of patients correctly classified as high risk.
- Further research is needed to determine whether prospective use of AF risk deployed at the time of stroke leads to more efficient utilization of rhythm monitoring and improved outcomes in patients presenting with stroke of uncertain etiology.