

# RE-DUAL PCI: dual antithrombotic therapy with dabigatran after percutaneous coronary intervention in patients with atrial fibrillation

Christopher P. Cannon

Deepak L Bhatt, Jonas Oldgren, Gregory YH Lip, Stephen G Ellis, Takeshi Kimura, Michael Maeng, Bela Merkely, Uwe Zeymer, Savion Gropper, Matias Nordaby, Eva Kleine, Ruth Harper, Jenny Manassie, James L Januzzi, Jurrien M ten Berg, Philippe Gabriel Steg and Stefan H Hohnloser

On behalf of the steering committee and RE-DUAL PCI investigators



## Thank you to all the RE-DUAL PCI investigators

Country	No. patients	National co-ordinator	Country	No. patients	National co-ordinator
Argentina	49	Dr Jose Navarro Estrada	Italy	88	Prof. Raffaele De Caterina
Australia	28	Prof. Steve Nicholls	Japan	111	Prof. Takeshi Kimura
Austria	18	Prof. Kurt Huber	Korea	81	Prof. Ki-Bae Seung
Belgium	44	Prof. Danny Schoors	Mexico	12	Dr Efrain Gaxiola Lopez
Brazil	34	Dr Jose Nicolau	Netherlands	50	Dr Ton Oude Ophuis
Bulgaria	77	Prof. Dimitar Raev	New Zealand	5	Prof. Harvey White
Canada	48	Dr Shamir Mehta	Norway	57	Dr Sigrun Halvorsen
Chile	12	Dr Fernando Lanas Zanetti	Poland	99	Prof. Grzegorz Opolski
Colombia	11	Dr Efrain Gomez	Portugal	41	Prof. Joao Morais
Croatia	40	Dr Darko Pocanic	Russia	129	Prof. Dmitry Aleksandrovich Zateyshchikov
Czech Republic	49	MUDr Petr Jansky	Singapore	9	Prof. Ru San Tan
Denmark	57	Dr Michael Mæng	Slovakia	39	Prof. Robert Hatala
Finland	43	Prof. Juhani Airaksinen	Slovenia	14	Dr Dragan Kovacic
France	97	Prof. Gilles Montalescot	Spain	114	Prof. Jose Luis Lopez Sendon
Germany	470	Prof. Uwe Zeymer	Sweden	46	Prof. David Erlinge
Greece	100	Prof. Georg Nickenig	Taiwan	34	Dr Juey-Jen Hwang
Hong Kong	14	Prof. Panagiotis Vardas	Thailand	29	Prof. Rungroj Kittayaphong
Hungary	115	Prof. Stephen Lee	Turkey	157	Prof. Zeki Ongen
India	35	Prof. Robert Gabor Kiss	United Kingdom	69	Dr Mick Ozkor
Ireland	14	Dr Upendra Kaul	United States	151	Dr Laura Mauri
Israel	35	Dr Peter Crean			
		Prof. Ran Kornowski			

# Antithrombotic therapy for atrial fibrillation and PCI



Anticoagulant therapy

**Low** shear stress thrombosis in left atrium

Anticoagulation superior to antiplatelet therapy



Antiplatelet therapy

**High** shear stress thrombosis – platelet mediated in the arteries

Dual antiplatelet therapy superior to ASA alone



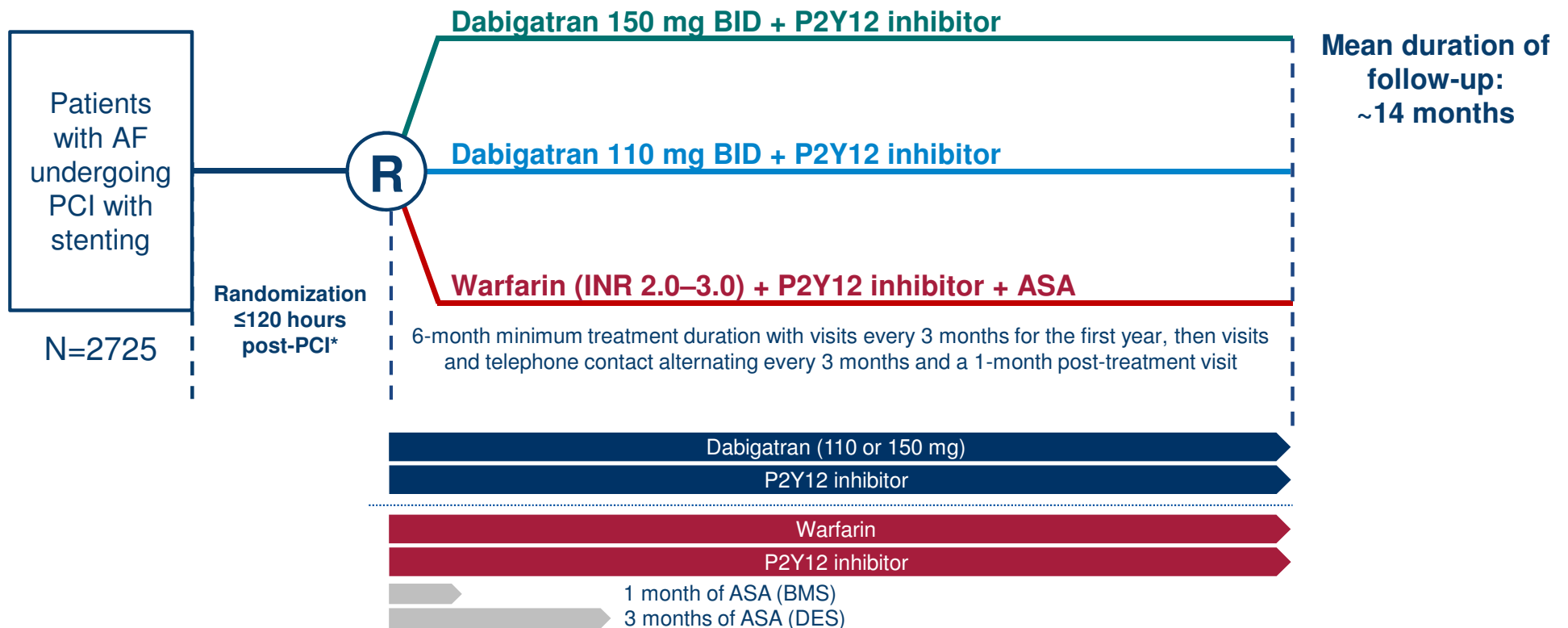
**BOTH** anticoagulant and dual antiplatelet therapy =

'triple therapy'

**High bleeding risk**

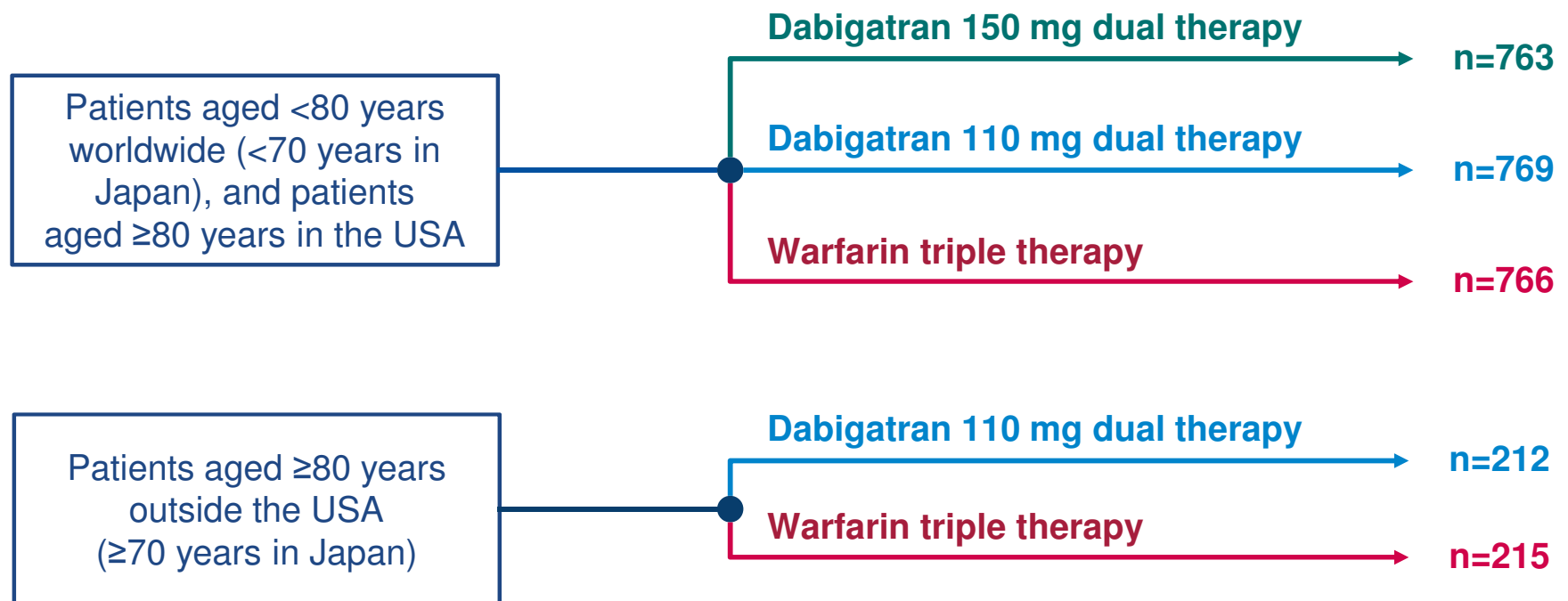


# Study Design: Multicenter, randomized, open-label trial following a PROBE design



\*Study drug should be administered 6 hours after sheath removal and no later than ≤120 hrs post-PCI (≤72 hrs is preferable). PROBE, prospective, randomized, open, blinded end-point; R, randomization; BMS, bare metal stent; DES, drug-eluting stent. ClinicalTrials.gov: NCT02164864; Cannon et al. Clin Cardiol 2016

## Patients were randomized based on age group and location



## Inclusion and exclusion criteria

### Key inclusion criteria

- Patients aged  $\geq 18$  years with paroxysmal, persistent or permanent NVAF
- ACS successfully treated by PCI and stenting (BMS or DES)
- Stable CAD with  $\geq 1$  lesion eligible for PCI that was successfully treated by elective PCI and stenting (BMS or DES)

### Key exclusion criteria

- Cardiogenic shock during current hospitalization
- Use of fibrinolytics within 24 hrs of randomization that, in the investigator's opinion, will put patient at high risk of bleeding
- Stroke or major bleeding event within 1 month prior to screening visit
- Severe renal impairment (CrCl  $< 30$  mL/min)

## Study objective and design

RE-DUAL PCI tests the safety and efficacy of two regimens of dual therapy with dabigatran without aspirin vs triple therapy with warfarin

- The primary endpoint was time to first ISTH major or clinically relevant non-major bleeding
- Formally tested and powered endpoints included:
  - Non-inferiority of 110 mg and 150 mg dual therapy groups on time to first ISTH major or clinically relevant non-major bleeding event.
  - Non-inferiority of both dual therapy groups combined on time to first event of death, thromboembolic event (MI, stroke, systemic embolism) or unplanned revascularization
  - Superiority testing of the bleeding endpoints
- 100% of outcome events were independently adjudicated by blinded external committee

## Summary of patient disposition

	Dabigatran 110 mg dual therapy	Dabigatran 150 mg dual therapy	Warfarin triple therapy
<b>Randomized patients, n</b>	981	763	981
<b>Patients completing study on study medication</b>	756	604	686
<b>with premature medication discontinuation</b>	130	99	163
<b>Premature study discontinuation</b>	95	60	132
Adverse event	65	41	59
Protocol violation	2	4	1
Loss to follow-up	4	3	2
Consent withdrawn	21	8	56
Missing/other	3	4	14
<b>Mean duration of follow-up, months</b>	14.1	14.3	13.8
<b>Total patient-years</b>	1013	803	933
<b>Time in target INR range 2.0–3.0,* mean</b>	n/a	n/a	64%

\*First valid INR measurement is defined as the first on-treatment INR measurement taken >90 days after randomization. At each specified time point, patients who had INR data up to that time point were evaluated and all valid INR data up to that time point were used. The target INR range was 2–3; an exception were patients in Japan who were ≥70 years old – for these patients, the target INR was 2–2.6. 58 patients had no valid INR measurement throughout the trial and are therefore excluded from the display

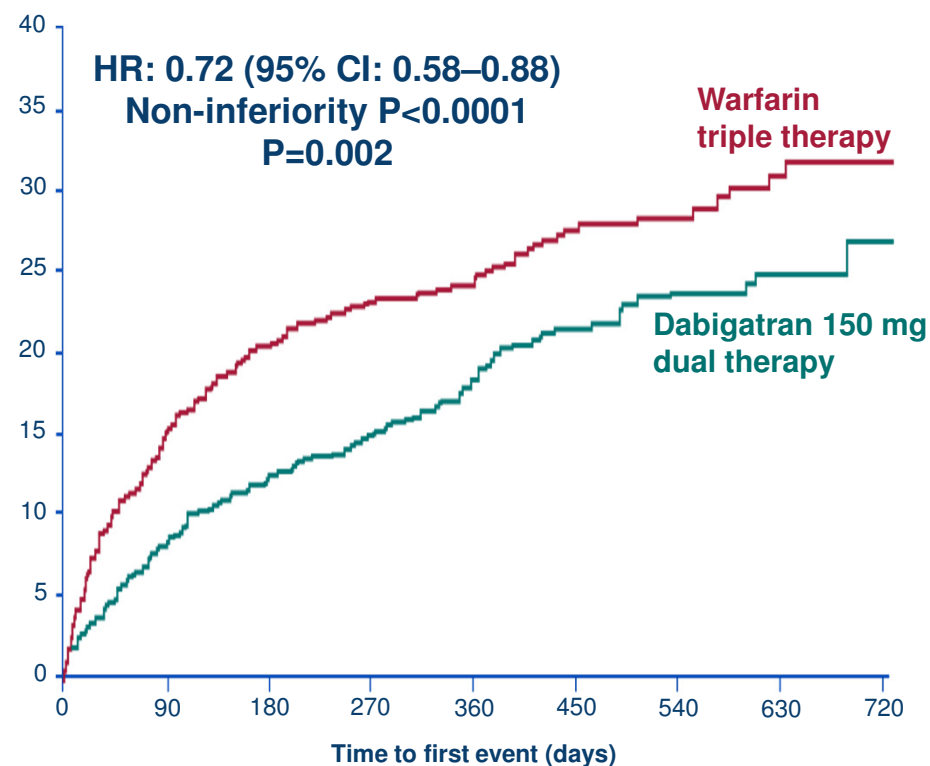
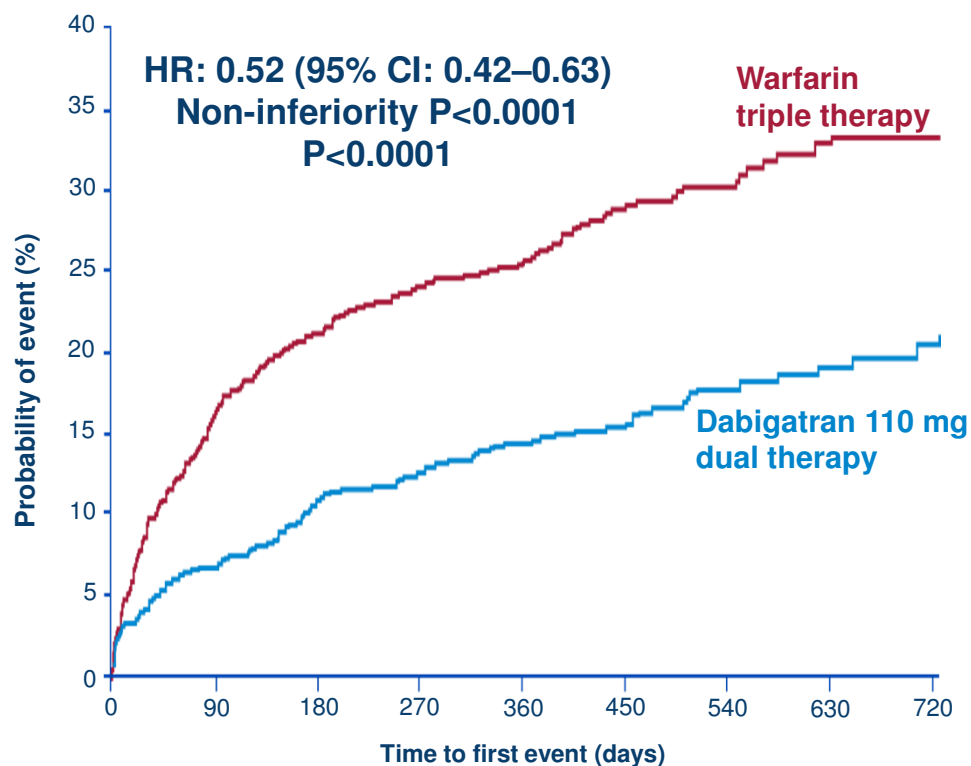


## Baseline characteristics

	Dabigatran 110 mg dual therapy (n=981)	Warfarin triple therapy (n=981)	Dabigatran 150 mg dual therapy (n=763)	Corresponding Warfarin triple therapy (n=764)
<b>Age, years, mean</b>	71.5	71.7	68.6	68.8
≥80 (US, ROW), ≥70 (Japan), %	22.9	22.9	1.0	1.0
<80 (US, ROW), <70 (Japan), %	77.1	77.1	99.0	99.0
<b>Male, %</b>	74.2	76.5	77.6	77.7
<b>Baseline CrCl, mL/min, mean</b>	76.3	75.4	83.7	81.3
<b>Diabetes mellitus, %</b>	36.9	37.8	34.1	39.7
<b>CHA<sub>2</sub>DS<sub>2</sub>-VASc score (mean)</b>	3.7	3.8	3.3	3.6
<b>Modified HAS-BLED score at baseline (mean)</b>	2.7	2.8	2.6	2.7
<b>ACS indication for PCI, %</b>	51.9	48.4	51.2	48.3
<b>DES only, %</b>	82.0	84.2	81.4	83.5

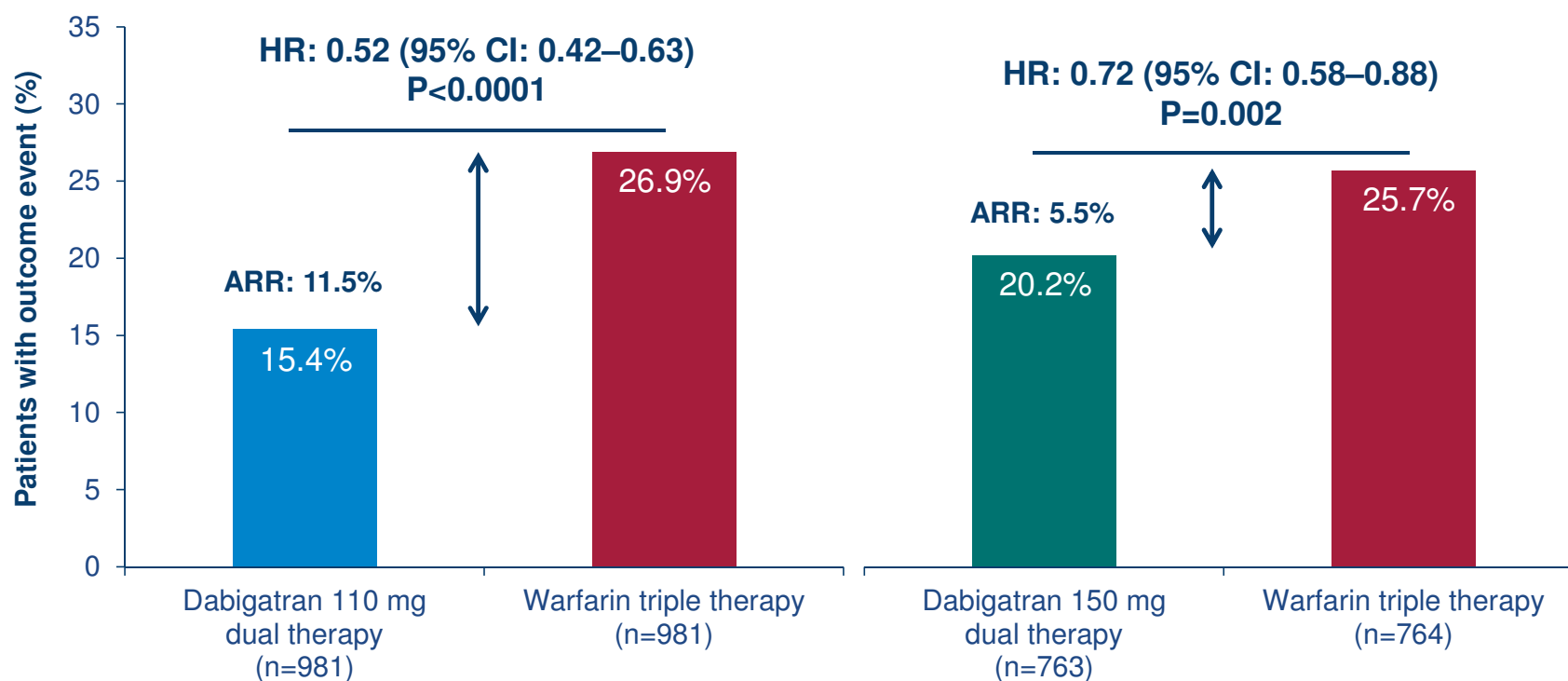
ROW, rest of world

# Primary Endpoint: Time to first ISTH major or clinically relevant non-major bleeding event



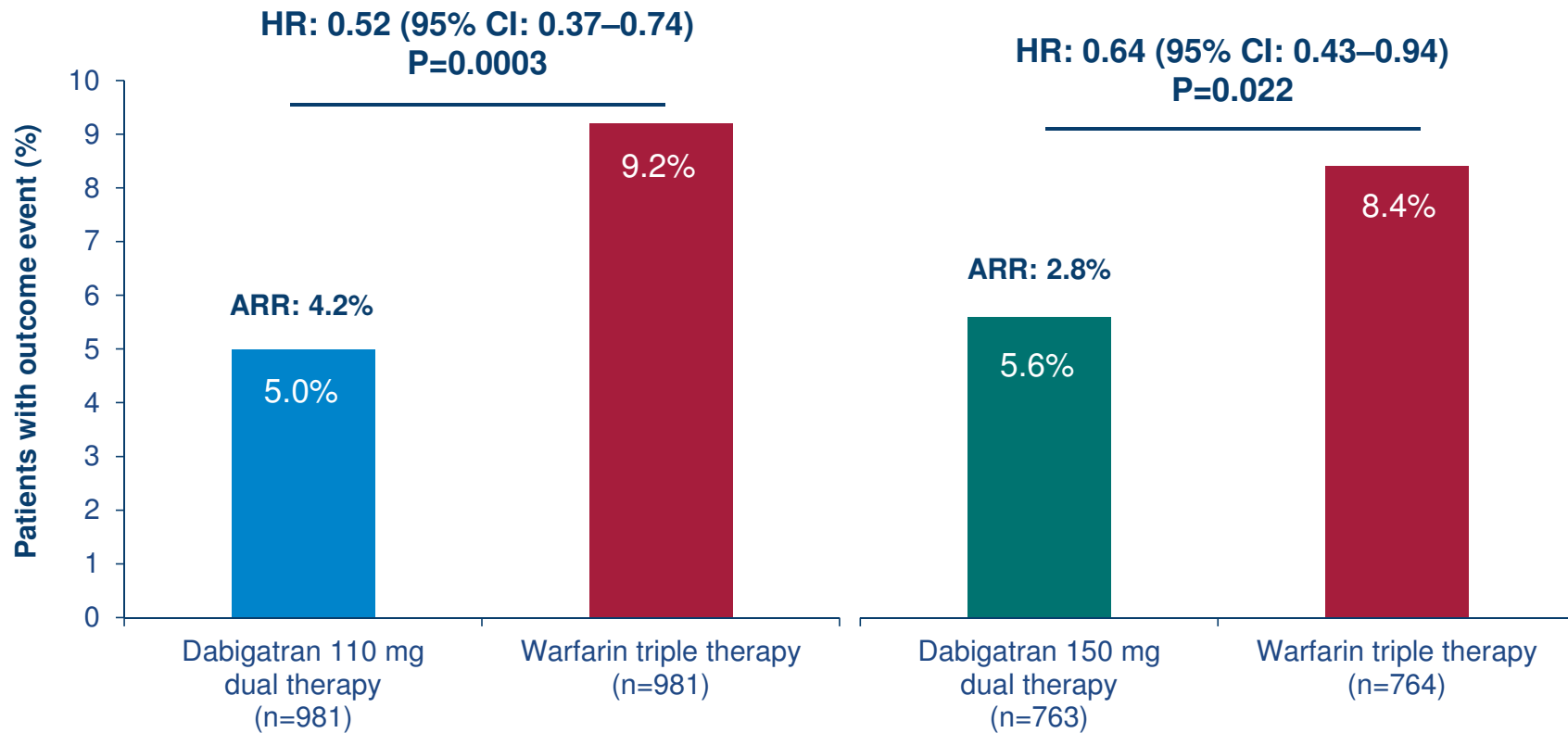
Full analysis set presented. HRs and Wald CIs from Cox proportional-hazard model. For the dabigatran 110 mg vs warfarin comparison, the model is stratified by age, non-elderly vs elderly (<70 or ≥70 in Japan and <80 or ≥80 years old elsewhere). For the dabigatran 150 mg vs warfarin comparison, an unstratified model is used, elderly patients outside the USA are excluded. Non-inferiority P value is one sided (alpha=0.025). Wald two-sided P value from (stratified) Cox proportional-hazard model (alpha=0.05)

# Primary endpoint: ISTH major or clinically relevant non-major bleeding event



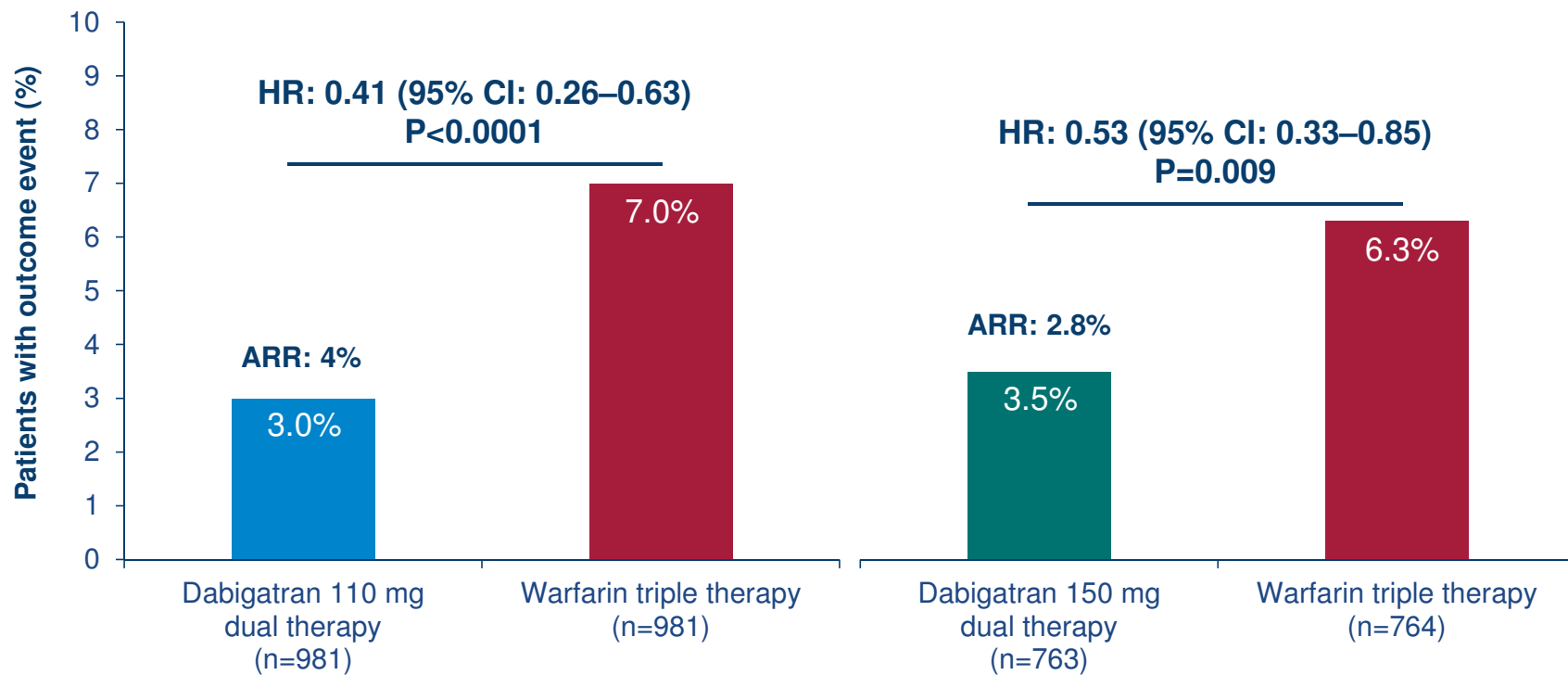
Wald two-sided P value from (stratified) Cox proportional-hazard model (alpha=0.05). ARR, absolute risk reduction

## Rates of ISTH major bleeding



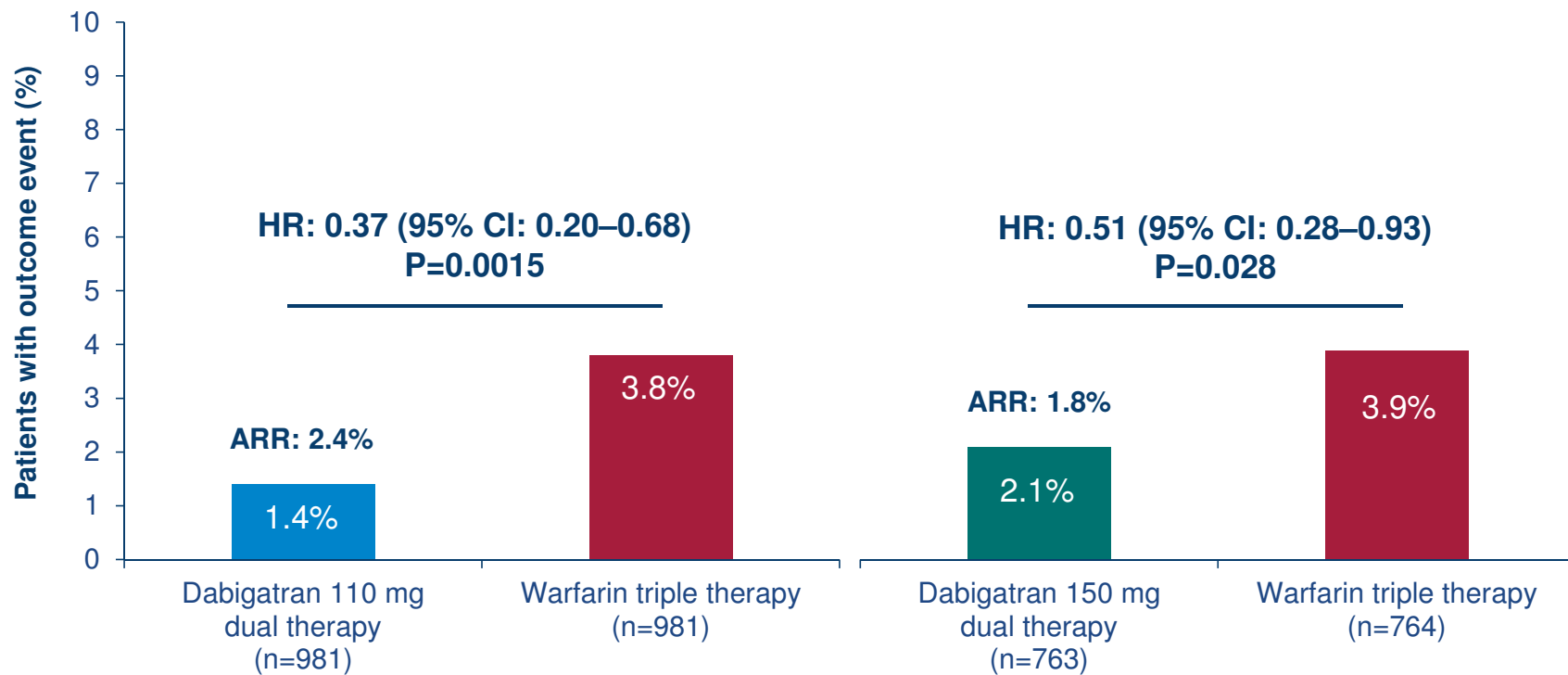
Wald two-sided P value from (stratified) Cox proportional-hazard model (alpha=0.05). ISTH major bleeding definition: fatal, critical organ (including intracranial haemorrhage), clinically overt bleeding with fall in Hb  $\geq$  2 g/dL. Hb, haemoglobin

## Rates of TIMI major or minor bleeding



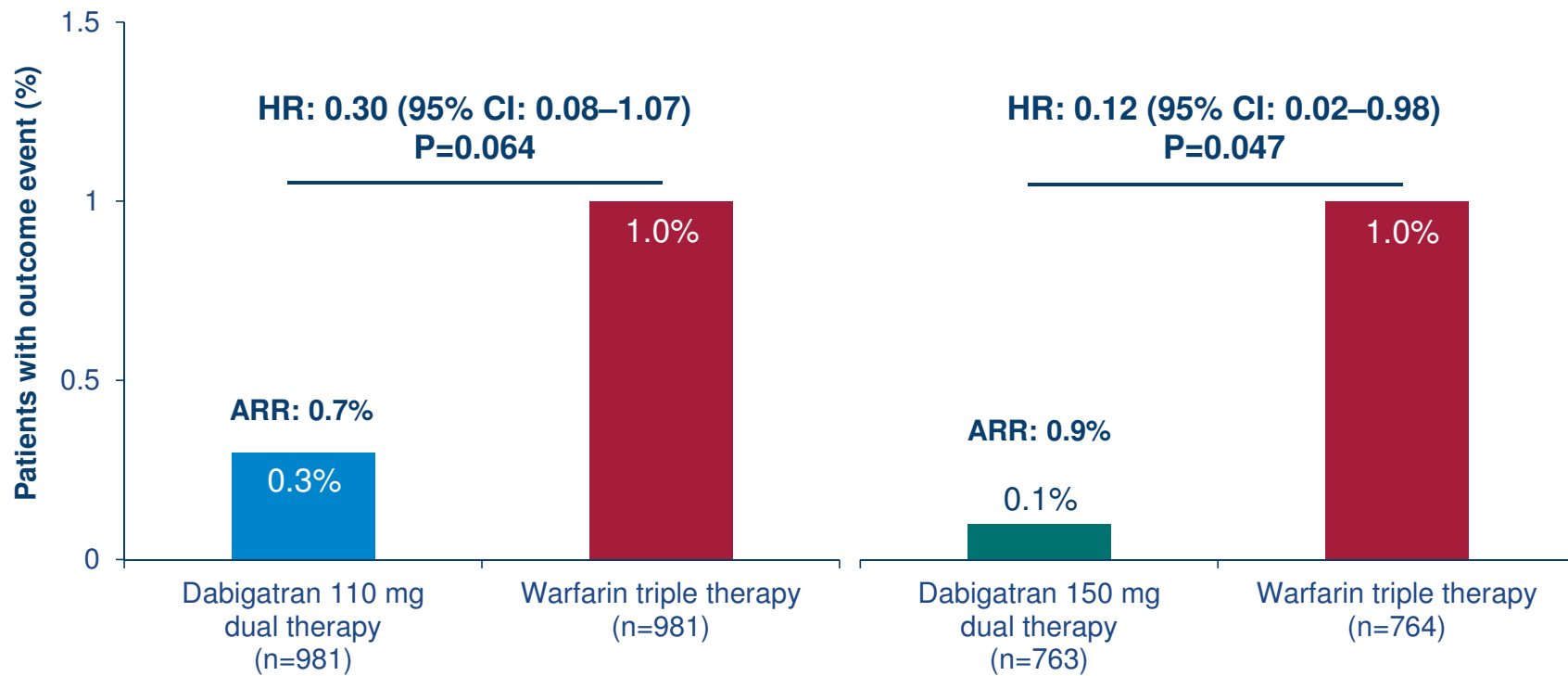
Wald two-sided P value from (stratified) Cox proportional-hazard model (alpha=0.05). TIMI major bleeding definition: fatal, intracranial haemorrhage, clinically overt bleeding with fall in Hb  $\geq 5$  g/dL; TIMI minor bleeding definition: clinically overt bleeding (including imaging), resulting in Hb drop of 3 to  $>5$  g/dL. TIMI, thrombolysis in myocardial infarction

## Rates of TIMI major bleeding



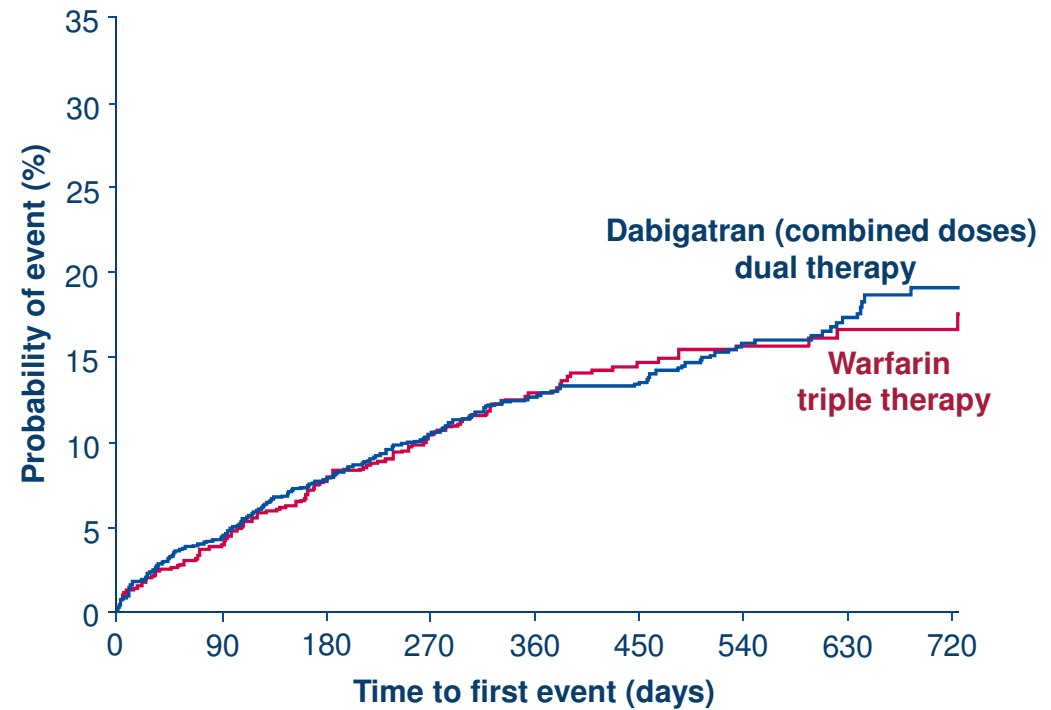
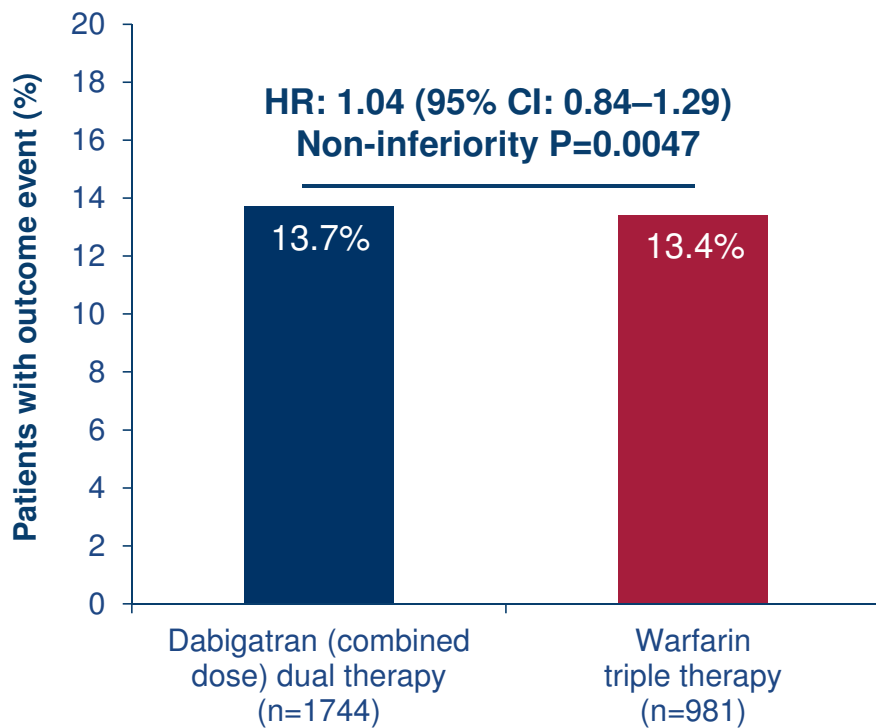
Wald two-sided P value from (stratified) Cox proportional-hazard model ( $\alpha=0.05$ ). TIMI major bleeding definition: fatal, intracranial haemorrhage, clinically overt bleeding with fall in Hb  $\geq 5$  g/dL.

## Rate of intracranial haemorrhage



Wald two-sided P value from (stratified) Cox proportional-hazard model (alpha=0.05)

# Time to death or thromboembolic event, or unplanned revascularization



Non-inferiority P value is one sided (alpha=0.025). Results presented are Step 3 of hierarchical testing procedure, testing non-inferiority of dabigatran dual therapy (combined doses) to warfarin triple therapy in death or thromboembolic event and unplanned revascularization



## Additional individual thromboembolic endpoints

	Dabigatran 110 mg dual therapy (n=981) n (%)	Warfarin triple therapy (n=981) n (%)	D110 DT vs warfarin TT		Dabigatran 150 mg dual therapy (n=763) n (%)	Warfarin triple therapy (n=764) n (%)	D150 DT vs warfarin TT	
			HR (95% CI)	P value			HR (95% CI)	P value
<b>All-cause death</b>	55 (5.6)	48 (4.9)	1.12 (0.76–1.65)	0.56	30 (3.9)	35 (4.6)	0.83 (0.51–1.34)	0.44
<b>Stroke</b>	17 (1.7)	13 (1.3)	1.30 (0.63–2.67)	0.48	9 (1.2)	8 (1.0)	1.09 (0.42–2.83)	0.85
<b>Unplanned revascularization</b>	76 (7.7)	69 (7.0)	1.09 (0.79–1.51)	0.61	51 (6.7)	52 (6.8)	0.96 (0.65–1.41)	0.83
<b>MI</b>	44 (4.5)	29 (3.0)	1.51 (0.94–2.41)	0.09	26 (3.4)	22 (2.9)	1.16 (0.66–2.04)	0.61
<b>Stent thrombosis</b>	15 (1.5)	8 (0.8)	1.86 (0.79–4.40)	0.15	7 (0.9)	7 (0.9)	0.99 (0.35–2.81)	0.98

Results presented are times to event. Stent thrombosis is time to definite stent thrombosis

# Subgroup analysis: age and ticagrelor use at baseline

## Time to first ISTH MBE or CRNMBE

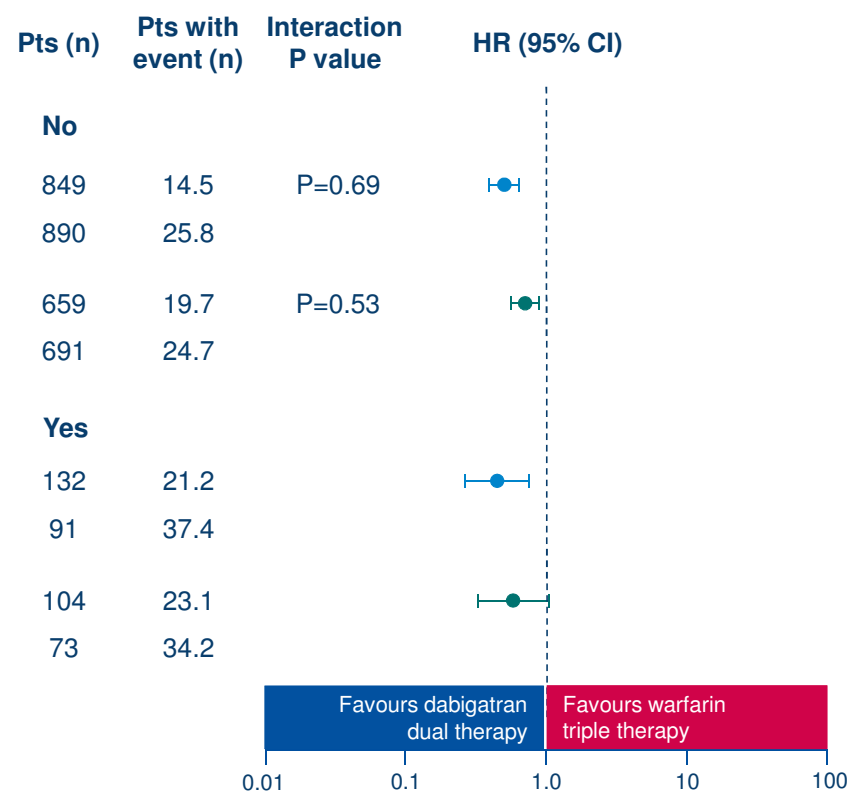
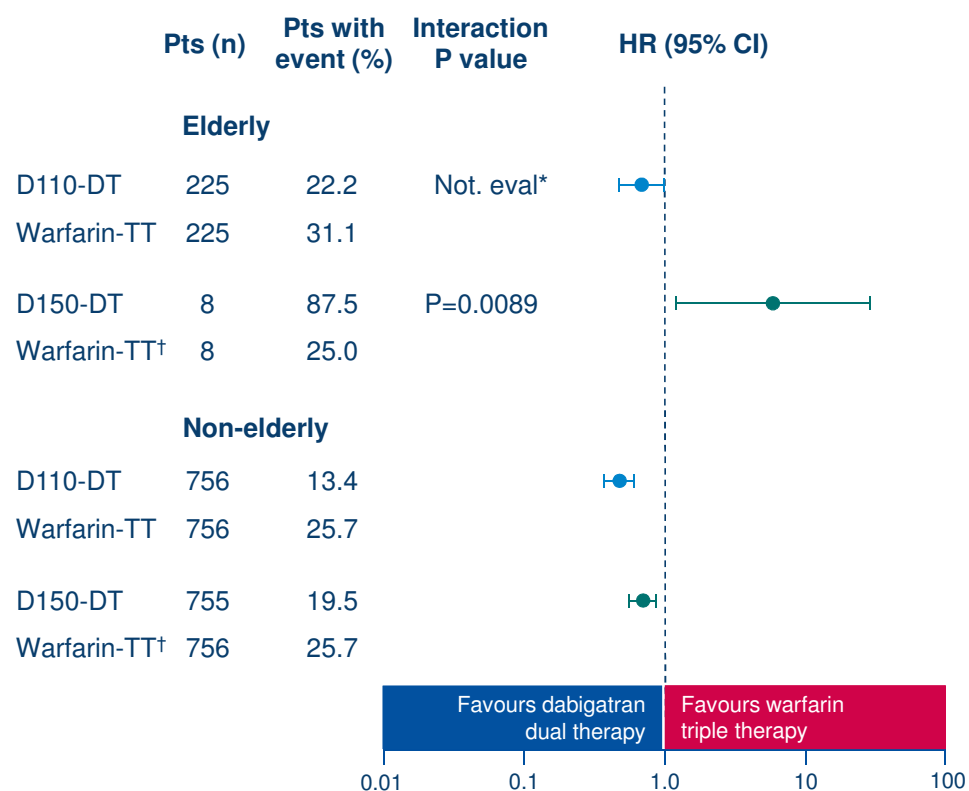


**RE-DUAL PCI**

Study in NVAF patients undergoing PCI

### Age

### Ticagrelor use at baseline (12% Pts)



Missing/not applicable categories not shown and removed prior to calculation of interaction P values. \*Not evaluable: for age-stratified model, the interaction P value is not derived. †For the comparison with D150-DT, elderly patients outside the USA are excluded. Age category is determined IVRS, interactive voice response system; MBE, major bleeding event; CRNMBE, clinically relevant non-major bleeding event; Pts, patients

# Subgroup analysis: age and ticagrelor use at baseline

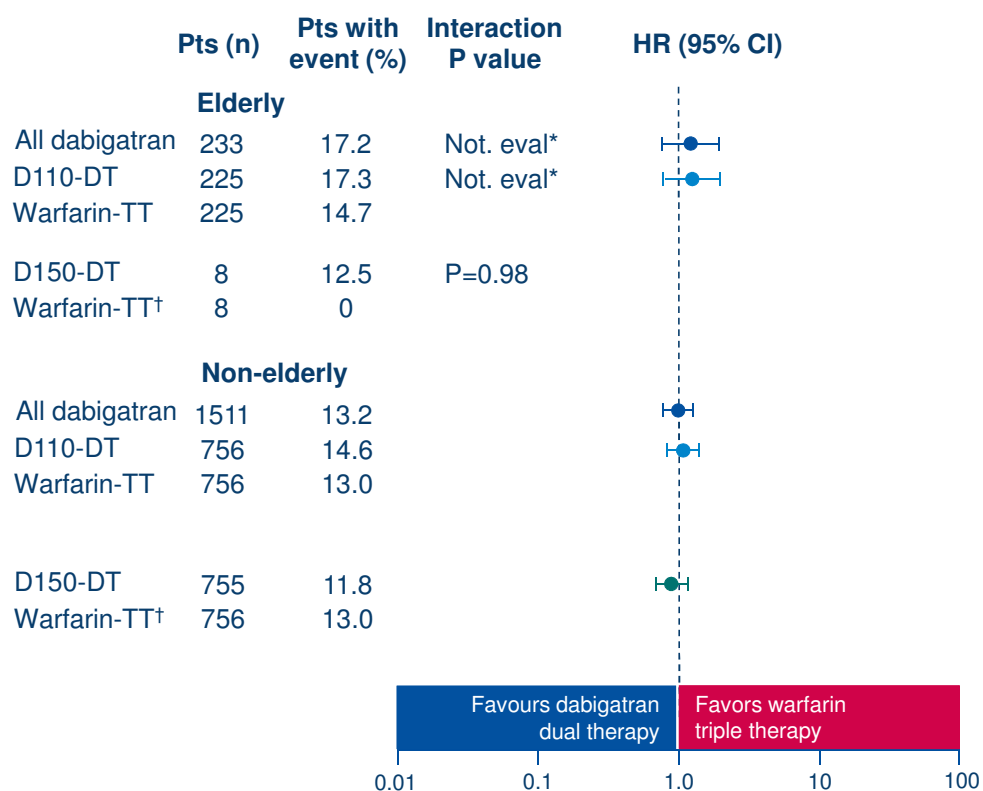
## Time to first DTE or unplanned revascularization



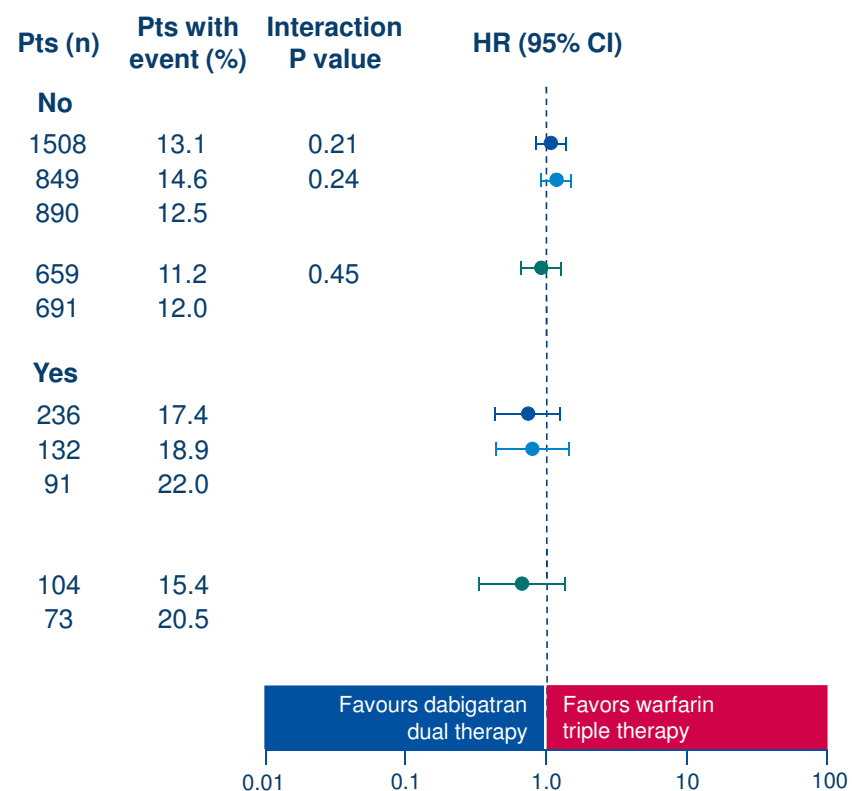
**RE-DUAL PCI**

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# Conclusions

## In patients with AF who have undergone PCI:



Dual therapy with dabigatran and a P2Y12 antagonist **significantly reduced the risk of bleeding versus warfarin triple therapy**, with non-inferiority for overall thromboembolic events



Absolute risk reductions with dabigatran dual therapy were **11.5% and 5.5%** in ISTH major or clinically relevant non-major bleeding at the 110 mg and 150 mg doses, respectively, compared with warfarin triple therapy



These dabigatran dual therapy regimens, using doses approved worldwide for stroke prevention, offer clinicians two additional options for managing Afib patients post-PCI

# RE-DUAL PCI results are now published



The NEW ENGLAND  
JOURNAL of MEDICINE

ORIGINAL ARTICLE

## Dual Antithrombotic Therapy with Dabigatran after PCI in Atrial Fibrillation

Christopher P. Cannon, M.D., Deepak L. Bhatt, M.D., M.P.H.,  
Jonas Oldgren, M.D., Ph.D., Gregory Y.H. Lip, M.D., Stephen G. Ellis, M.D.,  
Takeshi Kimura, M.D., Michael Maeng, M.D., Ph.D., Bela Merkely, M.D.,  
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Eva Kleine, M.Sc., Ruth Harper, Ph.D., Jenny Manassie, B.Med.Sc.,  
James L. Januzzi, M.D., Jurrien M. ten Berg, M.D., Ph.D., P. Gabriel Steg, M.D., and  
Stefan H. Hohnloser, M.D., for the RE-DUAL PCI Steering Committee and Investigators\*

### CONCLUSIONS

Among patients with atrial fibrillation who had undergone PCI, the risk of bleeding was lower among those who received dual therapy with dabigatran and a P2Y12 inhibitor than among those who received triple therapy with warfarin, a P2Y12 inhibitor, and aspirin. Dual therapy was noninferior to triple therapy with respect to the risk of thromboembolic events.