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Outcomes and regional differences in practice in a worldwide coronary stent registry

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ABSTRACT

Objective The primary objective was to assess the performance of a new generation thin-strut sirolimus-eluting coronary stent with abluminal biodegradable polymer in an all comer population. The secondary objective was to detail differences in contemporary percutaneous coronary intervention (PCI) practice worldwide.

Methods e-Ultimaster was an all-comer, prospective, global registry (NCT02188355) with independent event adjudication enrolling patients undergoing PCI with the study stent. The primary outcome measure was target lesion failure (TLF) at 1 year, defined as the composite of cardiac death, target vessel myocardial infarction and clinically driven target lesion revascularisation. Data were stratified according to 4 geographical regions.

Results A total of 37 198 patients were enrolled (Europe 69.2%, Asia 17.8%, Africa/Middle East 6.6% and South America/Mexico 6.5%) and 1-year follow-up was available for 35 389 patients (95.1%). One-year TLF occurred in 3.2% of the patients, ranging from 2% (Africa/Middle East) to 4.1% (South America/Mexico). In patients with acute coronary syndrome, potent $P2Y_{12}$ inhibitors were prescribed in 48% of patients at discharge, while at 1 year 72% were on any dual antiplatelet therapy. Lipid-lowering treatment was administered in 80.9% and 75.5% of patients at discharge and 1 year, respectively. Regional differences in the profile of the treated patients as well as in PCI practice were reported.

Conclusions In this investigation with worldwide representation, contemporary PCI using a new generation thin-strut sirolimus-eluting coronary stent with abluminal biodegradable polymer was associated with low 1-year TLF across clinical presentations and continents. Suboptimal adherence to current recommendations around antiplatelet and lipid lowering treatments was detected.

INTRODUCTION

Percutaneous coronary intervention (PCI) is the the most common modality of coronary revascularisation and among the most frequently performed therapeutic procedures in medicine.[1] While PCI has been extensively studied in large-scale national registries[2–4] as well as in randomised controlled trials comparing it with medical management or coronary artery bypass surgery,[5–7] comparative data on contemporary PCI practice across the globe are lacking. The main purpose of the e-Ultimaster registry was to assess the performance of a new generation thin-strut sirolimus-eluting coronary stent with abluminal biodegradable polymer in an all-comer patient population worldwide to complement the favourable data generated in randomised controlled trials.[8 9] A secondary objective of this analysis was to describe contemporary PCI practice worldwide.

METHODS

Study design

The e-Ultimaster registry (NCT02188355) was an all-comer, single-arm, prospective, multicentre study, with clinical follow-up at 3 months and 1 year, evaluating the performance of a new generation thin-strut sirolimus-eluting coronary stent with abluminal biodegradable polymer (Ultimaster; Terumo Corporation, Tokyo, Japan) in daily practice. Patients were enrolled between October 2014 and June 2018 in 378 hospitals from 50 countries (online supplemental table 1). Follow-up was performed at 3 months at 1 year, by phone or hospital visit. Information collected included vital status, occurrence of adverse events, angina status, antiplatelet medication and other cardiac medication. Sites were instructed to attempt three phone calls and one contact by letter to obtain follow-up information before patient was considered lost to follow-up. For the purpose of the analysis, countries were grouped in four geographical regions: Europe, Asia, South America/Mexico and Africa/Middle East (online supplemental figure 1 and online supplemental table 2). No patient or public was involved in the design or execution of the study.

Study population and device

All patients ≥18 years old undergoing PCI using a drug-eluting stent according to local hospital practice and with the intention to be implanted with the study stent were eligible. The registry was conducted in accordance with the Declaration of Helsinki and country-specific regulatory requirements. The study protocol was reviewed and approved by the Institutional Review Board/Ethics Committee of each participating centre and

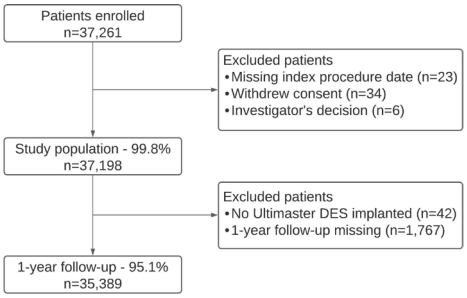

Figure 1 Flow chart of the study population. The 1-year follow-up population included patients who had event that contributed to the primary outcome measure, died during follow-up or completed 1-year follow-up. DES, drug-eluting stent.

all patients signed the informed consent form. The study population used to analyse clinical outcomes during follow-up includes all patients who received one or more study stents on enrolment and (1) completed 1 year follow-up or (2) who reached the primary outcome measure or (3) who died during follow-up. The Ultimaster coronary stent system is a new generation open-cell cobalt–chromium thin-strut (80 µm) sirolimus-eluting stent with an abluminal biodegradable polymer coating (poly-D,L-lactic acid polycaprolactone).[10] Sirolimus is released over a 3-month to 4-month period after which the polymer coating is fully degraded.

Clinical outcomes

The primary outcome measure was target lesion failure (TLF) at 1 year, defined as a composite of cardiac death, target vessel myocardial infarction and clinically driven target lesion

Table 1 Baseline patient characteristics

Patient characteristics	All regions n=37 198	Europe n=25 736	Asia n=6614	Africa/Middle East n=2438	South America/Mexico n=2410
Age, years	64.2±11.3 (37 198)	65.5±11.1 (25 736)	60.9±10.9 (6614)*	59.6±11.4 (2438)*	63.3±10.9 (2410)*
Octogenarians (≥80 years)	8.8% (3286/37 198)	10.7% (2757/25 736)	4.3% (281/6614)*	4.2% (102/2438)*	6.1% (146/2410)*
Gender, male	76.0% (28 257/37 198)	75.7% (19 486/25 736)	76.3% (5049/6614)	79.9% (1947/2438)*	73.7% (1775/2410)*
Body mass index, kg/m²	27.8±4.6 (29 946)	28.1±4.7 (21 612)	26.3±4.3 (4735)*	28.3±4.6 (1718)*	27.8±4.4 (1881)*
≤18.5	0.7% (222/29 946)	0.6% (128/21 612)	1.6% (74/4735)*	0.5% (8/1718)	0.6% (12/1881)
18.5–24.9	27.7% (8295/29 946)	25.5% (5502/21 612)	40.1% (1900/4735)*	23.0% (395/1718)*	26.5% (498/1881)
25–29.9	44.4% (13 293/29 946)	44.9% (9700/21 612)	41.2% (1951/4735)*	46.1% (792/1718)	45.2% (850/1881)
≥30	27.2% (8136/29 946)	29.1% (6282/21 612)	17.1% (810/4735)*	30.4% (523/1718)	27.7% (521/1881)
Cardiovascular risk factors, n†	2.1±0.9 (32 006)	2.1±0.9 (22 399)	2.0±0.9 (5250)*	2.2±1.0 (2231)*	2.1±0.9 (2126)
Diabetes mellitus	28.4% (10 379/36 572)	24.9% (6272/25 192)	32.2% (2114/6564)*	47.0% (1140/2428)*	35.7% (853/2388)*
Insulin dependent	20.4% (2121/10 379)	20.0% (1255/6272)	14.0% (296/2114)*	28.1% (320/1140)*	29.3% (250/853)*
Non-insulin dependent	79.5% (8249/10 379)	79.9% (5012/6272)	86.0% (1817/2114)*	71.7% (817/1140)*	70.7% (603/853)*
Unknown	0.09% (9/10 379)	0.08% (5/6272)	0.05% (1/2114)	0.3% (3/1140)	0.0% (0/853)
Smoking					
Never	37.0% (12 380/33 480)	33.9% (8075/23 848)	48.9% (2644/5408)*	42.1% (923/2193)*	36.3% (738/2031)*
Previous	29.0% (9711/33 480)	31.1% (7417/23 848)	19.9% (1078/5408)*	22.3% (490/2193)*	35.8% (726/2031)*
Current	23.6% (7897/33 480)	24.3% (5796/23 848)	19.0% (1025/5408)*	29.5% (647/2193)*	21.1% (429/2031)*
Unknown	10.4% (3492/33 480)	10.7% (2560/23 848)	12.2% (661/5408)	6.1% (133/2193)	6.8% (138/2031)
Hypertension	67.8% (22 840/33 684)	66.1% (15 624/23 632)	72.4% (4127/5698)*	64.1% (1445/2255)	78.3% (1644/2099)*
Hypercholesterolemia	59.9% (19 462/32 479)	61.6% (14 295/23 202)	55.1% (2797/5081)*	55.6% (1230/2211)*	57.4% (1140/1985)*
Family history of heart disease	36.2% (7259/20 081)	39.5% (5604/14 178)	20.7% (678/3274)*	35.9% (536/1494)*	38.9% (441/1135)
Previous MI	22.8% (7852/34 423)	21.5% (5239/24 392)	28.0% (1601/5727)*	20.8% (462/2220)	26.4% (550/2084)*
Previous revascularisation	29.1% (10 027/34 522)	29.2% (7127/24 442)	25.6% (1468/5744)*	30.9% (695/2253)	35.4% (737/2083)*
Previous PCI	26.0% (9026/34 687)	26.2% (6425/24 559)	23.3% (1342/5767)*	28.3% (642/2267)*	29.5% (617/2094)*
Previous CABG	5.6% (1938/34 562)	5.7% (1387/24 514)	3.3% (191/5745)*	6.0% (135/2255)	11.0% (225/2048)*
Atrial fibrillation on OAC	5.6% (1925/34 450)	6.8% (1651/24 359)	2.6% (150/5743)*	3.0% (69/2283)*	2.7% (55/2065)*
Previous stroke	5.4% (1879/34 577)	5.8% (1415/24 501)	5.8% (328/5682)	2.6% (60/2314)*	3.7% (76/2080)*
Peripheral vascular disease	6.7% (2255/33 880)	7.3% (1758/23 958)	5.1% (286/5655)*	5.9% (131/2222)*	3.9% (80/2045)*
Congestive heart failure	11.36% (3823/33 649)	9.5% (2255/23 821)	23.6% (1312/5552)*	6.1% (136/2242)*	5.9% (120/2034)*
Renal impairment	7.00% (2548/36 407)	6.9% (1731/25 134)	8.0% (522/6547)*	5.5% (128/2333)*	7.0% (167/2393)
Clinical presentation					
CCS	44.9% (16 672/37 171)	44.7% (11 482/25 715)	48.4% (3199/6613)*	42.0% (1024/2436)*	40.2% (967/2407)*
NSTE-ACS	35.0% (12 992/37 171)	35.7% (9191/25 715)	31.2% (2064/6613)*	37.6% (915/2436)	34.2% (822/2407)
STEMI	20.2% (7507/37 171)	19.6% (5042/25 715)	20.4% (1350/6613)	20.4% (497/2436)	25.7% (618/2407)*

Data are mean±SD for continuous variables with or % (n) for categorical variables. The number of patients with available data is indicated in brackets. The p value for the comparison over all four regions was <0.0001 for all variables.
Renal impairment: defined as estimated glomerular filtration rate <60 mL/min/1.73 m². Cardiovascular risk factors include diabetes, current smoking, hypertension, hypercholesterolemia and family history of CV disease
*Indicates a p value <0.05 for the difference in characteristics between the region as compared to Europe.
†Defines diabetes, current smoking, hypertension, hypercholesterolemia and family history of heart disease.
CABG, coronary artery bypass graft; CCS, chronic coronary syndromes; CV, cardiovascular; MI, myocardial infarction; NSTE-ACS, non-ST-segment elevation acute coronary syndrome; OAC, oral anticoagulant; PCI, percutaneous coronary intervention; RCA, right coronary artery; STEMI, ST-segment elevation myocardial infarction.

Table 2 Coronary artery disease at angiography and characteristics of the treated lesions

	All regions n=37 198	Europe n=25 736	Asia n=6614	Africa/Middle East n=2438	South America/Mexico n=2410
Extension of coronary disease					
Multivessel disease	46.1% (17 147/37 198)	45.4% (11 627/25 736)	46.9% (3104/6614)*	54.7% (1334/2438)*	43.0% (1037/2410)*
1-vessel disease	53.8% (20 029/37 198)	54.6% (14 062/25 736)	53.1% (3509/6614)*	45.2% (1101/2438)*	56.3% (1357/2410)
2-vessel disease	29.2% (10 867/37 198)	29.8% (7660/25 736)	26.3% (1738/6614)*	32.5% (792/2438)*	28.1% (677/2410)
3-vessel disease	16.9% (6269/37 198)	15.6% (4007/25 736)	20.6% (1364/6614)*	22.2% (541/2438)*	14.8% (357/2410)
Vessel treated					
Left main	3.1% (1158/37 198)	3.2% (825/25 736)	2.7% (179/6614)*	2.6% (63/2438)	3.8% (91/2410)
LAD	51.6% (19 177/37 198)	50.7% (13 048/25 736)	51.7% (3420/6614)	58.9% (1436/2438)*	52.8% (1273/2410)*
CFX	27.8% (10 343/37 198)	28.0% (7195/25 736)	25.1% (1660/6614)*	33.7% (822/2438)*	27.6% (666/2410)
RCA	34.3% (12 765/37 198)	34.5% (8878/25 736)	33.5% (2214/6614)	35.5% (865/2438)	33.5% (808/2410)
Graft (arterial or venous)	1.2% (444/37 198)	1.4% (355/25 736)	0.4% (29/6614)*	1.4% (33/2438)	1.1% (27/2410)
Lesion characteristics					
N of lesions identified, per patient	1.8±1.1 (37 176)	1.8±1.1 (25 734)	1.9±1.2 (6613)*	2.0±1.1 (2435)*	1.8±1.0 (2394)*
N of lesions treated, per patient	1.3±0.6 (37 158)	1.3±0.6 (25 729)	1.2±0.5 (6605)*	1.5±0.7 (2432)*	1.3±0.6 (2392)
Lesion characteristics, per patient					
CTO	5.1% (1884/37 198)	4.6% (1195/25 736)	6.5% (428/6614)*	4.5% (109/2438)	6.3% (152/2410)*
Bifurcation	11.8% (4395/37 198)	13.1% (3361/25 736)	7.8% (515/6614)*	11.9% (290/2438)	9.5% (229/2410)*
Small vessels	43.7% (16 241/37 198)	42.8% (11 016/25 736)	43.2% (2858/6614)	48.8% (1190/2438)*	48.8% (1177/2410)*
Long lesions	37.3% (13 885/37 198)	34.8% (8960/25 736)	41.9% (2768/6614)*	45.9% (1120/2438)*	43.0% (1037/2410)*
Lesion characteristics, per lesion					
ACC/AHA classification					
Type B2 lesion	22.0% (10 923/49 751)	22.2% (7721/34 797)	20.4% (1642/8033)*	16.5% (605/3659)*	29.3% (955/3262)
Type C lesion	20.6% (10 246/49 751)	20.6% (7165/34 797)	21.6% (1733/8033)	17.0% (622/3659)*	22.3% (726/3262)
Ostial lesions	5.6% (2780/49 347)	5.9% (2044/34 427)	4.2% (337/8032)*	6.4% (232/3642)	5.1% (167/3246)
Moderate/severe calcification	18.1% (8930/49 347)	19.4% (6667/34 427)	9.5% (762/8032)*	15.1% (550/3642)*	29.3% (951/3246)

Data are mean±SD for continuous variables with or % (n) for categorical variables. The number of patients with available data is indicated in brackets. The p value for the comparison over all 4 regions was <0.0001 for all variables, except for left main (overall p=0.017) and RCA (overall p=0.21). A * indicates a p value <0.05 for the difference in characteristics between the region as compared with Europe.
Lesion characteristics at index procedure are reported. Small vessels are defined as at least 1 stent with diameter ≤2.75 mm. Long lesions are defined as at least 1 stent with length ≥25 mm.
ACC/AHA, American College of Cardiology/American Heart Association; CFX, circumflex; CTO, chronic total occlusion; LAD, left anterior descending artery; RCA, right coronary artery.

revascularisation (endpoint definitions reported in online supplemental table 3). Prespecified secondary outcome measures included any death, cardiac death, myocardial infarction, target lesion revascularisation, target vessel revascularisation, target vessel failure (composite of cardiac death, target vessel myocardial infarction and target vessel revascularisation), the composite of any death, any myocardial infarction and any coronary revascularisation, stent thrombosis, and major vascular and bleeding complications. A clinical events committee reviewed and adjudicated all the reported adverse events possibly related to death, myocardial infarction, target lesion or target vessel revascularisation and stent thrombosis (online supplemental table 4). For the purpose of the study, length of stay was defined as [(date of discharge–date of procedure)+1]; that is, length of stay=1 means discharge on the same day of the procedure.

Statistical analysis

Patient demographics, comorbidities, target lesion characteristics, procedural characteristics and medication use were analysed per geographical region and were summarised using mean±SD for continuous variables and frequencies and percentages for categorical variables. A comparison was made over all regions, using ANOVA (if variances were equal) or Welch test (if variances were unequal) for continuous variables and χ^2 test for categorical variables. In addition, comparisons were made between each region and Europe, using Student's t-test (parametric) or Kruskal-Wallis test (non-parametric) for continuous variables and χ^2 test or Fisher exact test for categorical variables. A univariate logistic regression model was used to calculate the OR with 95% CI for primary and secondary outcome measures for each region as compared with Europe. To identify predictors of the primary outcome measure, a stepwise logistic regression model was used with p values to enter and stay in the model set to p=0.25 and p=0.10, respectively. The variables entered in the model were age, sex, body mass index, diabetes mellitus, hypertension, hypercholesterolemia, smoking, renal failure, previous PCI, previous coronary artery bypass surgery, previous myocardial infarction, non-ST-elevation acute coronary syndromes (NSTE-ACS), ST-elevation myocardial infarction (STEMI), multivessel disease, number of lesion identified, number of lesions treated, treated vessel, bifurcation, chronic total occlusion, in-stent restenosis, ostial lesions, moderate to severe calcification, AHA/ACC lesion type, small vessels, long lesions, number of implanted study stents, length of implanted study stent, radial access and geographical region. Missing values were imputed with the mean value of the selected group. Statistical analyses were performed using SAS software, V.9.4 (SAS Institute, Inc., Cary, NC, USA).

RESULTS

Patient and procedural characteristics

A total of 37 198 patients were included in the study and 35 389 patients (95.1%) completed 1-year follow-up (figure 1). With respect to regional distribution, 25 736 (69.2%), 6614 (17.8%), 2438 (6.6%) and 2410 (6.5%) patients were enrolled in Europe, Asia, Africa/Middle East and South America/Mexico, respectively. Patient's characteristics stratified per region of enrolment are summarised are detailed in table 1. The majority of the patients across the continents were treated for ACS, while

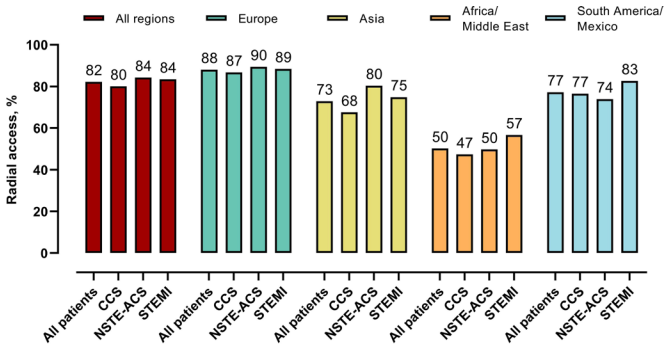

Figure 2 Radial access according to clinical presentation per region. CCS, chronic coronary syndrome; NSTE-ACS, non-ST-segment elevation acute coronary syndrome; STEMI, ST-segment elevation myocardial infarction.

STEMI patients comprised 20.2% of the overall cohort. Details on coronary artery disease at angiography and on the characteristics of the lesions treated are reported in table 2.

The proportion of patients undergoing PCI via transradial access ranged from 50.2% (Africa/Middle East) to 88.1% (Europe). This access route was used in 80.1% of patients with chronic coronary syndromes (CCS), 84.3% of patients with NSTE-ACS and 83.5% of patients with STEMI (p<0.001) (figure 2). Technical details on the PCI procedure are reported in online supplemental table 5. In the vast majority of cases, the procedure consisted of solely balloon angioplasty and stenting, while the use of additional devices such as atherectomy or cutting balloons was limited to 1.1% or less of the procedures in all continents. Balloon dilatation prior to stent deployment (ie, pre-dilatation) was performed in 51.4% (Africa/Middle East) to 59.3% of lesions (South America/Mexico), while balloon post-dilatation to optimise stent expansion was applied in 37.4% (South America/Mexico) to 47.5% (Asia) of lesions. In STEMI, thrombus aspiration was performed in 9.4% (Africa/Middle East) to 21% of the patients (Asia), while in saphenous vein graft interventions, distal protection was applied in 5.4% of cases. Intravascular imaging was rarely used, with the exception of Japan (97.5% use) (online supplemental figure 2). The use of closure devices for femoral access ranged from 9.6% (Asia) to 72.6% (Europe).

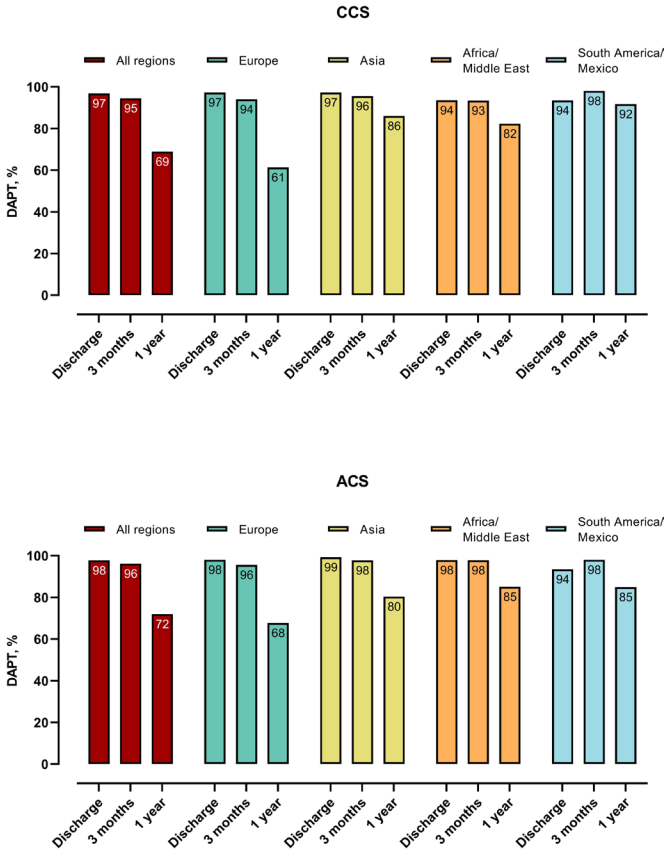

Figure 3 Dual antiplatelet therapy at discharge and at follow-up according to clinical indication. ACS, acute coronary syndrome; CCS, chronic coronary syndrome; DAPT, dual antiplatelet therapy.

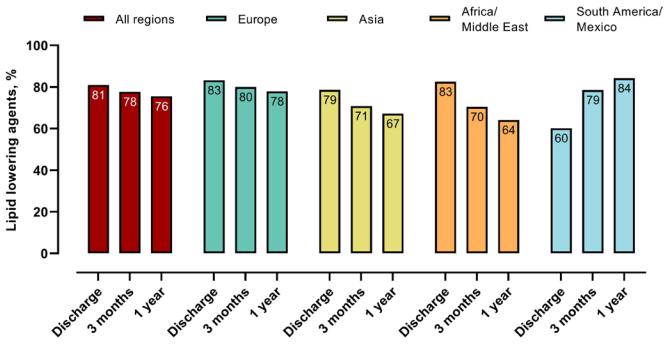

Figure 4 Lipid-lowering treatment in the overall patient population.

Antithrombotic and lipid-lowering treatments

The use of unfractionated heparin during PCI exceeded 90% across the continents, with the exception of Asia, where low molecular weight heparin was used in 31% of the cases (in 11% in patients with CCS and in 46% in patients with ACS) (online supplemental table 6). Intravenous glycoprotein IIb/IIIa receptor inhibitors were used in less than 2% and 10% of PCI for CCS and ACS, respectively. The use of dual antiplatelet therapy (DAPT) at discharge, 3 months and 1 year stratified for the clinical presentation across the continents are depicted in figure 3 and online supplemental table 7. Potent $P2Y_{12}$ inhibitors at discharge were administered in 48.0% of patients with ACS (online supplemental table 7 and online supplemental figure 3). A total of 6.1% of patients were discharged on oral anticoagulants, ranging from 2.0% (South America/Mexico) to 7.5% (Europe). Prescription of lipid-lowering therapy (ie, of any lipid-lowering agent) in the overall population was 80.9% at discharge and 75.5% at 1 year (figure 4). Rates of lipid-lowering agents at 1 year according to region and clinical presentation are reported in online supplemental table 8.

Periprocedural complications, length of stay and 1-year clinical outcomes

Angiographic complications, defined as coronary perforation or spasm, no reflow, side branch occlusions or residual thrombus, occurred in 2.3%, 3.1% and 5.2% in patients presenting with CCS, NSTE-ACS and STEMI, respectively (p<0.0001). Online supplemental table 9 reports the event rates stratified per clinical presentation and geographical region. The median (10th−90th percentile) length of hospital stay post-procedure ranged from 2 (1−4) for patients with CCS to 3 (1–7) for NSTE-ACS, and 4 (2–10) for patients with STEMI. Regional data for length of hospital stay post-procedure are reported in online supplemental table 10. The primary outcome measure of the study, TLF at 1 year, occurred in 3.2% of the patients, while definite

Table 3 One-year clinical outcomes

	All regions n=35 389	Europe n=24 819	Asia n=6305	Africa/Middle East n=2081	South America/Mexico n=2184	P value
Target lesion failure†	3.2% (1135/35 389)	3.5% (867/24 819)	2.2% (137/6305)*	2.0% (41/2081)*	4.1% (90/2184)	<0.0001
Cardiac death†	1.3% (455/35 389)	1.3% (320/24 819)	0.9% (59/6305)*	0.9% (19/2081)	2.6% (57/2184)*	<0.0001
Target vessel MI†	0.9% (316/35 389)	1.1% (271/24 819)	0.4% (22/6305)*	0.6% (13/2081)*	0.5% (10/2184)*	<0.0001
Clinically driven TLR†	1.7% (591/35 389)	1.9% (458/24 819)	1.2% (78/6305)*	1.1% (22/2081)*	1.5% (33/2184)	<0.0001
All-cause death†	2.1% (746/35 389)	2.2% (539/24 819)	1.6% (101/6305)*	1.4% (28/2081)*	3.6% (78/2184)*	<0.0001
All MI†	1.2% (423/35 389)	1.5% (361/24 819)	0.4% (25/6305)*	1.1% (22/2081)	0.7% (15/2184)*	<0.0001
Revascularisations						
TVR†	2.4% (830/35 389)	2.6% (655/24 819)	1.6% (100/6305)*	1.4% (28/2081)*	2.2% (47/2184)	<0.0001
TV non-TLR†	0.7% (261/35 389)	0.9% (226/24 819)	0.3% (17/6305)*	0.3% (6/2081)*	0.6% (12/2184)	<0.0001
TLR†	1.7% (614/35 389)	1.9% (469/24 819)	1.4% (86/6305)*	1.1% (23/2081)*	1.7% (36/2184)	<0.0001
Clinically driven revascularisations						
TVR†	2.3% (800/35 389)	2.6% (638/24 819)	1.4% (91/6305)*	1.3% (27/2081)*	2.0% (44/2184)	<0.0001
TV non-TLR*	0.7% (252/35 389)	0.9% (218/24 819)	0.3% (16/6305)*	0.3% (6/2081)*	0.6% (12/2184)	<0.0001
Target vessel failure*	3.7% (1308/35 389)	4.1% (1016/24 819)	2.4% (148/6305)*	2.2% (46/2081)*	4.5% (98/2184)	<0.0001
Stent thrombosis†						
Definite †	0.4% (146/35 389)	0.5% (125/24 819)	0.1% (9/6305)*	0.2% (4/2081)*	0.4% (8/2184)	<0.0001
Probable†	0.3% (94/35 389)	0.2% (60/24 819)	0.2% (13/6305)	0.2% (4/2081)	0.8% (17/2184)*	<0.0001
Definite/probable†	0.7% (238/35 389)	0.7% (183/24 819)	0.4% (22/6305)*	0.4% (8/2081)	1.1% (25/2184)*	<0.0001
Possible†	0.5% (190/35 389)	0.6% (141/24 819)	0.4% (23/6305)*	0.4% (8/2081)	0.8% (18/2184)	<0.0001
All bleedings	2.9% (1013/35 389)	3.7% (923/24 819)	0.6% (36/6305)*	0.7% (15/2081)*	1.8% (39/2184)*	<0.0001
BARC 2–5 bleeding	2.1% (743/35 389)	2.7% (675/24 819)	0.5% (29/6305)*	0.6% (12/2081)*	1.2% (27/2184)	<0.0001
BARC 3–5 bleeding	0.9% (304/35 389)	1.1% (265/24 819)	0.2% (14/6305)*	0.4% (8/2081)*	0.8% (17/2184)	<0.0001

Events are reported as % (n) in the patient population that reached 1-year follow-up, died during follow-up or who had event that contributed to the primary outcome measure (n=35 389). The p value is given for the comparison over all 4 regions.
Target lesion failure: composite of cardiac death, TV-MI or clinically driven TLR. Target vessel failure: composite of cardiac death, TV-MI or clinically driven TVR.
*Indicates a p value <0.05 for the difference in characteristics between the region as compared with Europe.
†Events were adjudicated by an independent Clinical Event Committee.
MI, myocardial infarction; TV non-TLR, target vessel but non-target lesion revascularisation; TLR, target lesion revascularisation; TVR, target vessel revascularisation.

or probable stent thrombosis and bleedings at 1 year occurred in 0.7% and 2.9% of the patients, respectively. Table 3 summarises the 1-year clinical outcomes stratified per region while the corresponding event rates according to clinical presentations are reported in online supplemental tables 11–13. Independent predictors of TLF at 1 year are reported in table 4.

DISCUSSION

The main finding of e-Ultimaster, a global registry with independent event adjudication, was that PCI performed with a new generation thin-strut sirolimus-eluting coronary stent with abluminal biodegradable polymer was associated with low rates of TLF at 1 year across patient's clinical presentations and continents (<5% for virtually all analyses). Device safety was remarkable with a definite or probable stent thrombosis rate at 1 year <1%. These results expand to an all comer and far bigger population treated in clinical practice the favourable outcomes of PCI with the same device observed in randomised controlled trials, which have previously shown a 1-year TLF rate of 5.4% among 551 patients with stable and unstable coronary disease and a 1-year TLF rate of 6.1% among 375 patientgs with STEMI.[9 11] Independent predictors of 1-year TLF in our study included clinical characteristics such as age, diabetes, renal insufficiency, ACS at presentation and previous revascularisation as well as lesion-specific and procedural predictors, all markers of disease complexity. The performance of PCI in Europe, as compared with Asia and Africa/Middle East, was associated with an increased risk of TLF. The observational nature of the study does not allow conclusion on whether this finding may be due to differences in technique, case selection or unmeasured confounders.

The true global nature of the study allowed for an unprecedented simultaneous assessment of current PCI practices across different regions in the world. Accordingly, worldwide comparative data on contemporary PCI practices are lacking while available data are limited to few countries and specific aspects of the procedure, such as antiplatelet treatment or vascular access.[12 13] Limitations of the few 'global' PCI studies included the use of first-generation drug-eluting stents or an enrolment essentially limited to Western countries.[14 15] We detected major differences in the profile of patients undergoing PCI, procedural practices, pharmacological treatments and outcomes. With respect to the profile of the patients treated, the majority were men over the age of 60 years, while the proportion of octogenarians differed by more than a factor 2 across the continents. More than a quarter of the patients had diabetes, with the prevalence approaching half in Africa/Middle East. In accordance to current guidelines, the main indication for PCI across the continents was ACS.[16–18] Our study showed that radial access has become the vascular access site of choice worldwide, with a use ranging from one out of two procedures in Africa/Middle East to virtually nine out of ten in Europe. While in Europe the use of radial approach was widely embraced for all clinical presentation, in Asia and Africa/Middle East this access route was more frequently used in patients with ACS than those with CCS. The choice of the transradial approach for the entire spectrum of clinical presentations is in line with recent guidelines and supported by our study, showing that the use of this vascular access site was protective with respect to 1-year TLF.[19] For patients treated via a femoral approach, the use of vascular closure devices showed a great deal of variation, ranging from less than 10% in Asia to almost three-quarters of all cases in Europe. In the absence of adequately powered randomised

Table 4 Predictors for 1-year target lesion failure

Univariable				Multivariable			
Predictor	**OR**	**95% CI**	**P value**		**OR**	**95% CI**	**P value**
Region							
Europe vs Asia	1.63	1.36 to 1.96	<0.0001	Europe vs Asia	1.56	1.29 to 1.89	<0.0001
Europe vs Africa/Middle East	1.80	1.31 to 2.47	0.0003	Europe vs Africa/Middle East	2.01	1.45 to 2.79	<0.0001
Europe vs South America/Mexico	0.84	0.67 to 1.05	0.13	Europe vs South America/Mexico	0.91	0.72 to 1.14	0.39
Clinical							
Age (+10 years)	1.33	1.27 to 1.41	<0.0001	Age (+10 years)	1.17	1.10 to 1.24	<0.0001
Body mass index (+5 kg/m²)	0.95	0.89 to 1.02	0.17	Body mass index (+5 kg/m²)	0.93	0.87 to 1.01	0.073
Diabetes	1.62	1.43 to 1.83	<0.0001	Diabetes	1.44	1.26 to 1.64	<0.0001
Renal impairment	2.77	2.36 to 3.26	<0.0001	Renal impairment	1.92	1.62 to 2.29	<0.0001
Previous PCI	1.68	1.48 to 1.90	<0.0001	Previous PCI	1.42	1.23 to 1.63	<0.0001
Previous CABG	2.55	2.12 to 3.07	<0.0001	Previous CABG	1.30	1.03 to 1.65	0.027
NSTE-ACS	1.13	1.00 to 1.28	0.049	NSTE-ACS	1.20	1.05 to 1.38	0.0093
STEMI	1.04	0.90 to 1.21	0.57	STEMI	1.58	1.33 to 1.87	<0.0001
Multivessel disease	1.67	1.48 to 1.89	<0.0001				
Lesion/procedural							
No of lesions identified (+1)	1.33	1.27 to 1.39	<0.0001	No of lesions identified (+1)	1.24	1.17 to 1.31	<0.0001
No of lesions treated (+1)	1.30	1.19 to 1.41	<0.0001	No of lesions treated (+1)	0.81	0.70 to 0.93	0.0022
RCA treated	0.74	0.65 to 0.84	<0.0001	RCA treated	0.73	0.64 to 0.84	<0.0001
Left main treated	3.38	2.75 to 4.17	<0.0001	Left main treated	1.88	1.49 to 2.38	<0.0001
Graft treated	4.03	3.00 to 5.46	<0.0001	Graft treated	1.83	1.26 to 2.66	0.0016
Bifurcation	1.77	1.52 to 2.06	<0.0001	Bifurcation	1.32	1.12 to 1.56	0.0011
In-stent restenosis	1.73	1.40 to 2.04	<0.0001	In-stent restenosis	1.24	0.98 to 1.57	0.068
Moderate/severe calcification	1.50	1.31 to 1.71	<0.0001				
Lesion type B2	1.38	1.21 to 1.57	<0.0001				
Lesion type C	1.43	1.25 to 1.62	<0.0001				
Small vessels	1.23	1.10 to 1.39	0.0005				
Total stent length	1.008	1.006 to 1.011	<0.0001				
No of stents implanted (+1)	1.30	1.23 to 1.37	<0.0001	No of stents implanted (+1)	1.26	1.15 to 1.37	<0.0001
Radial access	0.73	0.64 to 0.85	<0.0001	Radial access	0.81	0.69 to 0.94	0.0066

CABG, coronary artery bypass graft; NSTE-ACS, non-ST-segment elevation acute coronary syndrome; PCI, percutaneous coronary intervention; RCA, right coronary artery; STEMI, ST-segment elevation myocardial infarction.

controlled trials, current guidelines do not provide recommendations in favour or against the use of those devices.

In our study, the PCI procedure consisted of solely balloon angioplasty and stenting in the vast majority of cases, while additional devices such as atherectomy or cutting balloons were rarely used (in 2% or less across the continents). We showed that balloon dilatation prior to stent implantation was more frequently performed than balloon post-dilatation (applied in less than half of the cases). Intravascular imaging was rarely performed, with the exception of Japan where it was used in the vast majority of procedures. The old and inexpensive unfractionated heparin remained the peri-procedural anticoagulant of choice across patient's clinical presentations and continents, being used in more than 9 out of 10 procedures.[18 19] Glycoprotein IIb/IIIa receptor inhibitors were rarely administered, even in the setting of ACS. Virtually all patients received DAPT at discharge. However, approximately 1 out of 5 of patients presenting with CCS was discharged on ticagrelor or prasugrel instead of the guideline-recommended clopidogrel. In addition, DAPT was still administered in 2 out of 3 patients with CCS at 1 year, while the recommended DAPT duration for this indication is 6 months.[20] The proportion of patients with CCS on DAPT at 1 year was as high as 8 to 9 out of 10 patients in Asia, Africa/Middle East and South America/Mexico, although such a strategy has been associated with increased bleeding risk in the absence of an ischaemic benefit.[21] Remarkable was the finding that less than half of patients with ACS were discharged on a potent $P2Y_{12}$ inhibitor (ie, ticagrelor or prasugrel), with a proportion being as low as 1 in 7 in South America/Mexico. This was despite the strong recommendation in guidelines for both agents over clopidogrel.[18] Likely explanation for this finding is that in some countries these agents may either not be commercialised or too expensive. In all regions, the prescription of ticagrelor surpassed by more than a factor 6 the one of prasugrel. The guideline-recommended DAPT duration of 1 year in ACS was prescribed in less than three quarters of the patients, with Europe showing the lowest rate (2 out of 3 patients), while in other continents the rate exceeded 80%.[18] Although e-Ultimaster did not collect all the parameters allowing for a formal bleeding risk assessment, the risk profile of the patients (eg, mean age 64 years, renal insufficiency 7%, prior stroke 5%, need for oral anticoagulation 6%) and the low bleeding rates observed do not seem to justify earlier DAPT discontinuation. Our findings are in line with an international myocardial infarction registry showing that 1 patient out of 4 was not on DAPT at 1 year.[13]

Despite the wealth of data and the clear-cut recommendations for secondary prevention for lipid-lowering agents, our study demonstrates that lipid-lowering treatment was suboptimal, with approximately 1 in 5 and 1 in 4 patients not receiving lipid-lowering treatment at discharge and 1 year, respectively.[22] Our findings reproduce on a global scale prior observation from national and multi-national registries.[23] Little is known about

differences in current length of stay following PCI across the globe. In our study, the post-procedural length of stay ranged considerably according to clinical presentation and geographical areas. The greatest variation was observed in the rate of same-day discharge among patients treated with PCI for CCS, ranging from 1/20 in Asia to 2/3 in South America/Mexico. Such differences cannot be explained by medical reasons alone and are likely related to specificities of the healthcare system and reimbursement issues. Notable was the variation in post-procedural length of stay we observed in patients with STEMI, ranging from a median of 4 days in Europe and Africa/Middle East to a median of 6 days in Asia.

Our study has several limitations inherent to the nature of the investigation. While the registry had no exclusion criteria other than age less than 18 years and unwillingness to sign the informed consent and encouraged the enrolment of a true all-comer population, the 1-year mortality observed is substantially lower than the one documented in other PCI datasets with systematic inclusion, revealing the selection of a low-risk population.[24 25] While all deaths, myocardial infarctions, target lesion and target vessel revascularisations as well as stent thromboses were adjudicated by an independent clinical events committee, other outcome measures were not. Since the measurement of cardiac enzymes post-PCI was left at the discretion of the investigators according to local practice, the incidence of periprocedural myocardial infarctions may have been underestimated. While systematic online data monitoring was performed, underreporting of events cannot be excluded. Enrolment was not equally distributed among regions; however, even in regions less well represented, such as Africa/Middle East and South America/Mexico, the recruitment approached 2500 patients. In addition, practice in countries aggregated to a region were likely non-homogenous. As the study stent was not overall approved, countries with high PCI volumes such as the USA or China could not be included in the study. Finally, loss to follow-up (less than 5%) may have been a source of bias. Baseline characteristics of patients with and without follow-up are reported in online supplemental table 14.

In summary, this study, unmatched to our knowledge in size as well as global representation, showed a remarkable performance of a new generation thin-strut biodegradable-polymer sirolimus-eluting stent, with low TLF as well as stent thrombosis rates at 1 year across clinical presentations and continents. Differences in PCI practice across the globe, such as in the use of transradial access, were outlined and suboptimal adherence to current recommendations on DAPT as well as lipid-lowering therapies were detected. Notable was the administration of DAPT 1 year post-PCI in the vast majority of patients with CCS in several regions of the world and the low prescription rate of potent $P2Y_{12}$ in patients with ACS. These findings are a call for standardisation of PCI practice and pharmacological treatment post-PCI. Tools to facilitate worldwide implementation of guideline-recommended treatments should be investigated.

Key messages

What is already known on this subject?

- While randomised controlled trials have established the efficacy and safety of a new generation thin-strut sirolimus-eluting coronary stent with abluminal biodegradable polymer, information on the performance of the device in a real-world setting are sparse. Although percutaneous coronary intervention (PCI) is one of the most frequently performed invasive therapeutic procedures in medicine, data on contemporary practice worldwide as well as on regional differences are lacking.

What might this study add?

- This study expands the favourable performance profile of the study stent observed in randomised controlled trials to an all-comer population in daily practice. In addition, it outlines differences in PCI practice worldwide and showed, among other findings, a suboptimal prescription of antiplatelet as well as lipid-lowering agents.

How might this impact on clinical practice?

- This study supports the use of a new generation thin-strut sirolimus-eluting coronary stent with abluminal biodegradable polymer, independently of clinical presentation and local PCI practice. In addition, it calls for a better compliance with practice guidelines, in particular with respect to pharmacological treatment post-PCI.

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Contributors MR is responsible for the overall content as the guarantor. MC interpreted the results and drafted the manuscript. MR participated in data collection, interpreted the results and drafted the manuscript. LJ and RD extracted the data and performed the statistical analyses. All other authors participated in data collection and provided a critical review of the manuscript.

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Patient consent for publication Not applicable.

Ethics approval This study involves human participants. The study protocol was reviewed and approved by the Institutional Review Board/Ethics Committee of each participating centre (378 hospitals from 50 countries). A complete list with all reference numbers/ID can be obtained on request, Participants gave informed consent to participate in the study before taking part.

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SUPPLEMENTAL MATERIAL

Cimci M, *et al*. *Heart* 2022;0:1–8. doi: 10.1136/heartjnl-2021-320116

Supplemental Tables

Supplemental Table 1: List of participating sites and local principal investigators

Country	Participating sites and investigators
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Austria	AKH Linz: **Clemens Steinwender**; Medical University Vienna (AKH): **Irene Lang**; Medizinische Universität Graz: **Gabor Toth-Mayor**
Bangladesh	National Heart Foundation Hospital and Research Institute: **Fazila Tun-Nesa Malik**
Belarus	City Clinical Emergency Hospital: **Alexander Beimanov**; RSPC: **Oleg Polonetsky**
Belgium	AZ Sint Lucas: **Jan Nimmegeers**; CHR de La Citadelle: **Suzanne Pourbaix**; Hôpital Ambroise Paré de Mons: **Stéphane Carlier**; CHU Charleroi: **Adel Aminian**; CHU UCL Mont Godinne Namur: **Antoine Guédès**; Epicura Hornu: **Philippe Decroly**; Imelda Ziekenhuis: **Willem De Wilde**; Jan Yperman Ziekenhuis: **Dries De Cock**; OLVZ Aalst: **Bernard De Bruyne**; UCL Saint Luc: **Joelle Kefer**
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Bulgaria	Mbal Haskovo: **Sevdalin Topalov**; Mbal Montana City Clinic Sveti Georgi: **Krasimir Pandev**; Mbal Sveta Karidad, Plovdiv: **Dimitar Karageorgiev**; Mbal Sveta Petka Vidin: **Diana Trendafilova-Lazaroba**; Specialized Cardiology Hospital For Active Treatment: **Angel Mitov**; Trakiya Hospital, Stara Zagora: **Borislov Borisov**; Umhat Alexandrovska: **Dobrin Vassilev**; Umhat St.Ekaterina: **Julia Jorgova-Makedonska**
Chile	Clinica Bicentenario: **Carlos Romero**; Clinica Santa Maria: **Pablo Pedreros**; Hospital Clínico San Borja Arriaran: **Gabriel Maluenda**; Hospital Guillermo Grant Benavente: **Luis Perez**; Hospital Regional de Antofagasta: **Bernhard Westerberg**; Hospital Regional Puerto Montt: **Victor David Assef**; Hospital San Juan de Dios: **Angel Puentes**
Colombia	Centro Cardiovascular de Caldas: **Hugo Castaño**; Clinica Shaio: Pablo Castro; Fundación Cardiovascular de Colombia (Bucaramanga): **Tamara Gorgadze**; Instituto del Corazon Bucaramanga: **Boris Eduardo Vesga**, **Hector Hernandez**
Czech Republic	St Anne's University Hospital Brno: **Ladislav Groch**; Kardiologie na Bulovce: **Miroslav Erbrt**; Karlovarská Krajská Nemocnice: **Alexandr Schee**; FNKV Hospital: **Viktor KočKa**; Krajska Nemocnice T. Bati: **Zdenek Coufal**
Egypt	Al Hayat Hospital: **Hany Ragy**; Al Nakheel Hospital: **Yasser Sadek**; Dr Ahmed Abdel Aziz Multicenter: **Mohamed Abdel Aziz**; Dr Hussien Heshmat – As Salam International Hospital: **Hussien Heshmat**; El Marwa Hospital: **Mounir Asman**; Italian Hospital: **Ihab Daoud**; L-Fouad Cardiac Center: **Ahmed Emara**; Dr Hisham Ammar Multicenter: **Hisham Ammar**; Police Hospital: **Mohamed Helal**; Tarek Rasid: **Tarek Rashid**; Um El Korra M Setiha Hospital: **Mohamed Setiha**; Nile Badrawy Hospital: **Sameh Ahmed Salama**; Wadi El Neel: **Hazem Khamis**
Estonia	North-Estonia Medical Center: **Peep Laanmets**;
France	Centre D'exploration-Chirurgie Cardio-Vasculaire: **Jean-Louis Leymarie**; CH Bretagne Atlantique: **Emmanuelle Filippi**; CH de Marne La Vallée: **Simon Elhadad**; CH de Montreuil: **Chaib Aures**; CH Haguenau: **Fabien De Poli**; Groupe Hospitalier de la Rochelle Ré Aunis: **Charlotte Trouillet**; CH La Timone Marseille: **Jean-Louis Bonnet**; CH Louis Pasteur-Le Coudray: **Grégoire Rangé**; CH de Pau: **Nicolas Delarche**; CH René Dubos Pontoise: **Francois Funck**; CH St Joseph St Luc Lyon: **Olivier Dubreuil**; CH Sud Francilien: **Pascal Goube**; CH Valence: **Stanislas Champin**; CH Yves Le Foll - Saint Brieuc: **Denis Amer Zabalawi**; CHD Vendée La Roche Sur Yon: **Emmanuel Boiffard**; CH Général de Saint Quentin: **Pierre Henon, Florent Chevalier**; CHIC Quimper: **Thierry Joseph**; CHR Orleans Cardiologie: **Olivier Bizeau**; CHU Angers: **Alain Furber**; CHU Caen: **Farzin Beygui**; CHU Clermont-Ferrand: **Pascal Motreff**; CHU de Poitiers: **Sebastien Levesque**; Clinique Ambroise Paré: **Julien Rosencher**; Clinique Diaconat Fonderie Mulhouse: **Pradip Kumar Sewoke**; Clinique du Millénaire Montpellier: **Christophe Piot**; Clinique Du Pont de Chaume Montauban: **Laurent Delorme**; Clinique Louis Pasteur Essey les Nancy: **Max Amor, Michael Angioi**; Clinique Rhône Durance: **Gilles Bayet**; Clinique Saint-Laurent: **Yves Biron**; Clinique St Hilaire Rouen: **Matthieu Godin;** Clinique St Joseph: **Julien Jeanneteau**; GCS Cardiologique de Bayonne: **Jean Luc Banos**; Groupe Hopitalier Paris Saint Joseph: **Romain Cador**; Groupement Mutualiste de Grenoble: **Jacques Monsegu;** Hopital Privé Claude Galien Quincy: **Stéphane Champagne**; Hopital Albert Schweitzer GHCA Colmar: **Plastaras Philoktimon**; Hôpital Europøen de Paris la Roseraie: **Hakim Benamer**; Hopital Privé Dijon Bourgogne: **Philippe Brunel**; Hopital Privé Jacques Cartier Massy: **Thomas Hovasse**, **Bernard Chevalier**; Hopital Privé La Louviere-Lille: **Fabrice Leroy**; Hopital Privé Saint Martin: **Guillaume Lecoq**; Hôpital Privé St Martin de Pessac: **Levy Raphy**; Hôpital Privé St Martin de Pessac: **Bernard Karsenty**; Institut Arnault Tzanck St Laurent du Var: **Alexandre Avran**; Le Confluent Nouvelles Cliniques Nantaises: **Ashok Tirouvanziam**; Nouvel Hopital Civil de Strasbourg: **Olivier Morel**; Pôle Santé République Clermont Ferrand: **Pascal Barraud**; Polyclinique Les Fleurs: **Philippe Commeau**
Georgia	Joann Medical Center (JAMC): **Lasha Chantladze**
Hungary	Pándy Kálmán Hospital: **Jambrik Zoltan**; Markusovszky University Teaching Hospital: **Lajos Nagy**; Moritz Kaposi General Hospital: **Andras Vorobcsuk**; PECS University: **Ivan Horvath**; Semmelweis University: **Bela Merkely**; Szabolcs - Szatmar - Bereg County Hospital and University Teaching Hospital: **Kôszegi Zsolt**

Country	Participating sites and investigators
Iceland	Landspitali National University Hospital of Iceland: **Ingibjörg Jóna Guðmundsdóttir**;
India	Dayanand Medical College: **Gurpreet Singh Wander**; Fortis Hospital: **R. Keshava**; G. Kuppuswamy Naidu Memorial Hospital: **Rajpal Abhaichand**; H .J. Doshi Ghatkopar Hindusabha Hospital: **Anil Potdar**; Heart & General Hospital: **Prakash Chandwani**; Kamalnayan Bajaj Hospital, Aurangabad: **Ajit Bhagwat**; Krishna Institute of Medical Sciences: **Rajendra Kumar Premchand**; Madras Medical Mission: **Ajit Mullasari**; Maharaja Agrasen Hospital: **B B Chanana**; Max Super Specialty Hospital: **Viveka Kumar**; Medanta Hospital: **Praveen Chandra**; BM Birla Heart Research Cente: **Ashwani Mehta**; Sree Chitra Tirunal Institute of Medical Sciences & Technology: **Bijulal Sasidharan**; Wockhardt Hospital: **Prashant Jagtap**
Indonesia	Awal Bros Hospital: **Bambang Budiono**; Binawaluya Cardiac Center: **Muhammad Munawar**; RSUPN Dr. Cipto Mangunkusumo Hospital: **Muhammad Yamin**; Dr. Soetomo General Hospital: **Yudi Her Oktaviono**; Dr. Wahidin Sudirohusodo General Hospital- Awal Bros Hospital: **Abdul Hakim Alkatiri**; Medistra Hospital: **Teguh Santoso**; National Cardiovascular Center Harapan Kita Hospital: **Doni Firman**; Saiful Anwar General Hospital: **Sasmojo Widito**
Ireland	Cork University Hospital: **Eugene McFadden**; University Hospital Galway: **Jim Crowley**; University Hospital Limerick: **Thomas Kiernan**
Israel	Assaf Harofeh Medical Center: **Minha Saar**; Galilee Medical Center: **Marc Brezins**; Rambam Medical Center: **Ariel Roguin**; Ziv Medical Center: **Majdi Halabi**
Japan	Gunma Prefectural Cardiovascular Center: **Ren Kawaguchi**; Higashi Takarazuka Satoh Hospital: **Satoru Otsuji**; Iwaki Kyoritsu General Hospital: **Yoshito Yamamoto**; Kakogawa Central City Hospital: **Makoto Kadotani**; Kansai Rosai Hospital: **Takayuki Ishihara**; Kokura Memorial Hospital: **Kenji Ando**; Komaki City Hospital: **Katsuhiro Kawaguchi**; Kouseikai Takai Hospital: **Yasunori Nishida**; Mie Heart Center: **Hideo Nishikawa**; Mimihara General Hospital: **Shozo Ishihara**; Okamura Memorial Hospital: **Yasuhiro Tarutani**; Osaka General Medical Center: **Takashi Morita**; Osaka Rosai Hospital: **Masami Nishino**; Saiseikai Senri Hospital: **Keiji Hirooka**; Saiseikai Yamaguchi General Hospital: **Shiro Ono**; Saiseikai Yokohama City Eastern Hospital: **Yoshiaki Ito**; Saitama Cardiovascular And Respiratory Center: **Makoto Muto**; Sakurabashi Watanabe Hospital: **Kenshi Fujii**; Sapporo Higashi Tokushukai Hospital: **Seiji Yamazaki**; Seirei Hamamatsu General Hospital: **Hisayuki Okada**; Seirei Yokohama Hospital: **Kazuhiro Ashida**; Shonan Kamakura General Hospital: **Shigeru Saito**; Showa University Fujigaoka Hospital: **Hiroshi Suzuki**; Tokai University Hachiouji Hospital: **Takashi Matsukage**
Jordan	Jordan Hospital: **Imad Alhaddad**
Kazakhstan	Aktobe Regional Hospital: Aidos Taumov; Cardiology Center Petropavl: **Maxat Kudratullayev**; City Hospital #2: **Marat Alikhanov**; Clinical Center of Cardiac Surgery and Transplantation: **Vadim Seisembekov**; Jsc Nat. Scient. Cardiosurgery Ctr.: **Marat Aripov**; Medical University Clinic West Kazakhstan: **Dauren Teleuov**; National Surgery Center Almaty: **Bauyrzhan Ormanov**; Pavlodar Regional Cardiologic Center: **Ruslan Baisebenov**; Regional Cardiosurgery Center: **Azamat Kenzhinovich Zhashkeyev**; Rudnyi City Hospital: **Azamat Yerzhanov**; The Almaty City Heart Center: **Orazbek Sakhov**; Semey State Medical University, Interventional Cardiology Dpt: **Ersin Sabitov**
Kuwait	Sabah Al Ahmad Cardiac Center: **Vladimir Kotevski**
Lebanon	Hôpital Abou Jaoudé: **Daou Abdo**; Labib Medical Center: **Ahmad Serhal**
Lithuania	Hospital Of Lithuanian University Of Health Sciences Kauno klinikos: **Ramunas Unikas**; Klaipeda Seamen's Hospital: **Aurimas Knokneris**
Macedonia	City General Hospital: **Vladimir Ristovski**; University Clinic Of Cardiology: **Sasko Kedev**
Malaysia	Desa Park City: **Chong Yoon Sin**; Hospital Serdang: **Abdul Kahar Ghapar**; Hospital Sultanah Bahiyah: **Abd Syukur Bin Abdullah**; Hospital Tengku Ampuan Afzan: **Siti Khairani bt Zainal Abidin**; HSC Medical Center: **Tee Chee Hian**; UiTM Sg. Buloh Campus: **Nicholas Chua Yul Chye**
Mexico	Clinica Hospital San Jose de Navojoa: **Santiago Sandoval Navarrete**; Hospital Fray Juan de San Miguel de Uruapan: **Juan Jorge Beltran Ochoa**; Hospital Star Medica Merida: **Sergio Alonso Villareal Umaña**; Casa del Corazon de la Peninsula de Yucatan SCP: **Carlos Ramon Rodas Caceres**
Morocco	Cherradi_Clinique Agdal: **Rhizlan Cherradi**; Clinique Achifaa de Casablanca: **Anass Assaidi**; Clinique Grant Atlas: **Dounia Benzaroual**; Clinique Internationale de Marrakech: **Fahd Chaara**
Netherlands	Albert Schweitzer Ziekenhuis: **Martijn Scholte**; Amphia Ziekenhuis: A**lexander J.J. Ijsselmuiden**; Catharina Ziekenhuis: W.A.L. **Pim Tonino**; Jeroen Bosch Ziekenhuis: **Jawed Polad; Jacob van Eck**; Maasstad Ziekenhuis: **Pieter Cornelis Smits**; Meander MC: **Fabrizio Spano**; Medisch Centrum Haaglanden: **Lucas H. Savalle**; Medisch Spectrum Twente, Enschede: **Clemens Von Birgelen**; Rijnstate Ziekenhuis: **Peter W. Danse**; Scheper Hospital: **Gillian Jessurun**; Zorgsaam Ziekenhuis Zeeuws-Vlaanderen: **Pieter Bisschops**
Oman	Muscat Private Hospital: **Amr Hassan**
Poland	Insytut Kardiologii im. Prymasa Tys ąclecia Stefana Kardynała Wyszyńskiego: **Adam Witkowski**; Miedziowe Centrum Zdrowia: **Adrian Wlodarczak**; Szpital Kliniczny Przemienienia Panskiego Um Im. K. Marcinkowskiego W Poznaniu: **Maciej Lesiak**;
Portugal	CHLN Norte Hospital Santa María: **Pedro Canas Da Silva**
Romania	Centrele de Excelenta Ares: **Alexandru Voican**; Clinicile Icco S.R.L.: **Mihai Ursu**; Cordismed Timisoara: **Milovan Slovenski**; Spitalul Judetean de Urgenta Sibiu: **Ioan Bitea Cornel**
Saudi Arabia	Dallah Hospital, Riyadh: **Samih Lawand**; King Fahad Cardiac Center: **Tarek Kashour**; Prince Abdullah Bin Abdul Aziz Musad Cardiac Center: **Muhammad Aurangzaib Mughal**
Serbia	Cardiovascular Institute Dedinje: **Dragan Sagic**; Clinical Center Kragujevac: **Nikola Jagic**; Cardiology Clinic, Clinical Centre of Serbia: **Vladan Vukcevic**; Kbc Zvezdara: **Alexandar Davidovic**; CHC Bezanijska Kosa: **Sasa Hinic**
Slovakia	Stredodlovensky Ustav Srdcovych A Cievnych Chorob: **Martin Hudec**
South Africa	Ethekwini Hospital & Heart Centre: **Shiraz Gafoor**; **Ismail Soosiwala**; Milpark Hospital: **Graham Cassel**; Netcare Greenacres Hospital: **Martin Tawanda Butau**; Netcare Union Hospital: **Jean-Paul Theron**; Netcare Unitas Hospital:

Country	Participating sites and investigators
	Jean Vorster; Netcare Unitas Hospital: **Pieter Blomerus**; Netcare Unitas Hospital: **Iftikar Osman Ebrahim**; Netcare Unitas Hospital: **Jacobus Badenhorst**
Spain	Bellvitge University Hospital: **Joan Antonio Gomez**; Complexo Hospitalario Universitario A Coruña (CHUAC): **Nicolás Vázquez Gonzalez**; Hospital 12 Octubre: **Fernando Sarnago**; Hospital Cabueñes: **Iñigo Lozano**; Hospital Clínico Lozano Blesa de Zaragoza: **José Ramón Ruiz Arroyo**; Hospital Clínico Universitario de Santiago de Compostela: **Ramiro Trillo Nouche**; Clinico Universitario Valencia: **Juan Sanchís**; Hospital de Cruces-Barakaldo: **Juan Alcibar**; Hospital Universitario Donostia: **Mariano Larman**; Hospital de Galdakao: **José Ramón Rumoroso**; Hospital de La Cruz Roja de Córdoba: **José Suárez de Lezo**; Hospital de León: **Maria López Benito**; Hospital de Mérida: **Pablo Cerrato Garcia**; Hospital de Navarra: **Baltasar Lainez**; Hospital del Mar: **Beatriz Vaquerizo**; Hospital Fundacion Alcorcon: **Javier Botas**; Hospital G. Trias I Pujol: **Eduard Fernández Nofrerias**; Hospital General Castellón: **Pascual Baello Monge**; Hospital General Ciudad Real: **Fernando Lozano Ruiz-Poveda**; Hospital General de Albacete: **Jesus Maria Jimenez Mazuecos**; Hospital General Universitario de Burgos: **Javier Robles**; Hospital Infanta Cristina: **José Ramon Lopez Minguez**; Hospital Juan Ramón Jiménez: **Pepi Garcia**; Clinica La Luz: **Jorge Palazuelos**; Hospital Manises: **Gema Miñana**; Hospital Marqués de Valdecilla: **Jose Javier Zueco**; Hospital Meixoeiro-Medtec: **Andrés Iñiguez Romo**; Hospital Moncloa: **Eulogio Garcia Fernandez**; Hospital Puerta de Hierro: **Javier Goicolea**; Hospital Reina Sofia de Córdoba: **Manuel Pan**; Clínica San Fransisco de Asis: **Arturo García Touchard**; Hospital San Pedro: **Javier Fernández**; Hospital San Pedro de Alcantara-Caceres: **Javier Fernandez Portales**; Hospital San Rafael: **Gonzalo Peña**; Hospital Sant Pau: **Antonio Peñaranda Serra**; Hospital Santa Lucía de Cartagena Hospital Nostra Señora Rossell: **José Domingo Cascón**; Hospital Txagorritxu: **Alfonso Torres**; Hospital Universitario de Gran Canaria Dr Negrin: **Pedro Martin Lorenzo**; Hospital Universitario de Guadalajara: **Javier Balaguer Requena**; Hospital Universitario Lucus Augusti (HULA): **Raymundo Ocaranza Sanchez**; Hospital Universitario Miguel Servet (H.U.M.S.): **Jose Antonio Diarte de Miguel**; Hospital Vall d'Hebron: **Bruno García Del Blanco**; Hospital Virgen Arrixaca: **Eduardo Pinar**; Hospital Virgen de La Salud: **P. José Moreu Burgos**; Instituto Cardiologico Hospital Campo Grande: **Juan Manuel Duran**; San Juan de Alicante: **Ramón López Palop**; Universitario Central de Asturias: **César Moris-De La Tassa**
Sweden	Gävle Sjukhus: **Robert Kastberg**; Mälarsjukshuet: **Finn Hjortevang**; Skaraborgs Sjukhus v Skövde: **Jason Stewart**; Sundvalls Sjukhus: **Espen Haugen**; Universitets Sjukhuset I Örebro: **Ole Fröbert**; Västmanlads Sjukhus Västerås: ;
Switzerland	Cardiocentro Lugano, Ticino: Giovanni Pedrazzini; Herz Gefäss Zentrum Zürich: **Peter Wenaweser**; Hôpital de La Tour: **Edoardo De Benedetti**; Hôpitaux Universitaires de Genève: **Maro Roffi**; Kantonsspital Baselland: **Gregor Leibundgut**; Kantonsspital Frauenfeld Spital Thurgau AG: **Michael Neuhaus**; Kantonsspital Luzern: **Florim Cuculi**
Thailand	Central Chest Institute Of Thailand: **Wirash Kehasukcharoen**; HRH Princess Maha Chakri Sirindhorn Medical Center (Nakornayok): **Arthit Wongsoasup**; Paolo Memorial Hospital Phaholyothin: **Niphonth Srisuwanunt**
Tunisia	Dr. Mohamed Drissa Clinique Hannibal Lac 2: **Mohamed Akram Drissa**; Dr. Ben Chedli Tarek - Soukra Medical: **Ben Chedli Tarek**; Dr. Bouziri - Clinique Générale Et Cardiovasculaire de Tunis: **Sami Bouziri**; Dr. Elyes Kharrat - Bassatine Clinic: **Elyes Kharrat**; Polyclinique El bassatine_Dr. Mohamed Najeh Abid: **Mohamed Najeh Abid**; Clinique Générale et Cardiovasculaire de Tunis _Dr. Saloua Trabelsi: **Saloua Trabelsi**; Polyclinique El Bassatine: **Rridha Ennouri**
Ukraine	Heart Institute: **Andriy Khohlov**; NAMS Amosov | Emergency Endovascular Surgery Department: **Sergii Salo**; NAMS Amosov | X-Ray Diagnostics And Invasive Cardiology Department: **Yevhenii Aksonov**; S.P.M.C. of Pediatric Cardiology and Cardiac Surgery: **Georgiy Mankovskiy**
United Arab Emirates	Al Noor Hospital - Airport: **Mohammad Andron**; Al Qassimi Hospital: **Arif Al Nooryani**; Al Zahra Private Hospital, Dubai: **Syed Nazir**; Belhoul Speciality Hospital, Dubai: **Muhammad Adnan Raufi**; Dr. Sulaiman Al Habib: **Albert Alahmar**; Dubai Hospital: **Hesham Ahmed Osman**; Iranian Hospital, Dubai: **Seyed Bagher Tabatabaei**; Lifecare Hospital: **Khaled Galal**; Prime Hospital, Dubai: **Murali Krishna**; Rashid Hospital: **Fahad Omar Baslaib**
United Kingdom	Essex Cardiothoracic Centre, Basildon: **Rohan Jagathesan**; Bedford Hospital: **Ramesh de Silva**; Blackpool Victoria Hospital: **Jonas Eichhofer**; Bradford Teaching Hospitals: **John Kurian**; Croydon University Hospital: **Sanjay Kumar**; Dorset County Hospital: **Javed Iqbal**; Eastbourne District General Hospital: **David Walker**; Freeman Hospital: **Rajiv Das**; GBS Re Bucks Healthcare NHS Trust (Buckinghamshire, Wycombe): **Piers Clifford**; James Cook University Hospital: **David Austin**; Kettering General Hospital: **Javed Ehtisham**; Kings Mill Hospital: **Ifti Fazal**; Lincoln County Hospital: **Kelvin Lee**; Lister Hospital, Stevenage: **Paul Kotwinski**; The Royal Wolverhampton Hospitals: **Shahzad Munir**; Norfolk And Norwich University Hospital: **Alisdair Ryding**; Northwick Park Hospital: **Ahmed Elghamaz**; Plymouth Hospital: **Girish Viswanathan**; Queen Elizabeth Hospital, Birmingham: **Sagar Doshi**; Queens Medical Center Nottingham: **Sachin Jadhav**; Royal Berkshire Hospital: **Nicos Spyrou**; Royal Blackburn Hospital: **John Mcdonald**; Royal Bournemouth And Christchurch Hospitals NHS Foundation Trust: **Suneel Talwar**; Royal Brompton And Harefield: **Robert Smith**; Royal Cornwall Hospitals: **Sen Devadathan**; Derby Teaching Hospitals: **Kamal Chitkara**; The Royal Free Hospital: **Sundeep Kalra**; Royal Gwent Hospital, Newport: **James Cullen**; Royal Stoke University Hospital: **Mamas Mamas**; Royal Sussex Hospital, Brighton: **David Hildick-Smith**; Royal United Hospital, Bath**: Kevin Carson**; Salisbury District Hospital: **Tim Wells**; Sandwell And West Birmingham Hospitals: **Chetan Varma**; Sheffield Teaching Hospital: **James Richardson**; Tunbridge Wells Hospital: **Clive Lawson**; UH Coventry and Warwickshire: **Rajathurai Thirumaran**; University Hospital South Manchester: **Hussain Contractor**; University Hospital Of Wales: **Rito Mitra**; University Hospitals Of Leicester: **Ian Hudson**; West Middlesex Hospital: **Sukhinder Nijjer**; Western Sussex Hospitals - Worthing Hospital: **Nicholas Pegge**; Worcestershire Acute Hospitals NHS Trust: **Helen Routledge**; Wrightington Hospital: **V J Karthikeyan**
Uzbekistan	Republic Specialized Center of Surgery: **Mirjamol Mirumarovich Zufarov**
Vietnam	Thong Nhat Hospital: **Nguyen Van Tan**

Supplemental Table 2: Regions, countries and number of patients enrolled

	N of patients
Europe	**25736**
Austria	189
Belarus	17
Belgium	613
Bulgaria	1161
Czech Republic	293
Estonia	654
France	4546
Hungary	224
Iceland	50
Ireland	407
Lithuania	283
Macedonia	383
Netherlands	4336
Poland	331
Portugal	90
Romania	197
Serbia	364
Slovakia	105
Spain	4305
Sweden	666
Switzerland	554
Ukraine	267
United Kingdom	5701
Asia	**6614**
Armenia	310
Bangladesh	365
Georgia	128
India	1466
Indonesia	555
Japan	942
Kazakhstan	2319
Malaysia	302
Thailand	62
Uzbekistan	113
Vietnam	52
Africa/Middle East	**2438**
Egypt	587
Israel	293
Jordan	28
Kuwait	50
Lebanon	5
Morocco	177
Oman	25
Saudi Arabia	125
South Africa	295
Tunisia	431
United Arab Emirates	422
South America/Mexico	**2410**
Argentina	249
Brazil	259
Chile	1326
Colombia	497
Mexico	79

Supplemental Table 3: Definitions of primary outcome events

Event	Definition
Cardiac death	Cardiac death was defined as any death due to proximate cardiac cause (e.g. MI, low-output failure, fatal arrhythmia), un-witnessed death and death of unknown cause, and all procedure-related deaths, including those related to concomitant treatment.).
Myocardial infarction	Three types of myocardial infarction (MI) **depending of the time of occurrence:** • **Pre-procedural MI**: occurring any time between the admission time at the hospital and the procedure. • **Peri-procedural MI**: occurring during the procedure or within 48h after procedure (baseline procedure or any repeated percutaneous coronary intervention) or 72h after CABG. Peri-procedural MI clearly related to revascularization of non-target vessel will not be counted as event for device oriented composite endpoint-TLF (see below) • **Spontaneous MI**: occurring any time beyond the baseline procedure and in between any repeated intervention (see below). Two types of Myocardial infarction (MI) **depending on ECG assessment**: • **Q-wave MI**: occurring with detection of development of new, pathological Q-waves in 2 or more contiguous leads. • **Non-Q-wave MI**: occurring in the absence of new pathological Q-waves, with elevation of values of cardiac enzymes CK and CK-MB and Troponin. In this protocol only Troponin T or Troponin I will be used for the assessment of myocardial infarctions, not high sensitivity troponin. **PERIPROCEDURAL MI <48 HOURS after PCI** A. New pathologic Q waves in ≥ 2 contiguous ECG leads ***AND*** • Any CKMB > 1*URL ***or*** • In the absence of CKMB: Troponin > 1*URL ***or*** • In the absence of CKMB and Troponin: CK > 1*URL ***or*** • In the absence of CKMB and Troponin and CK: CEC decision upon clinical scenario B. Appropriate cardiac enzyme data (respecting top-down hierarchy, b1 to b3): b1. CK ≥ 2*URL Confirmed by • CKMB>1*URL ***or*** • In the absence of CKMB: Troponin > 1*URL ***or*** • In the absence of CKMB and Troponin: CEC decision upon clinical scenario ***OR*** b2. In the absence of CK: CKMB >3*URL ***OR*** b3. In the absence of CK and CKMB: Troponin >3*URL Note URL = upper reference limit, defined as 99th percentile of normal reference range **SPONTANEOUS MI > 48HOURS after PCI** A. Recurrent thoracic chest pain or ischemic equivalent ***AND*** New pathologic Q waves in ≥2 contiguous ECG leads ***AND***: • Any CKMB >1*URL ***or*** • In the absence of CKMB: Troponin>1*URL ***or*** • In the absence of CKMB and Troponin: CK > 1*URL ***or*** • In the absence of CKMB and Troponin and CK: CEC decision upon clinical scenario B. Appropriate cardiac enzyme data: b1. CK ≥ 2*URL Confirmed by • CKMB>1*URL ***or*** • In the absence of CKMB: Troponin>1*URL ***or*** • In the absence of CKMB and Troponin: CEC decision upon clinical scenario ***OR*** b2. In the absence of CK: CKMB >3*URL ***OR*** b3. In the absence of CK and CKMB: Troponin >3*URL ***OR*** b4. In the absence of CK, CKMB and Troponin, clinical decision based upon clinical scenario.

Target vessel myocardial infarction	Myocardial infarction that could not be clearly attributable to a vessel other than target vessel(s)
Clinically-driven target lesion revascularization	Target lesion revascularization (TLR) is any clinically driven repeat percutaneous intervention of the target lesion or bypass surgery of the target vessel performed for restenosis or other complication of the target lesion. All TLRs were classified prospectively as clinically indicated or not clinically indicated by the Investigator prior to repeat angiography. The target lesion was defined as the treated segment from 5 mm proximal to the stent and to 5 mm distal to the stent. A revascularization was considered clinically driven if angiography at follow-up showed a percent diameter stenosis≥ 50% (core lab QCA assessment) and if one of the following occurred: 1. a positive history of recurrent angina pectoris, presumably related to the target vessel; 2. objective signs of ischemia at rest (ECG changes) or during exercise test (or equivalent),presumably related to the target vessel; 3. abnormal results of any invasive functional diagnostic test (e.g. Doppler flow velocity reserve, fractional flow reserve); 4. diameter stenosis≥ 70% (by corelab QCA assessment) even in the absence of the above-mentioned ischemic signs or symptoms.

MI: myocardial infarction; PCI: percutaneous coronary intervention; TLR: target lesion revascularization

Supplemental Table 4: Clinical Event Committee members

Name	Affiliated hospital
Taku Asano	St Luke's International Hospital, Tokyo, Japan
Claude Hanet	Catholic University Hospital Mont-Godinne, Belgium
Hara Hironori	Academic Medical Center (AMC), Amsterdam, the Netherlands
Yuki Katagiri	Academic Medical Center (AMC), Amsterdam, the Netherlands
Hideyuki Kawashima	Academic Medical Center (AMC), Amsterdam, the Netherlands
Norihiro Kogame	Academic Medical Center (AMC), Amsterdam, the Netherlands
Hidenori Komiyama	Nippon Medical school, Tokyo, Japan
Yosuke Miyazaki	Erasmus Medical Center Rotterdam, the Netherlands
Masafumi Ono	Academic Medical Center (AMC), Amsterdam, the Netherlands
Bastiaan Schölzel	Amphia Ziekenhuis Breda, the Netherlands
Kuniaki Takahashi	Academic Medical Center (AMC), Amsterdam, the Netherlands
George Vlachojannis	Maasstad Ziekenhuis Rotterdam, the Netherlands

Supplemental Table 5: Procedural characteristics

	All regions n=37198	Europe n=25736	Asia n=6614	Africa/Middle East n=2438	South America/Mexico n=2410
Radial access – all patients	82.2% (30584/37198)	88.1% (22668/25736)	73.0% (4831/6614)*	50.2% (1223/2438)*	77.3% (1862/2410)*
Radial access – CCS	80.1% (13348/16672)	86.8% (9961/11482)	67.6% (2161/3199)*	47.4% (485/1024)*	76.6% (741/967)*
Radial access – NSTE-ACS	84.3% (10948/12992)	89.5% (8225/9191)	80.4% (1659/2064)*	49.8% (456/915)*	74.0% (608/822)*
Radial access – STEMI	83.5% (6266/7507)	88.5% (4462/5042)	74.9% (1011/1350)*	56.7% (282/497)*	82.7% (511/618)
Intravascular imaging	6.3% (2356/37198)	4.0% (1028/25736)	17.2% (1135/6614)*	3.8% (93/2438)	4.2% (100/2410)
IVUS	3.7% (1358/37198)	1.4% (369/25736)	13.1% (869/6614)*	3.2% (79/2438)*	1.7% (41/2410)
OFDI	2.2% (807/37198)	1.6% (417/25736)	4.9% (324/6614)*	0.3% (8/2438)*	2.4% (58/2410)*
Microcatheter use per lesion	2.2% (1084/49720)	1.6% (570/34795)	4.5% (365/8032)*	2.0% (74/3647)	2.3% (75/3246)*
Number of study stents implanted per patient, n	1.6±0.9 (37098)	1.6±0.9 (25710)	1.3±0.6 (6601)*	1.7±1.0 (2398)*	1.6±0.9 (2389)
Length of implanted study stents per patient, mm	31.1±19.7 (37032)	31.1±20.3 (25656)	30.6±17.8 (6601)*	32.7±19.6 (2391)*	30.5±17.1 (2384)
Length of implanted study stents per lesion, mm	25.7±13.8 (44715)	25.4±14.3 (31432)	26.6±12.3 (7583)*	26.7±13.5 (2922)*	26.2±12.4 (2778)*
Balloon pre-dilatation, per lesion	58.6% (29112/49720)	59.2% (20598/34795)	58.7% (4717/8032)*	51.4% (1873/3647)*	59.3% (1924/3246)
Balloon post-dilatation, per lesion	40.2% (19976/49720)	38.5% (13377/34795)	47.5% (3816/8032)	43.0% (1569/3647)*	37.4% (1214/3246)
Atherectomy, per lesion	0.7% (322/49720)	0.6% (223/34795)	1.1% (85/8032)*	0.1% (5/3647)*	0.3% (9/3246)*
Cutting balloon, per lesion	1.0% (477/49720)	1.0% (347/34795)	0.9% (72/8032)	0.6% (22/3647)*	1.1% (36/3246)
Thrombus aspiration (in STEMI patients), per lesion	18.3% (1677/9162)	19.4% (1208/6217)	21.0% (326/1556)	9.4% (61/647)*	11.1% (82/742)*
Distal protection (for SVG lesions)	5.4% (24/444)	NR	NR	NR	NR

	All regions n=37198	Europe n=25736	Asia n=6614	Africa/Middle East n=2438	South America/Mexico n=2410
Complete revascularization at index procedure (in MVD)					
All patients	43.4% (7065/16267)	43.6% (4866/11150)	39.2% (1122/2866)*	56.0% (719/1283)*	37.0% (358/968)*
CCS	50.7% (3468/6842)	49.0% (2354/4807)	56.9% (615/1081)*	60.2% (326/542)*	42.0% (173/412)*
NSTE-ACS	41.5% (2558/6168)	43.7% (1827/4183)	30.2% (337/1121)*	51.2% (263/514)*	37.4% (131/350)*
STEMI	31.9% (1036/3249)	31.7% (683/2153)	25.5% (169/663)*	57.3% (130/227)*	26.2% (54/206)
Staged procedures					
All patients	5.6% (2096/37198)	6.4% (1647/25736)	4.1% (269/6614)*	3.3% (81/2438)*	4.1% (99/2410)*
CCS	4.4% (739/16672)	4.8% (551/11482)	4.8% (152/3199)	1.1% (11/1024)*	2.6% (25/967)*
NSTE-ACS	5.4% (696/12992)	6.1% (561/9191)	3.0% (62/2064)*	4.4% (40/915)*	4.0% (33/822)*
STEMI	8.8% (661/7507)	10.6% (535/5042)	4.1% (55/1350)*	6.0% (30/497)*	6.6% (41/618)*
Procedure duration time (min)					
All patients	53±30 (28348)	50±29 (20107)	55±33 (4502)*	60±33 (1918)*	61±36 (1821)*
CCS	54±33 (12484)	52±31 (8978)	62±38 (1942)*	55±32 (761)*	65±40 (803)*
NSTE-ACS	52±28 (10097)	51±27 (7153)	49±26 (1614)*	61± 33 (729)*	58± 31 (601)*
STEMI	49±28 (5746)	45±25 (3958)	53±29 (945)*	66± 35 (426)*	60±34 (417)*
Closure device for femoral access	45.4% (3195/7041)	72.6% (2520/3470)	9.6% (168/1752)*	32.9% (408/1240)*	17.1% (99/579)*

Data are mean± standard deviation for continuous variables with or % (n) for categorical variables. The number of patients with available data is indicated in brackets. The p-value for the comparison over all 4 regions was <0.0001 for all variables, except for cutting balloon (overall p=0.089). A*indicates a p-value <0.05 for the difference in characteristics between the region as compared to Europe.

Procedural characteristics at index procedure are reported. Contrast use was only collected in a limited number of patients with specific indications.

CCS: chronic coronary syndromes; IVUS: intravascular ultrasound; MVD: multivessel disease; NR = not reported (due to low numbers); STEMI: ST-segment elevation myocardial infarction; NSTE-ACS: non-ST-segment elevation acute coronary syndromes; OFDI: optical frequency domain imaging; SVG: saphenous vein graft

Supplemental table 6: Intra-procedural anticoagulation

Chronic coronary syndromes	All regions n=16672	Europe n=11482	Asia n=3199	Africa/Middle East n=1024	South America/Mexico n=967
Unfractionated heparin	93.9% (9261/9867)	93.7% (8644/9226)	88.9% (1681/1892)	90.4% (694/768)	96.3% (617/641)
Low molecular weight heparin	6.2% (609/9867)	6.3% (585/9226)	11.2% (212/1892)	9.9% (76/768)	3.7% (24/641)
Bivalirudin	0.2% (16/9867)	0.2% (16/9226)	0.4% (7/1892)	0.1% (1/768)	2.5% (16/641)
Acute coronary syndromes	All regions n=20499	Europe n=14233	Asia n=3414	Africa/Middle East n=1412	South America/Mexico n=1440
Unfractionated heparin	94.0% (11496/12227)	93.8% (10738/11443)	56.1% (1412/2516)	90.7% (1000/1103)	96.7% (758/784)
Low molecular weight heparin	5.6% (678/12227)	5.7% (653/11443)	45.9% (1154/2516)	9.3% (102/1103)	3.2% (25/784)
Bivalirudin	1.2% (140/12227)	1.2% (139/11443)	0.2% (4/2516)	1.0% (11/1103)	0.1% (1/784)

Supplemental Table 7: Dual antiplatelet therapy

All patients	All regions n=37198	Europe n=25736	Asia n=6614	Africa/Middle East n=2438	South America/Mexico n=2410
DAPT at discharge after index procedure	97.4% (36231/37189)	97.7% (25142/25733)	98.3% (6499/6613)	96.1% (2339/2435)	93.5% (2251/2408)
Aspirin	97.5% (36269/37189)	97.8% (25171/25733)	98.3% (6502/6613)	96.3% (2345/2435)	93.5% (2251/2408)
Any P2Y12 inhibitor	99.8% (37117/37189)	99.8% (25681/25733)	99.8% (6603/6613)	99.6% (2425/2435)	100% (2408/2408)
Clopidogrel	64.1% (23843/37189)	58.6% (15089/25733)	72.0% (4763/6613)*	79.1% (1927/2435)*	85.7% (2064/2408)*
Any potent P2Y12 inhibitor	35.1% (13034/37189)	40.6% (10451/25733)	27.5% (1816/6613)*	17. 8% (433/2435)*	13.9% (334/2408)*
Prasugrel	5.1% (1889/37189)	4.4% (1134/25733)	10.1% (665/6613)*	2.4% (59/2435)*	1.3% (31/2408)*
Ticagrelor	30.0% (11145/37189)	36.2% (9317/25733)	17.4% (1151/6613)*	15.4% (374/2435)*	12.6% (303/2408)*
Ticlopidine	0.6% (240/37189)	0.5% (141/25733)	0.4% (24/6613)	2.7% (65/2435)*	0.4% (10/2408)
DAPT at 3-month follow-up	95.4% (34171/35804)	94.8% (23584/24866)	96.7% (6210/6422)	95.9% (2168/2261)	98.0% (2209/2255)
Aspirin	96.7% (34609/35804)	96.4% (23973/24866)	97.2% (6239/6422)	96.4% (2180/2261)	98.3% (2217/2255)
Any P2Y12 inhibitor	97.2% (34803/35804)	97.1% (24149/24866)	97.1% (6234/6422)	97.2% (2197/2261)	98.6% (2223/2255)
DAPT at 1-year follow-up	70.6% (24352/34488)	64.8% (15672/24178)	83.1% (5135/6180)*	83.8% (1706/2035)*	87.8% (1839/2095)*
Aspirin	86.8% (29931/34488)	85.1% (20568/24178)	91.2% (5633/6180)*	89.9% (1829/2035)	90.7% (1901/2095)
Any P2Y12 inhibitor	78.1% (26919/34488)	73.1% (17675/24178)	87.9% (5430/6180)*	89.2% (1816/2035)*	95.4% (1998/2095)*
Chronic coronary syndromes	All regions n=16672	Europe n=11482	Asia n=3199	Africa/Middle East n=1024	South America/Mexico n=967
DAPT at discharge after index procedure	96.8% (16141/16670)	97.3% (11170/11482)	97.3% (3110/3198)	93.6% (958/1024)	93.5% (903/966)
Aspirin	97.0% (16168/16670)	97.5% (11190/11482)	97.3% (3112/3198)	94.0% (963/1024)	93.5% (903/966)
Any P2Y12 inhibitor	99.8% (16633/16670)	99.8% (11456/11482)	99.9% (3194/3198)	99.3% (1017/1024)	100% (966/966)
Clopidogrel	80.2% (13366/16670)	79.8% (9167/11482)	77.2% (2469/3198)	88.6% (907/1024)*	85.2% (823/966)
Any potent P2Y12 inhibitor	19.1% (3182/16670)	19.7% (2258/11482)	22.3% (714/3198)*	7.0% (72/1024)*	14.3% (138/966)*
Prasugrel	4.3% (711/16670)	2.3% (262/11482)	13.4% (427/3198)*	1.0% (10/1024)*	1.2% (12/966)*
Ticagrelor	14.8% (2471/16670)	17.4% (1996/11482)	9.0% (287/3198)*	6.1% (62/1024)*	13.0% (126/966)*

Ticlopidine	0.5% (85/16670)	0.3% (31/11482)	0.3% (11/3198)	3.7% (38/1024)*	0.5% (5/966)
DAPT at 3-month follow-up	94.5% (15271/16165)	94.0% (10502/11178)	95.6% (2955/3090)	93.4% (925/990)	98.0% (889/907)
Aspirin	96.0% (15521/16165)	96.0% (10734/11178)	96.0% (2966/3090)	93.9% (930/990)	98.2% (891/907)
Any P2Y12 inhibitor	96.6% (15607/16165)	96.6% (10799/11178)	96.0% (2965/3090)	95.5% (945/990)	99.0% (898/907)
DAPT at 1-year follow-up	68.9% (10756/15611)	61.3% (6652/10859)	86.0% (2554/2970)*	82.3% (739/898)*	91.7% (811/884)*
Aspirin	85.6% (13363/15611)	83.1% (9026/10859)	91.4% (2717/2970)*	86.9% (780/898)	95.0% (840/884)*
Any P2Y12 inhibitor	77.1% (12030/15611)	70.9% (7694/10859)	90.5% (2688/2970)*	89.5% (804/898)*	95.5% (844/884)*
Acute coronary syndromes	All regions n=20499	Europe n=14233	Asia n=3414	Africa/Middle East n=1412	South America/Mexico n=1440
DAPT at discharge after index procedure	97.9% (20066/20492)	98.0% (13953/14230)	99.3% (3389/3414)	97.9% (1379/1409)	93.5% (1345/1439)
Aspirin	98.0% (20077/20492)	98.1% (13962/14230)	99.3% (3390/3414)	97.9% (1380/1409)	93.5% (1345/1439)
Any P2Y12 inhibitor	99.8% (20458/20492)	99.8% (14204/14230)	99.9% (3409/3414)	99.8% (1406/1409)	100% (1439/1439)
Clopidogrel	51.1% (10463/20492)	41.6% (5913/14230)	67.2% (2294/3414)*	72.3% (1018/1409)*	86.0% (1238/1439)*
Any potent P2Y12 inhibitor	48.0% (9840/20492)	57.5% (8181/14230)	32.3% (1102/3414)*	25.6% (361/1409)*	13.6% (196/1439)*
Prasugrel	5.7% (1178/20492)	6.1% (872/14230)	7.0% (238/3414)	3.5% (49/1409)*	1.3% (19/1439)*
Ticagrelor	42.3% (8662/20492)	51.4% (7309/14230)	25.3% (864/3414)*	22.1% (312/1409)*	12.3% (177/1439)*
Ticlopidine	0.8% (155/20492)	0.8% (110/14230)	0.4% (13/3414)*	1.9% (27/1409)*	0.3% (5/1439)
DAPT at 3-month follow-up	96.2% (18877/19614)	95.6% (13063/13668)	97.7% (3254/3331)	97.8% (1241/1269)	98.0% (1319/1346)
Aspirin	97.2% (19065/19614)	96.7% (13220/13668)	98.2% (3272/3331)	98.4% (1248/1269)	98.4% (1325/1346)
Any P2Y12 inhibitor	97.8% (19172/19614)	97.5% (13330/13668)	98.1% (3268/3331)	98.5% (1250/1269)	98.4% (1324/1346)
DAPT at 1-year follow-up	72.0% (13584/18856)	67.7% (9009/13300)	80.4% (2581/3210)*	85.1% (966/1135)*	84.9% (1028/1211)*
Aspirin	87.8% (16552/18856)	86.7% (11527/13300)	90.8% (2916/3210)	92.3% (1048/1135)	87.6% (1061/1211)
Any P2Y12 inhibitor	78.9% (14873/18856)	74.9% (9967/13300)	85.4% (2742/3210)*	89.0% (1010/1135)*	95.3% (1154/1211)*

Data are % (n). The number of patients with available data is indicated in brackets. The p-value for the comparison over all 4 regions was ≤0.01 for all variables, except for "Any P2Y12 inhibitor" in ACS patients (overall p=0.42). A * indicates a p-value <0.05 for the difference in characteristics between the region as compared to Europe.
DAPT: dual antiplatelet therapy.

Supplemental Table 8: Lipid lowering medication

All patients	All regions n=37198	Europe n=25736	Asia n=6614	Africa/Middle East n=2438	South America/Mexico n=2410
At discharge	80.9% (30075/37189)	83.2% (21422/25733)	78.6% (5195/6613)*	82.5% (2008/2435)	60.2% (1450/2408)*
At 3 months	77.7% (27804/35804)	80.0% (19897/24866)	70.8% (4544/6422)*	70.4% (1592/2261)*	78.5% (1771/2255)
At 1 year	75.5% (26046/34488)	77.9% (18825/24178)	67.2% (4153/6180)*	64.1% (1304/2035)*	84.2% (1764/2095)*
Chronic coronary syndromes	All regions n=16672	Europe n=11482	Asia n=3199	Africa/Middle East n=1024	South America/Mexico n=967
At discharge	76.1% (12679/16670)	78.9% (9056/11482)	69.0% (2206/3198)*	76.0% (778/1024)	66.1% (639/966)*
At 3 months	75.0% (12122/16165)	77.3% (8637/11178)	65.4% (2022/3090)*	74.1% (734/990)	80.4% (729/907)
At 1 year	74.9% (11698/15611)	76.5% (8306/10859)	68.1% (2022/2970)*	66.6% (598/898)*	87.3% (772/884)*
Acute coronary syndromes	All regions n=20499	Europe n=14233	Asia n=3414	Africa/Middle East n=1412	South America/Mexico n=1440
At discharge	84.8% (17372/20492)	86.8% (12347/14230)	87.6% (2989/3414)	87.2% (1228/1409)	56.2% (808/1439)*
At 3 months	79.9% (15661/19614)	82.3% (11242/13668)	75.7% (2521/3331)*	67.5% (856/1269)*	77.4% (1042/1346)
At 1 year	76.0% (14328/18856)	79.0% (10501/13300)	66.4% (2131/3210)*	62.0% (704/1135)*	81.9% (992/1211)

The p-value for the comparison over all 4 regions was <0.0001 for all variables. A*indicates a p-value <0.05 for the difference in characteristics between the region as compared to Europe.
Data are % (n). The number of patients with available data is indicated in brackets.

Supplemental Table 9: Angiographic complications

All patients	All regions n=37198	Europe n=25736	Asia n=6614	Africa/Middle East n=2438	South America/Mexico n=2410	P-value
Any complication	3.2% (1176/37173)	3.7% (951/25733)	1.3% (86/6613)*	2.6% (63/2433)*	3.2% (76/2394)	<0.0001
Coronary perforation	4.8% (56/1176)	4.6% (44/951)	7.0% (6/86)	4.8% (3/63)	4.0% (3/76)	0.78
Coronary spasm	6.4% (75/1176)	4.7% (45/951)	18.6% (16/86)*	9.5% (6/63)	10.5% (8/76)	<0.0001
No reflow	11.6% (136/1176)	10.2% (97/951)	16.3% (14/86)	12.7% (8/63)	22.4% (17/76)*	0.0063
Side branch occlusion	16.1% (189/1176)	17.0% (162/951)	12.8% (11/86)	12.7% (8/63)	10.5% (8/76)	0.31
Residual thrombus	9.4% (110/1176)	8.5% (81/951)	12.8% (11/86)	17.5% (11/63)*	9.2% (7/76)	0.076
Chronic coronary syndromes	All regions n=16672	Europe n=11482	Asia n=3199	Africa/Middle East n=1024	South America/Mexico n=967	
Any complication	2.3% (382/16660)	2.8% (320/11480)	0.8% (24/3198)*	1.7% (17/1023)*	2.2% (21/959)	<0.0001
Non-ST-segment elevation acute coronary syndromes	All regions n=12992	Europe n=9191	Asia n=2064	Africa/Middle East n=915	South America/Mexico n=822	
Any complication	3.1% (406/12987)	3.6% (326/9190)	1.2% (24/2064)*	3.2% (29/915)	3.3% (27/818)	<0.0001
ST-segment elevation myocardial infarction	All regions n=7507	Europe n=5042	Asia n=1350	Africa/Middle East n=497	South America/Mexico n=618	
Any complication	5.2% (387/7502)	6.0% (304/5042)	2.8% (38/1350)*	3.5% (17/493)*	4.5% (28/617)	<0.0001

Data are % (n). The number of patients with available data is indicated in brackets. The p-value is given for the comparison over all 4 regions. A*indicates a p-value <0.05 for the difference in characteristics between the region as compared to Europe.

Supplemental Table 10: Length of stay

	All regions	Europe	Asia	Africa/Middle East	South America/Mexico	P-value
All patients	2 (1-7) n=36554	2 (1-6) n=25403	3 (2-11)* n=6421	2 (2-5) n=2386	2 (1-7)* n=2344	<0.0001
Chronic coronary syndromes	2 (1-4) n=16399	2 (1-4) n=11356	3 (2-8)* n=3097	2 (2-3)* n=1003	2 (1-4)* n=943	<0.0001
Non-ST elevation acute coronary syndromes	3 (1-7) n=12781	2 (1-6) n=9062	5 (2-11)* n=2026	2 (2-4)* n=894	2(1-6) n=799	<0.0001
ST-segment elevation myocardial infarction	4 (2-10) n=7349	4 (2-8) n=4965	6 (2-14)* n=1297	4 (2-6)* n=487	5 (1-8) n=600	<0.0001

Data are median (10^{th} -90^{th} percentile) days. The p-value is given for the comparison over all 4 regions
A*indicates a p-value <0.05 for the difference in characteristics between the region as compared to Europe.

Supplemental Table 11: One-year clinical outcomes in chronic coronary syndromes

	All regions n=15935	Europe n=11110	Asia n=3015	Africa/Middle East n=912	South America/Mexico n=898	P-value
Target lesion failure°	3.0% (473/15935)	3.4% (375/11110)	2.2% (65/3015)*	1.3% (12/912)*	2.3% (21/898)	<0.0001
Cardiac death°	1.0% (160/15935)	1.2% (131/11110)	0.6% (18/3015)*	0.4% (4/912)*	0.8% (7/898)	0.0080
Target vessel MI°	0.8% (131/15935)	1.0% (115/11110)	0.3% (9/3015)*	0.6% (5/912)	0.2% (2/898)*	<0.0001
Clinically driven TLR°	1.6% (250/15935)	1.7% (183/11110)	1.6% (47/3015)	0.9% (8/912)	1.3% (12/898)	0.31
All-cause death°	1.7% (264/15935)	1.9% (215/11110)	1.1% (32/3015)*	0.7% (6/912)*	1.2% (11/898)	<0.0001
All MI°	1.1% (174/15935)	1.4% (151/11110)	0.4% (11/3015)*	0.9% (8/912)	0.5% (4/898)*	<0.0001
Revascularizations						
TVR°	2.2% (349/15935)	2.4% (262/11110)	1.9% (56/3015)	1.1% (10/912)*	2.3% (21/898)	0.042
TV non-TLR°	0.6% (102/15935)	0.8% (90/11110)	0.1% (4/3015)*	0.1% (1/912)*	0.8% (7/898)	<0.0001
TLR°	1.6% (260/15935)	1.7% (185/11110)	1.7% (52/3015)	1.0% (9/912)	1.6% (14/898)	0.45
Clinically driven revascularizations						
TVR°	2.1% (334/15935)	2.3% (255/11110)	1.7% (51/3015)*	1.0% (9/912)*	2.1% (19/898)	0.018
TV non-TLR°	0.6% (97/15935)	0.8% (85/11110)	0.1% (4/3015)*	0.1% (1/912)*	0.8% (7/898)	0.0002
Target vessel failure°	3.4% (543/15935)	3.9% (434/11110)	2.3% (69/3015)*	1.4% (13/912)*	3.0% (27/898)	<0.0001
Stent thrombosis°						
Definite °	0.3% (44/15935)	0.4% (39/11110)	0.1% (3/3015)*	0.1% (1/912)	0.1% (1/898)	0.058
Probable°	0.2% (32/15935)	0.2% (26/11110)	0.1% (4/3015)	0.0% (0/912)	0.2% (2/898)	0.37
Definite/probable°	0.5% (75/15935)	0.6% (64/11110)	0.2% (7/3015)*	0.1% (1/912)	0.3% (3/898)	0.027
Possible°	0.5% (78/15935)	0.6% (65/11110)	0.3% (8/3015)*	0.2% (2/912)	0.3% (3/898)	0.072
All bleedings						
BARC 2-5 Bleeding	1.9% (295/15935)	2.4% (270/11110)	0.5% (15/3015)*	0.6% (5/912)*	0.6% (5/898)*	<0.0001
BARC 3-5 Bleeding	0.8% (126/15935)	1.0% (114/11110)	0.2% (7/3015)*	0.3% (3/912)*	0.2% (2/898)*	<0.0001

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Target lesion failure: composite of cardiac death, TV-MI or clinically driven TLR. Target vessel failure: composite of cardiac death, TV-MI or clinically driven TVR
MI: myocardial infarction; TLR: target lesion revascularization; TV non-TL: target vessel, non-target lesion, revascularization; TVR: target vessel revascularization

Supplemental Table 12: One-year clinical outcomes in non-ST-segment elevation acute coronary syndromes

	All regions n=12374	Europe n=8852	Asia n=1992	Africa/Middle East n=806	South America/Mexico n=724	P-value
Target lesion failure	3.5% (428/12374)	3.9% (341/8852)	2.0% (40/1992)*	2.4% (19/806)*	3.9% (28/724)	<0.0001
Cardiac death	1.3% (160/12374)	1.3% (119/8852)	0.9% (18/1992)	1.0% (8/806)	2.1% (15/724)	0.087
Target vessel MI	1.1% (132/12374)	1.3% (114/8852)	0.3% (6/1992)*	1.0% (8/806)	0.6% (4/724)	0.0007
Clinically driven TLR	2.0% (243/12374)	2.2% (198/8852)	1.0% (20/1992)*	1.4% (11/806)	1.9% (14/724)	0.0023
All-cause death°	2.3% (287/12374)	2.5% (219/8852)	1.5% (30/1992)*	1.7% (14/806)	3.3% (24/724)	0.011
All MI°	1.5% (183/12374)	1.8% (158/8852)	0.4% (7/1992)*	1.6% (13/806)	0.7% (5/724)*	<0.0001
Revascularizations						
TVR°	2.7% (334/12374)	3.1% (274/8852)	1.5% (30/1992)*	1.7% (14/806)*	2.2% (16/724)	0.0002
TV non-TLR°	0.9% (109/12374)	1.0% (90/8852)	0.6% (12/1992)	0.5% (4/806)	0.4% (3/724)	0.078
TLR°	2.0% (249/12374)	2.3% (203/8852)	1.1% (21/1992)*	1.4% (11/806)	1.9% (14/724)	0.0022
Clinically driven revascularizations						
TVR°	2.6% (326/12374)	3.0% (268/8852)	1.4% (28/1992)*	1.7% (14/806)*	2.2% (16/724)	0.0002
TV non-TLR°	0.9% (105/12374)	1.0% (87/8852)	0.6% (11/1992)	0.5% (4/806)	0.4% (3/724)	0.079
Target vessel failure°	4.0% (497/12374)	4.5% (399/8852)	2.3% (46/1992)*	2.7% (22/806)*	4.1% (30/724)	<0.0001
Stent thrombosis°						
Definite °	0.4% (52/12374)	0.5% (45/8852)	0.1% (2/1992)*	0.3% (2/806)	0.4% (3/724)	0.069
Probable°	0.2% (27/12374)	0.2% (17/8852)	0.2% (3/1992)	0.1% (1/806)	0.8% (6/724)*	0.0038
Definite/probable°	0.6% (79/12374)	0.7% (62/8852)	0.3% (5/1992)*	0.4% (3/806)	1.2% (9/724)	0.016
Possible°	0.6% (75/12374)	0.6% (56/8852)	0.5% (10/1992)	0.5% (4/806)	0.7% (5/724)	0.87
All bleedings						
BARC 2-5 Bleeding	2.4% (293/12374)	3.0% (265/8852)	0.3% (6/1992)*	0.9% (7/806)*	2.1% (15/724)	<0.0001
BARC 3-5 Bleeding	1.0% (126/12374)	1.2% (108/8852)	0.2% (3/1992)*	0.6% (5/806)	1.4% (10/724)	<0.0001

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Target lesion failure: composite of cardiac death, TV-MI or clinically driven TLR. Target vessel failure: composite of cardiac death, TV-MI or clinically driven TVR
MI: myocardial infarction; TLR: target lesion revascularization; TV non-TL: target vessel, non-target lesion, revascularization; TVR: target vessel revascularization

Supplemental Table 13: One-year clinical outcomes in ST-segment elevation myocardial infarction

	All regions n=7060	Europe n=4839	Asia n=1298	Africa/Middle East n=361	South America/Mexico n=562	P-value
Target lesion failure	3.3% (234/7060)	3.1% (151/4839)	2.5% (32/1298)	2.8% (10/361)	7.3% (41/562)*	<0.0001
Cardiac death	1.9% (135/7060)	1.5% (70/4839)	1.8% (23/1298)	1.9% (7/361)	6.2% (35/562)*	<0.0001
Target vessel MI	0.8% (53/7060)	0.9% (42/4839)	0.5% (7/1298)	0.0% (0/361)	0.7% (4/562)	0.22
Clinically driven TLR	1.4% (98/7060)	1.6% (77/4839)	0.9% (11/1298)*	0.8% (3/361)	1.3% (7/562)	0.16
All-cause death°	2.8% (195/7060)	2.2% (105/4839)	3.0% (39/1298)	2.2% (8/361)	7.7% (43/562)	<0.0001
All MI°	0.9% (66/7060)	1.1% (52/4839)	0.5% (7/1298)	0.3% (1/361)	1.1% (6/562)	0.17
Revascularizations						
TVR°	2.1% (147/7060)	2.5% (119/4839)	1.1% (14/1298)*	1.1% (4/361)	1.8% (10/562)	0.0084
TV non-TLR°	0.7% (50/7060)	1.0% (46/4839)	0.08% (1/1298)*	0.3% (1/361)	0.4% (2/562)	0.0039
TLR°	1.5% (105/7060)	1.7% (81/4839)	1.0% (13/1298)	0.8% (3/361)	1.4% (8/562)	0.23
Clinically driven revascularizations						
TVR°	2.0% (140/7060)	2.4% (115/4839)	0.9% (12/1298)*	1.1% (4/361)	1.6% (9/562)	0.0043
TV non-TLR°	0.7% (50/7060)	1.0% (46/4839)	0.08% (1/1298)*	0.3% (1/361)	0.4% (2/562)	0.0039
Target vessel failure°	3.8% (268/7060)	3.8% (183/4839)	2.5% (33/1298)*	3.1% (11/361)	7.3% (41/562)*	<0.0001
Stent thrombosis°						
Definite °	0.7% (50/7060)	0.9% (41/4839)	0.3% (4/1298)*	0.2% (1/361)	0.7% (4/562)	0.16
Probable°	0.5% (35/7060)	0.4% (17/4839)	0.5% (6/1298)	0.8% (3/361)	1.6% (9/562)*	0.0008
Definite/probable°	1.2% (84/7060)	1.2% (57/4839)	0.8% (10/1298)	1.1% (4/361)	2.3% (13/562)*	0.046
Possible°	0.5% (37/7060)	0.4% (20/4839)	0.4% (5/1298)	0.6% (2/361)	1.8% (10/562)*	0.0003
All bleedings						
BARC 2-5 Bleeding	2.2% (154/7060)	2.9% (139/4839)	0.6% (8/1298)*	0.0% (0/361)*	1.3% (7/562)*	<0.0001
BARC 3-5 Bleeding	0.7% (52/7060)	0.9% (43/4839)	0.3% (4/1298)*	0.0% (0/361)	0.9% (5/562)	0.054

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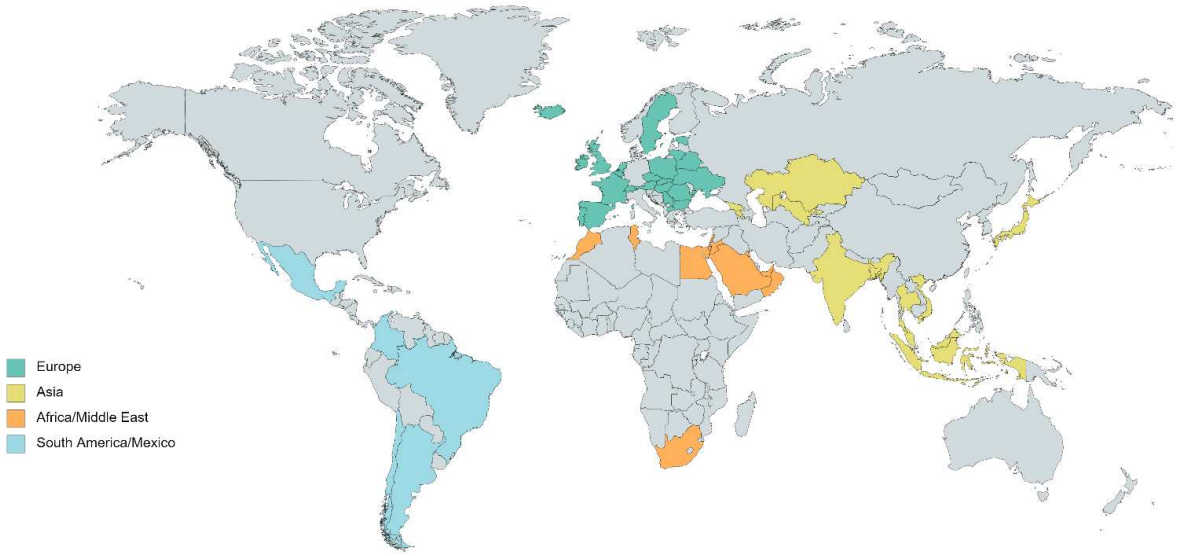
Supplemental table 14 Baseline characteristics of patients with and without one-year follow-up

	Patients with 1-year FU n=35389	Patients lost to follow-up n=1767	P-value
Patient characteristics			
Age, years	64.3 ±11.2 (35389)	61.5 ±11.7 (1767)	<0.001
Octogenarians (≥ 80years)	8.9% (3161/35389)	6.6% (116/1767)	<0.001
Gender, male	75.9% (26869/35389)	76.9% (1358/1767)	0.37
Body mass index, kg/m²	27.8 ±4.6 (28446)	27.7 ±4.6 (1463)	0.98
Cardiovascular risk factors[¶], n	2.1 ±0.9 (30369)	2.4 ±1.01 (1600)	<0.001
Diabetes mellitus	28.3% (9840/34780)	29.8% (522/1751)	0.17
Smoking			
Never	41.5% (11809/28455)	37.2% (557/1497)	0.001
Previous	32.6% (9267/28455)	28.7% (429/1497)	0.002
Current	25.9% (7379/28455)	34.1% (511/1497)	<0.001
Hypertension	67.6% (21629/31990)	71.5% (1183/1655)	0.001
Hypercholesterolemia	59.6% (18389/30843)	66.0% (1054/1598)	<0.001
Family history of heart disease	35.5% (6746/18982)	47.3% (508/1075)	<0.001
Previous MI	22.9% (7489/32719)	21.0% (350/1664)	0.08
Previous PCI	26.1% (8608/32965)	23.9% (401/1681)	0.04
Previous CABG	5.7% (1870/32850)	3.8% (64/1672)	0.001
Atrial fibrillation on OAC	5.7% (1854/32728)	4.0% (67/1682)	0.003
Previous stroke	5.5% (1803/32847)	4.3% (73/1690)	0.04
Peripheral vascular disease	6.7% (2147/32200)	6.2% (101/1642)	0.41
Congestive heart failure	11.3% (3604/31966)	13.0% (214/1643)	0.03
Renal impairment	7.0% (2433/34628)	6.3% (109/1738)	0.23
Clinical presentation			
CCS	45.1% (15935/35369)	40.6% (714/1761)	<0.001
NSTE-ACS	35.0% (12374/35369)	34.4% (605/1761)	0.59
STEMI	20.0% (7060/35369)	25.1% (442/1761)	<0.001

CABG: coronary artery bypass graft; CCS: chronic coronary syndromes; MI: myocardial infarction; NSTE-ACS: non-ST-segment elevation acute coronary syndromes; OAC: oral anticoagulants; PCI: percutaneous coronary intervention; STEMI: ST-segment elevation myocardial infarction

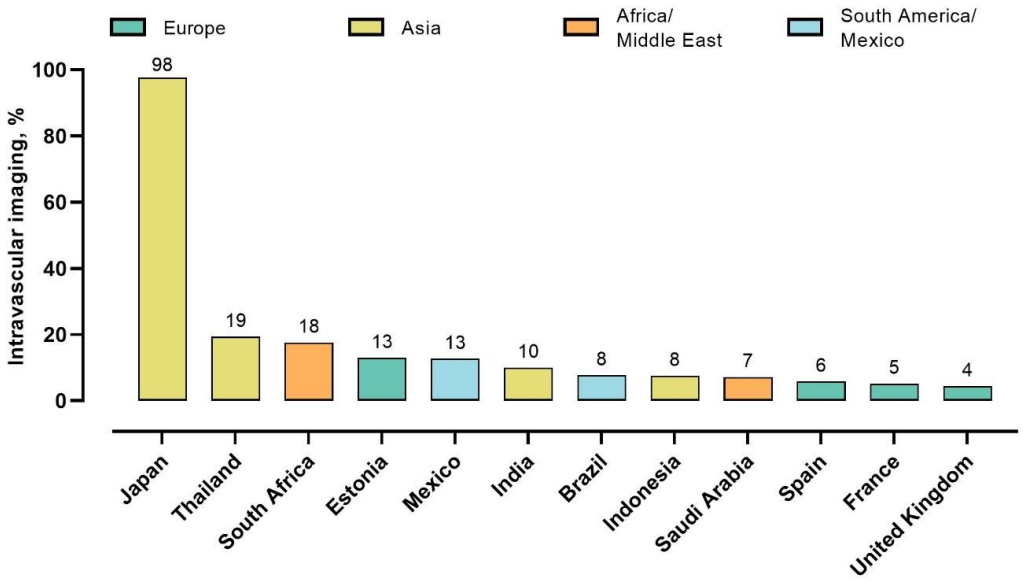
Supplemental Figures

Supplemental Figure 1: Participating countries



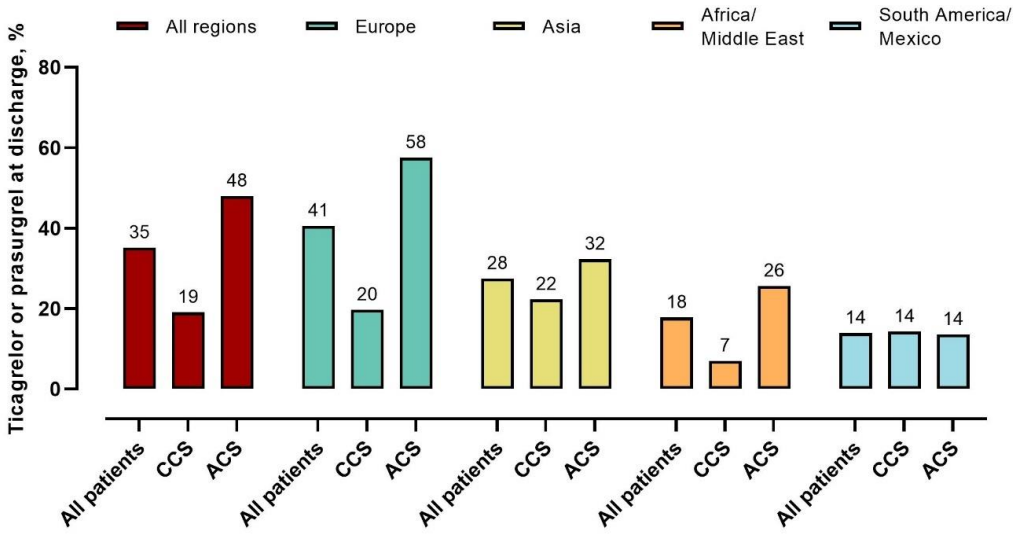
The map was created with mapchart.net

Supplemental Figure 2: Use of intravascular imaging



The 12 countries with the highest use are listed

Supplemental Figure 3: Ticagrelor or prasugrel treatment at discharge



ACS; acute coronary syndromes; CCS: chronic coronary syndromes