MHIF Research Highlights: November 2020

American Heart Association. Scientific Sessions

AHA 2020 – Online Starting Nov. 13!

MHIF Research will be highlighted in:

- 3 late-breaking presentations
- 1 oral presentation
- 3 moderated digital presentations
- 15 poster presentations

Thanks to our MHI physician partners who are helping us complete tasks to get patients enrolled in research studies as appropriate during COVID-19!

We appreciate our partnership with you!

Abstract Oral Session

- Dr. Traverse - Cardiosphere-derived Cells Improve Segmental Myocardial Circumferential Strain by Magnetic Resonance Imaging: Results from the Allogeneic Heart Stem Cells to Achieve Myocardial Regeneration

Late-breaking Science

- Dr. Lin - RHAPSODY: Rilonacept an IL-1α and IL-1β Trap Resolves Pericarditis Episodes and Reduces Risk of Recurrence in a Phase 3 Trial of Patients With Recurrent Pericarditis
- Dr. Bradley - The AHA COVID-19 Cardiovascular Disease Registry: Design, Implementation, and Initial Results
- Dr. Bradley - Racial and Ethnic Differences in Treatment and Outcomes for Patients Hospitalized with COVID-19: Findings from the American Heart Association COVID-19 Cardiovascular Disease Registry

MHIF FEATURED STUDIES:

COVID PACT

Comparing anticoagulation therapy in COVID+ patients in the ICU

PI: Dr. Brandon Wiley

CONTACT:
Christine Majeski -
Christine.majeski@allina.com

cvMOBIUS Registry

Evaluating PCSK9 inhibitors among subjects with a recent ASCVD event

PI: Dr. Courtney Baechler

CONTACT:
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MHIF FEATURED STUDY:

ARIES

OPEN AND ENROLLING

EPIC message: *Research MHIF Patient Referral*

CONDITION:	PI:	RESEARCH CONTACT:	SPONSOR:
Heart Failure	Peter Eckman, MD	Kari Thomas & Sarah Schwager Kari.m.thomas@allina.com 612-863-7493 Sarah.Schwager@allian.com 612-863-6257	Abbott Vascular

DESCRIPTION:

The purpose of this study is to understand if aspirin is needed in subjects implanted with HeartMate 3. Subjects with devices like HeartMate 3 take two blood thinner medicines, specifically warfarin and aspirin. Subjects often experience both clotting and bleeding complications.

Data suggests that the HeartMate 3 may not require as much anticoagulation as are used with similar devices. This study will test if subjects need aspirin together with warfarin or just warfarin alone.

CRITERIA LIST/ QUALIFICATIONS:

Inclusion:

- Subjects will receive the HeartMate 3 as their first LVAD

Exclusion:

- Post implant additional temporary or permanent mechanical circulatory support (MCS)
- Investigator mandated antiplatelet therapy for other conditions

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MHIF FEATURED STUDY:

cvMOBIUS Registry

ENROLLING SOON:

EPIC message: *Research MHIF Patient Referral*

CONDITION:	PI:	RESEARCH CONTACT:	SPONSOR:
Recent ASCVD Event	Courtney Baechler, MD	Andie Sarafolean andrea.sarafolean@allina.com | 612-863-3941	Amgen

DESCRIPTION:

The purpose of cvMOBIUS (Cardiovascular Multi-dimensional Observational Investigation of the Use of PCSK9 Inhibitors) is **to evaluate the effectiveness of PCSK9 inhibitors to reduce cardiovascular events among subjects with a recent ASCVD event or revascularization procedure.**

While large randomized trials have shown additional lipid-lowering through PCSK9i can further reduce risk of ASCVD events, real-world effectiveness of PCSK9i in subjects with ASCVD events has yet to be established.

CRITERIA LIST/ QUALIFICATIONS:

Inclusion:

- ≥ 40 y.o.
- Hospitalization for a clinical ASCVD event (acute MI, unstable angina, IS or CLI) within 18 months of enrollment and/or coronary, peripheral, or carotid revascularization including percutaneous or surgical revascularization in the past 18 months
- LDL ≥ 70 mg/dL with no immediate plans for statin change or newly started on PCSK9i after index hospitalization/procedure (no more than 6 months prior to enrollment)

Exclusion: ESRD, on a PCSK9i prior to qualifying event

MHIF FEATURED STUDY:

COVID PACT

OPEN AND ENROLLING:

EPIC message: *Research MHIF Patient Referral*

CONDITION:	PI:	RESEARCH CONTACT:	SPONSOR:
COVID-19	Brandon Wiley, MD	Christine Majeski christine.majeski@allina.com | 612-863-3546	The TIMI Study Group

DESCRIPTION:

The purpose of this trial is comparing antiplatelet and anticoagulation strategies in critically ill COVID19 patients..

Patients will be randomized to 1:1 to these treatment arms and then further randomized into anti-platelet vs no antiplatelet treatments and followed for thrombotic complications.

CRITERIA LIST/ QUALIFICATIONS:

Inclusion:

- 18 or older
- Acute infection with severe acute respiratory syndrome coronarvirus 2 (SARS-CoV2)
- Currently admitted to an intensive care unit (ICU)

Exclusion:

- Ongoing (>48 hours) or planned full-dose (therapeutic) anticoagulation for any indication
- Ongoing or planned treatment with dual antiplatelet therapy
- Contraindication to antithrombotic therapy or high risk of bleeding
- History of heparin-induced thrombocytopenia
- Ischemic stroke within the past 2 weeks

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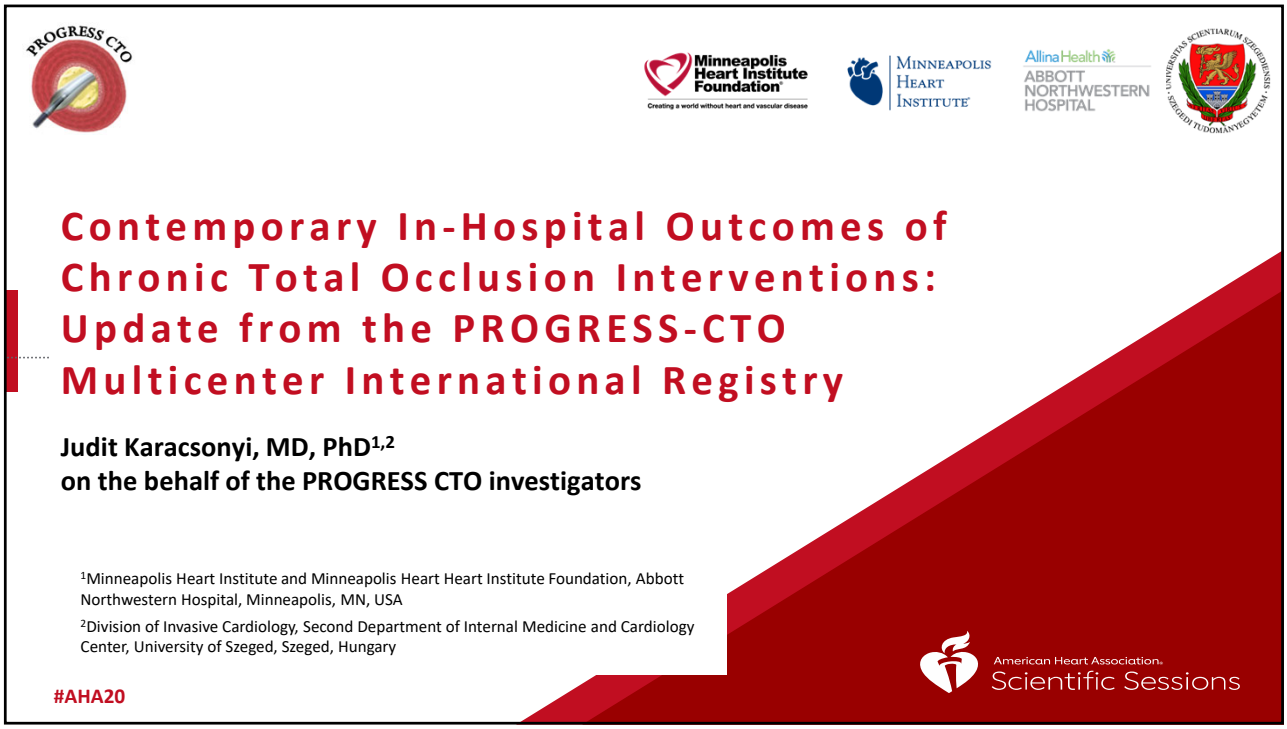
PROGRESS CTO
Minneapolis Heart Institute Foundation
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Minneapolis Heart Institute
AllinaHealth
ABBOTT NORTHWESTERN HOSPITAL
Contemporary In-Hospital Outcomes of Chronic Total Occlusion Interventions: Update from the PROGRESS-CTO Multicenter International Registry
Judit Karacsonyi, MD, PhD[1,2]
on the behalf of the PROGRESS CTO investigators
[1]Minneapolis Heart Institute and Minneapolis Heart Heart Institute Foundation, Abbott Northwestern Hospital, Minneapolis, MN, USA
[2]Division of Invasive Cardiology, Second Department of Internal Medicine and Cardiology Center, University of Szeged, Szeged, Hungary
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Disclosure Statement of Financial Interest

I, Judit Karacsonyi DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

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CTO PCI: success and complications

First Author		Study Period	Centers	Cases	Technical Success	Procedural Success	Overall MACE	Death	Acute MI	Stroke	TVR	Tamponade
Konstantinidis	EURO-CTO registry	2008-2015	53	17,626	85%	—	0.6%	0.2%	—	—	—	0.4%
Habara	Japanese Retrograde Summit Registry	2012–2013	56	3,229	—	88%	0.5%	0.2%	0.1%	0.1%	—	0.3%
Tajti	PROGRESS-CTO	2012–2017	20	3,055	87%	85%	3.0%	0.3%	0.7%	0.1%	0.2%	0.5%
Wilson	UK Hybrid	2012–2014	7	1,156	90%	—	1.6%	0.0%	0.8%	0.4%	0.0%	0.7%
Maeremans	RECHARGE	2014–2015	17	1,253	89%	86%	2.6%	0.2%	0.2%	2.2%	0.1%	1.3%
Sapontis	OPEN CTO	2013–2017	12	1,000	86%	85%	7.0%	0.9%	2.6%	0.0%	0.1%	—

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Methods

- **DESIGN:** Prospective, multi-center registry

PROGRESS CTO: 'Prospective Global Registry for the Study of Chronic Total Occlusion Intervention'

- **OBJECTIVE:** to examine contemporary outcomes of CTO PCI by analyzing the clinical, angiographic and procedural characteristics of 7,031 CTO interventions performed in 6,984 patients at 35 participating centers between 2012 and 2020.

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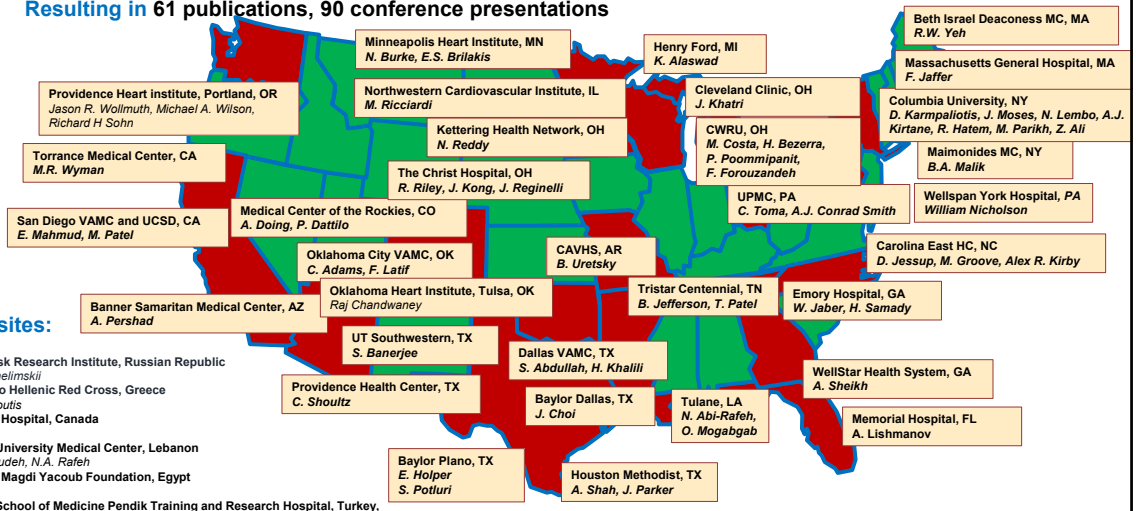
Global Coordinating Center: Chairman/PI: E. S. Brilakis; Global Director: B.V. Rangan;
Database Managers: Ilias Nikolakopoulos, Evangelia Vemmou, Judit Karacsonyi

Project Impact: Data from 50 participating centers,
Resulting in 61 publications, 90 conference presentations

NCT02061436



International sites:

- **Meshalkin Novosibirsk Research Institute, Russian Republic**
  O. Krestyaninov, D. Khelimskii
- **Kogialeneio-Benakeio Hellenic Red Cross, Greece**
  M. Koutouzis, Y. Tsiafoutis
- **St. Boniface General Hospital, Canada**
  B. Elbarouni, M. Love
- **St. George Hospital University Medical Center, Lebanon**
  A. Mealouf, F. A., Jaoudeh, N.A. Rafeh
- **Aswan Heart Centre, Magdi Yacoub Foundation, Egypt**
  A. ElGuindy
- **Marmara University School of Medicine Pendik Training and Research Hospital, Turkey,**
  Mustafa Kürşat Tigen, MD, Altuğ Çinçin, MD
- **Ondukuz Mayis University, Samsun, Turkey**
  Korhan Soylu, MD
- **Kocaeli Acibadem Hospital, Izmit, Turkey**
  Sevket Gorgulu, MD
- **Selcuk University, Konya, Turkey**
  Nazif Aygul, MD

Funding: Abbott Northwestern Hospital Foundation
Joseph F. and Mary M. Fleischacker Foundation
www.progresscto.org

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Statistical analyses

Categorical variables were expressed as percentages and were compared using Pearson's chi-square test or the Fisher exact test. Continuous variables are presented as mean ± SD or as median (interquartile range [IQR]) and were compared using the Student's t-test and the Wilcoxon rank sum test and as appropriate.

All statistical analyses were performed using JMP version 13.0 (SAS Institute, Cary, NorthCarolina).

A 2- sided p value of 0.05 was considered to indicate statistical significance.

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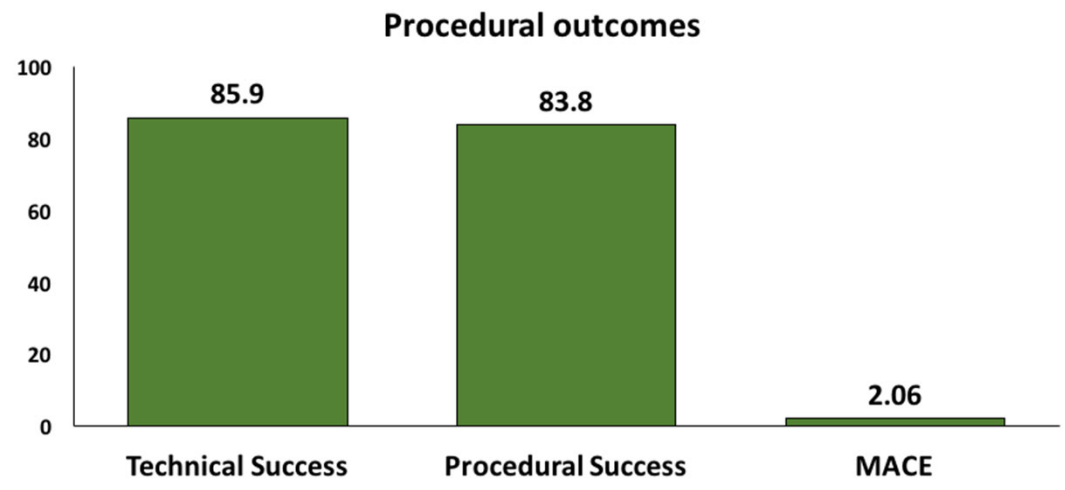

MACE: Major Cardiac Adverse Events

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Results: Baseline clinical characteristics

Variable	Overall (n= 6984)	Technical success (n=6001)	Technical failure (n=983)	p
Age (years)[a]	64.5 ± 10	64.3 ± 10	65.9 ± 9	**<0.0001**
Men	82%	81%	87%	**<0.0001**
Body Mass Index (kg/m^2)[a]	30.5 ± 6	30.4 ± 6	30.9 ± 6	0.068
Diabetes Mellitus	42%	42%	43%	0.536
Hypertension	90%	90%	95%	**<0.0001**
Dyslipidemia	89%	89%	88%	0.266
Smoking (current)	23%	23%	23%	0.929
LVEF (%)[a]	50.1 ± 13	50.2 ± 13	50.0 ± 13	0.733
Family History of CAD	32%	32%	32%	0.969
Congestive Heart Failure	29%	29%	31%	0.226
Prior MI	45%	44%	49%	**0.008**
Prior CABG	29%	28%	37%	**<0.0001**
Prior cerebrovascular disease	10%	10%	11%	0.189
Prior peripheral vascular disease	14%	14%	17%	**0.005**

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CAD: Coronary Artery Disease; LVEF: Left Ventricular Ejection Fraction; CABG: Coronary Artery Bypass Grafting; MI: Myocardial Infarction; a: mean±standard deviation; b: median (interquartile ranges)

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Angiographic characteristics II.

Variable	Overall (n= 7031)	Technical success (n= 6040)	Technical failure (n= 991)	p
CTO Target Vessel				
▪ Right Coronary Artery	53%	52%	56%	**0.016**
▪ Left Anterior Descendent	26%	27%	21%	
▪ Left Circumflex	20%	19%	21%	
▪ Left Main	0.4%	0.4%	0.6%	
▪ Saphenous Vein Graft	0.13%	0.13%	0.13%	
▪ Other	1.4%	1.4%	1.5%	
J-CTO score [a]	2.41 ± 1.28	2.23 ± 1.28	3.06 ± 1.11	**<0.0001**
Progress CTO score [a]	1.09 ± 1.01	1.03 ± 0.99	1.43 ± 1.08	**<0.0001**

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CTO: Chronic Total Occlusion; J-CTO: Japan CTO score; PROGRESS CTO score: Prospective Global Registry for the Study of Chronic Total Occlusion Intervention; a: mean±standard deviation

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Crossing strategies

Variable	Overall (n= 7031)	Technical success (n= 6040)	Technical failure (n= 991)	p
Successful Crossing Strategy				
▪ Antegrade wiring	54%	61%	7%	<0.0001
▪ Retrograde	20%	23%	3%	
▪ Antegrade dissection and re-entry	15%	16%	5%	
▪ None	12%	0%	85%	
First Crossing Strategy				
▪ Antegrade wiring	82%	83%	79%	0.0001
▪ Retrograde	13%	12%	17%	
▪ Antegrade dissection and re-entry	5%	5%	4%	

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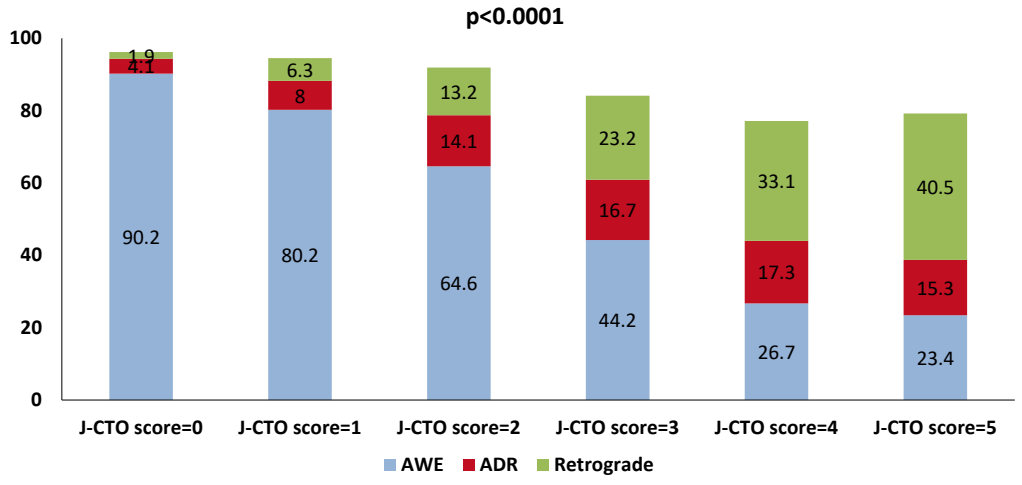
Successful crossing strategies stratified by J-CTO score



J-CTO: Japan CTO score, AWE: antegrade, wire escalation, ADR: Antegrade dissection and re-entry

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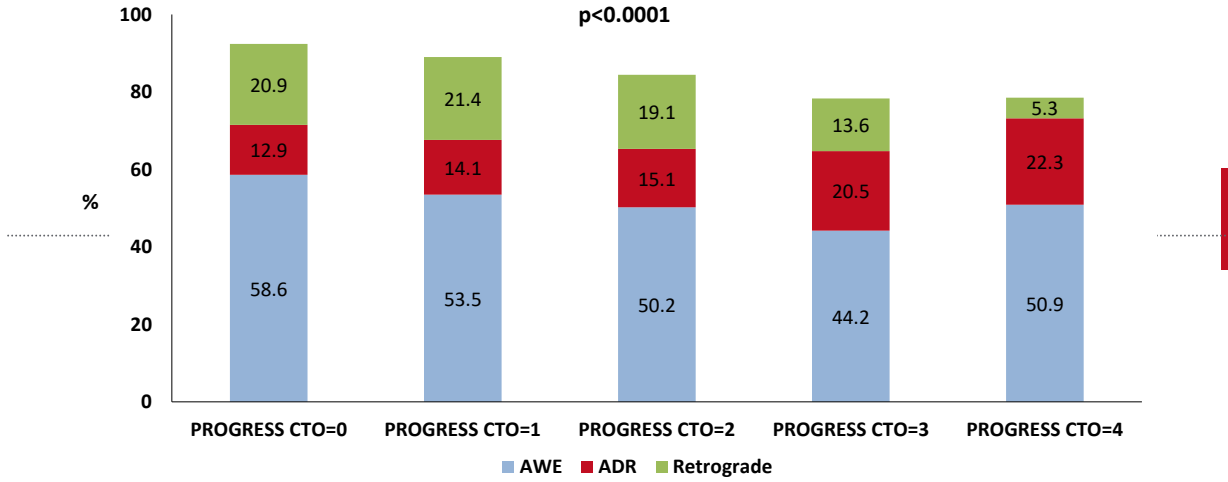
Successful crossing strategies stratified by PROGRESS-CTO score



PROGRESS CTO score: Prospective Global Registry for the Study of Chronic Total Occlusion Intervention; AWE: antegrade, wire escalation, ADR: Antegrade dissection and re-entry

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Angiographic characteristics II.

Variable	Overall (n= 7031)	Technical success (n= 6040)	Technical failure (n= 991)	p
Calcification (moderate/severe)	42%	40%	52%	**<0.0001**
Proximal vessel tortuosity (moderate/severe)	26%	24%	34%	**<0.0001**
Proximal cap ambiguity	35%	32%	53%	**<0.0001**
In-stent restenosis	16%	16%	19%	**0.043**
Prior failure to open CTO	20%	20%	24%	**0.001**
Side branch at the proximal cap	54%	52%	65%	**<0.0001**
Blunt/no stump, %	59%	57%	74%	**<0.0001**
Vessel diameter (mm) [b]	3.0 (2.5, 3.0)	3.0 (2.5, 3.0)	3.0 (2.5, 3.0)	0.099
Occlusion length (mm) [b]	25 (15, 40)	25 (15, 40)	30 (20, 50)	**<0.0001**
Number of stents used	2.3 ± 1.1	2.3 ± 1.1	2.1 ± 1.2	0.283

CTO: Chronic Total Occlusion; b: median (interquartile ranges)

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Procedural Outcomes

Variable	Overall
Technical Success	85.9%
Procedural Success	83.8%
Procedural time (min) [b]	115 (75, 170)
Fluoroscopy time (min) [b]	43 (26, 70)
Air kerma radiation dose (Gray) [b]	2.30 (1.30, 3.90)
Contrast volume [b]	225 (160, 305)
MACE	2.06%

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MACE: Major Cardiac Adverse Events
b: median (interquartile ranges)

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Complications

Variable	Overall
MACE	2.06%
Death	0.39%
Acute Q wave MI	0.01%
Acute MI	0.64%
Re-PCI	0.17%
Stroke	0.02%
Emergency CABG	0.01%
Pericardiocentesis	0.85%
Perforation	4.85%
Dissection/Thrombus of Donor Artery	0.79%

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MACE: Major Cardiac Adverse Events

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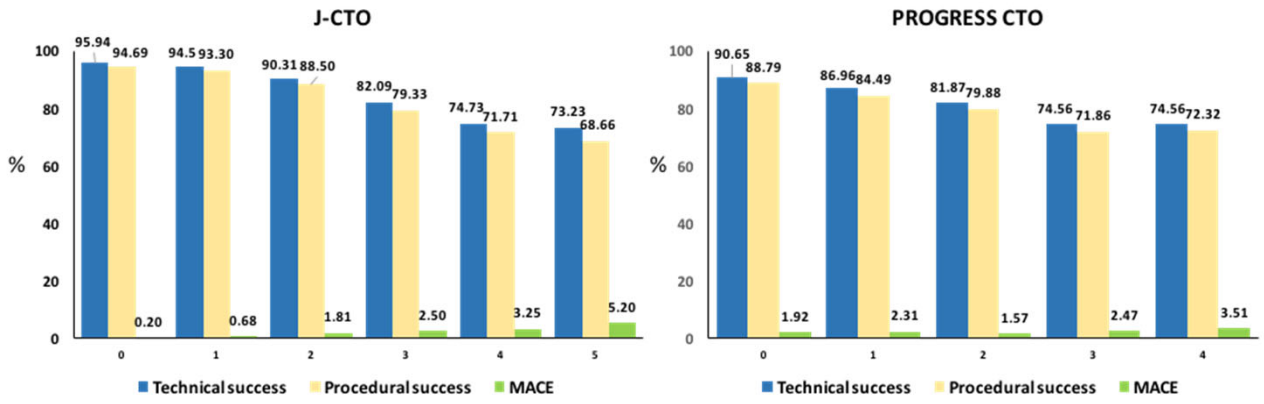
Procedural outcomes across JCTO and PROGRESS CTO score strata



J-CTO: Japan Chronic Total Occlusion score, PROGRESS CTO: Prospective Global Registry for the Study of Chronic Total Occlusion Intervention score)

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Limitations

1. **Observational registry without adjudication of clinical events by an independent committee**
2. **Quantitative coronary angiographic analyses were not performed**
3. **Procedures were performed by experienced CTO PCI operators, limiting extrapolation of the results in less experienced centers and operators**

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Conclusions

Using a combination of crossing strategies, high success and acceptable complication rates can be achieved in CTO PCI among various centers and patient populations.

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Thank you for your attention!

www.progresscto.org

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Outcomes of Patients with ST Elevation Myocardial Infarction and History of Prior Coronary Artery Bypass Graft Surgery

Judit Karacsonyi, MD, PhD[1,2]

on behalf of the Midwest STEMI consortium

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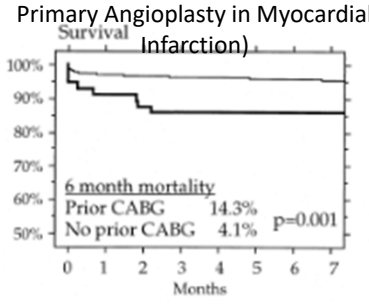
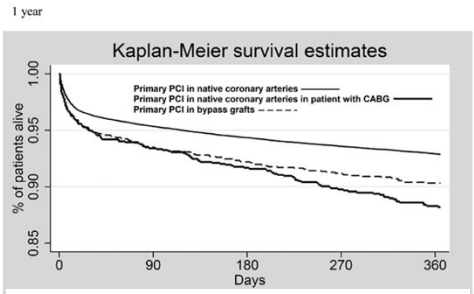
Introduction

The outcomes of STEMI patients with prior CABG surgery have received limited study.

Stone et al. PAMI-2 trial
(Second Primary Angioplasty in Myocardial Infarction)



Iqbal et al.



But no significant difference in 30-day mortality and in-hospital MACE after propensity-matching

Kohl et. al Midwest STEMI

TABLE 2 Angiographic and Clinical Outcomes of All Patients Split by History of Previous CABG

	Previous CABG (n = 249)	No Previous CABG (n = 3,303)	p Value
Death in-hospital	12 (4.8)	170 (5.2)	0.82
Outcomes at 30 days			
Cardiac readmission†‡	4 (1.7)	72 (2.3)	0.82
Stroke†‡	2 (0.8)	26 (0.8)	1.00
Reinfarction/reischemia†‡	3 (1.3)	41 (1.3)	1.00
Death	12 (4.8)	194 (5.9)	0.49
MACE	17 (6.8)	242 (7.4)	0.76
Outcomes at 1 year			
Cardiac readmission‡	21 (8.9)	205 (6.6)	0.17
Stroke†‡	5 (2.1)	34 (1.1)	0.19
Reinfarction/reischemia‡	10 (4.2)	87 (2.8)	0.20
Death	27 (10.8)	301 (9.1)	0.36
MACE	39 (15.7)	403 (12.2)	0.12
Death at 5 years	62 (24.9)	466 (14.2)	<0.001

Stone et al. *J Am Coll Cardiol.*

Iqbal et al. *Circ Cardiovasc Interv.*

Kohl et al. *JACC Cardiovasc*

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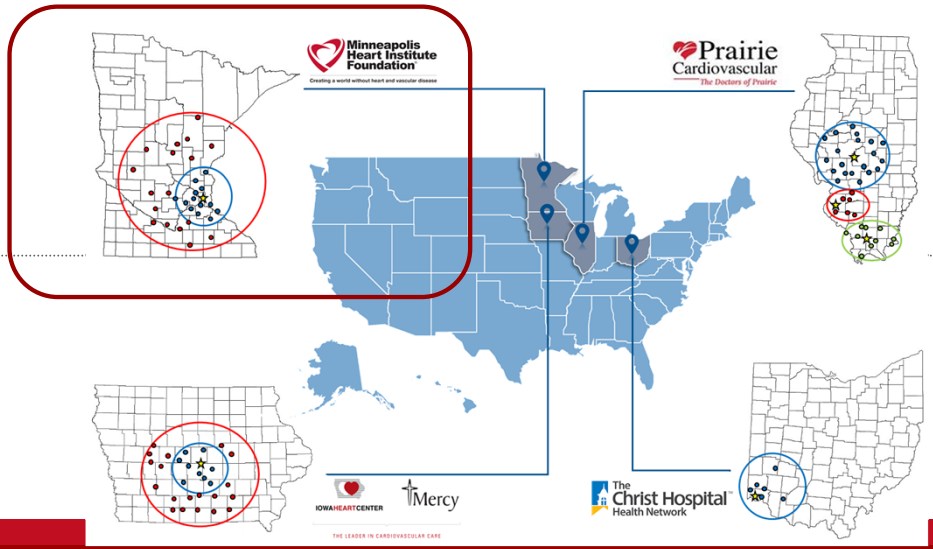
Midwest STEMI Consortium



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Statistical analyses

Continuous variables are presented as mean ± SD or median (interquartile range) and compared using the student's t-test, or Wilcoxon rank-sum test, as appropriate.

Categorical data are reported as frequencies or percentages and compared using the chi-square test or Fisher's exact test, as appropriate.

The incidence of events was assessed using the Kaplan Meier method and compared using the log-rank test and Cox proportional hazards models.

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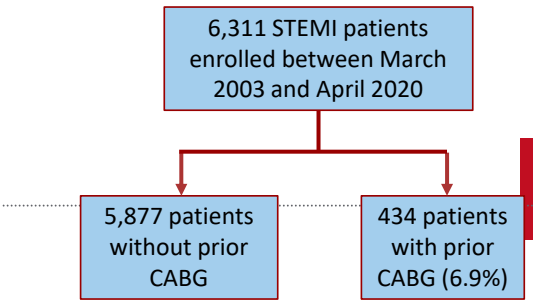
Methods

THE MIDWEST STEMI Consortium

- **DESIGN:** Prospective, multi-center registry, Midwest STEMI Consortium (MSC) 4 large, regional STEMI systems of care with similar standardized STEMI protocols
- Present project is Level 1 analyses of the Minneapolis Heart Institute patients
- **OBJECTIVE:** to compare the clinical and procedural characteristics and outcomes of STEMI patients with and without prior CABG surgery enrolled in a contemporary STEMI registry between March 2003 and April 2020.



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Results: Baseline clinical characteristics I.

Variable	No Prior CABG (n=5877)	Prior CABG (n=434)	p-value
Age, mean ± SD	62.9 ± 13.9	70.4 ± 11.7	<0.001
Male, n (%)	4138 (70)	348 (80)	<0.001
BMI, mean ± SD	29.1 ± 6.1	29.0 ± 5.8	0.769
Hypertension, n (%)	3318 (57)	368 (85)	<0.001
Dyslipidemia, n (%)	3029 (52)	384 (89)	<0.001
Diabetes, n (%)	1049 (18)	167 (39)	<0.001
Hx CAD, n (%)	1501 (26)	434 (100)	<0.001
Family Hx CAD, n (%)	2394 (45)	197 (50)	0.033
Hx CHF, n (%)	450 (8)	84 (19)	<0.001
Hx Smoking, n (%)	3581 (61)	277 (64)	0.218
Current smoker, n (%)	2026 (57)	80 (29)	<0.001
Previous MI, n (%)	1044 (18)	284 (68)	<0.001
Previous PCI, n (%)	1164(20)	239 (56)	<0.001

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BMI: Body Mass Index; CAD: Coronary Artery Disease; CABG: Coronary Artery Bypass Grafting; MI: Myocardial Infarction; CHF: congestive heart failure; Hx: History of; MI: Myocardial Infarction; PCI: Percutaneous

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Results: Baseline clinical characteristics II.

Variable	No Prior CABG (n=5877)	Prior CABG (n=434)	p-value
Hx Stroke, n (%)	218 (4)	37 (9)	<0.001
Cardiogenic Shock pre-PCI, n (%)	549 (9)	61 (14)	0.001
Cardiac Arrest pre-PCI, n (%)	585 (10)	53 (12)	0.133
Anterior MI, n (%)	2125 (36)	104 (24)	<0.001
Killip Class, n (%)			
0-1	5117 (87)	355 (82)	0.002
2-4	755 (13)	78 (18)	
Aspirin, n (%)	1707 (39)	265 (81)	<0.001
Beta-blocker, n (%)	1244 (28)	243 (74)	<0.001
ACE-inhibitor, n (%)	985 (22)	155 (47)	<0.001
ARB, n (%)	186 (4)	21 (6)	0.060
Statin, n (%)	1405 (32)	240 (73)	<0.001
Antiplatelet, n (%)	343 (8)	89 (27)	<0.001

#AHA20

MI: Myocardial Infarction; PCI: Percutaneous Coronary Intervention, ACE: acetylcholinesterase; ARB: Angiotensin II. receptor Blocker

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Angiographic characteristics I.

Variable	No Prior CABG (n=5877)	Prior CABG (n=434)	p-value
No clear culprit artery, n (%)	870 (15)	97 (23)	<0.001
TIMI flow pre-PCI, n (%)			
0/1	2884 (53)	160 (42)	<0.001
2/3	2519 (47)	217 (58)	
TIMI flow post-PCI, n (%)			
0/1	114 (2)	15 (4)	0.018
2/3	5284 (98)	362 (96)	
Peak CK, median (IQR)	791 (262, 1818)	428 (147, 1171)	<0.001
Peak CK-MB, median (IQR)	73 (20, 181)	41 (8, 111)	<0.001
Ejection Fraction, median (IQR)	50 (40, 60)	48 (35, 58)	<0.001
PPCI performed, n (%)	4676 (80)	293 (68)	<0.001
Length of stay, median (IQR)	3 (2, 4)	3 (2, 5)	0.032
Door to Balloon, min	55 (41, 79)	69 (52, 88)	<0.001

#AHA20

TIMI: thrombolysis in myocardial infarction; PCI: Percutaneous Coronary Intervention; CK: creatine kinase; CK-MB: creatine kinase myoglobin-binding; IQR: interquartile ranges

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Angiographic and Clinical Outcomes

Variable	No Prior CABG (n=5877)	Prior CABG (n=434)	p-value
Death, n (%)			
In hospital	319 (5)	40 (9)	0.001
30-day	374 (6)	47 (11)	<0.001
1-year	544 (9)	74 (17)	<0.001
5-year	818 (14)	124 (29)	<0.001
Outcomes at 30 days , n (%)			
Cardiac Readmission	313 (6)	24 (6)	0.680
Stroke	56 (1)	5 (1)	0.610
Re-infarction	82 (2)	5 (1)	0.752
Re-ischemia	74 (1)	6 (2)	0.744
Death	59 (1)	7 (2)	0.185
MACE	199 (4)	17 (5)	0.431
Outcomes at 1-year, n (%)			
Cardiac Readmission	844 (16)	90 (24)	<0.001
Stroke	89 (2)	13 (3)	0.011
Re-infarction	165 (3)	23 (6)	0.001
Re-ischemia	184 (3)	23 (6)	0.008
Death	225 (4)	34 (9)	<0.001
MACE	461 (9)	67 (18)	<0.001
Death at 5-year, n (%)	497 (9)	84 (22)	<0.001
Length of follow-up, median (IQR)	401 (365, 1826)	367 (365, 1706)	0.001

MACE: Major Cardiac Adverse Events; IQR: interquartile ranges

#AHA20

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Clinical outcomes after Cox Proportional Hazard Analyses

Prior CABG	Odds ratio	Std. Error	z	p-value	95% confidence interval	
Mortality In hospital	1.26	0.31	0.93	0.353	0.78	2.04
Mortality between discharge and 18 months	1.25	0.23	1.23	0.218	0.87	1.80
Mortality between 18 months and 5 years	1.96	0.35	3.71	<0.001	1.37	2.79

#AHA20

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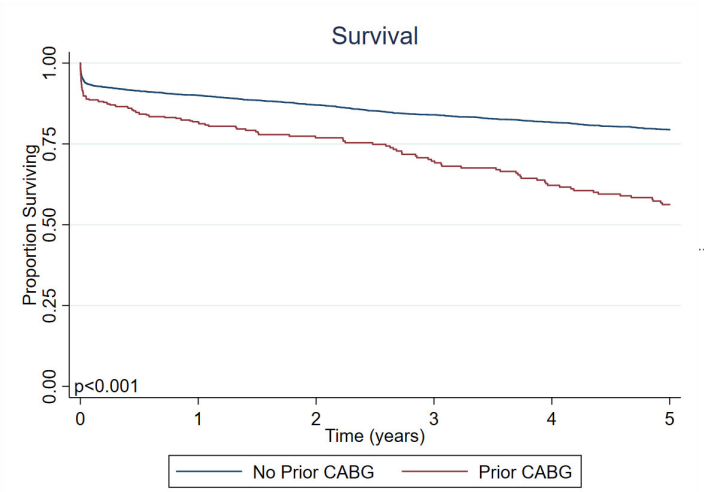
Kaplan-Meier curves of freedom from death in STEMI patients with vs. without prior CABG during 5 year follow up

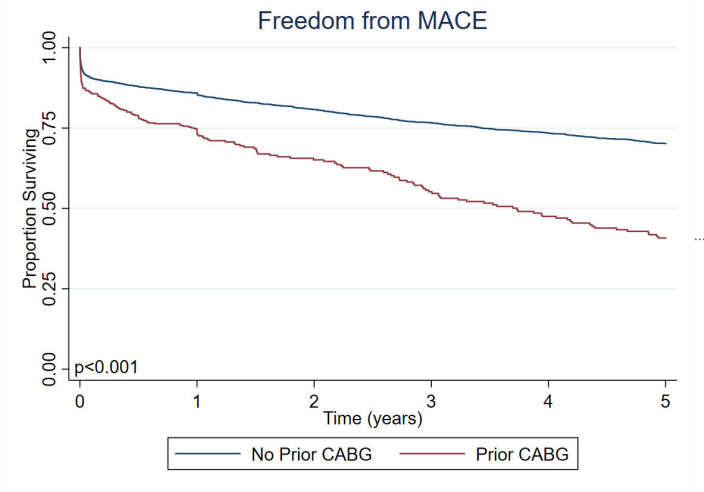


#AHA20

CABG: coronary artery bypass surgery, STEMI: ST elevation myocardial infarction

33

Kaplan-Meier curves of freedom from MACE in STEMI patients with vs. without prior CABG during 5 year follow up

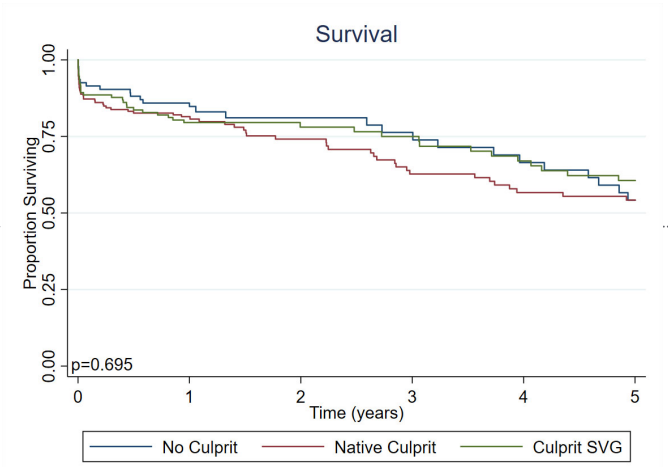


#AHA20

CABG: coronary artery bypass surgery, MACE: major cardiac adverse events; STEMI: ST elevation myocardial infarction

34

Kaplan-Meier curves of freedom from death in STEMI patients with prior CABG and native coronary culprit vessel vs. saphenous vein graft culprit vessel vs. no culprit vessel

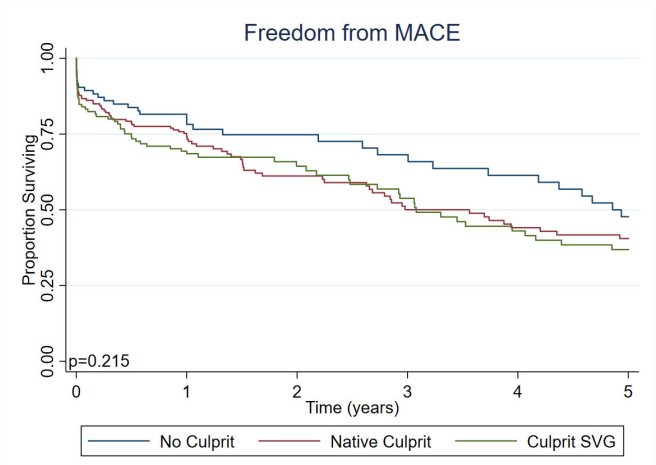


#AHA20

CABG: coronary artery bypass surgery, STEMI: ST elevation myocardial infarction

35

Kaplan-Meier curves of freedom MACE in STEMI patients with prior CABG and native coronary culprit vessel vs. saphenous vein graft culprit vessel vs. no culprit vessel.



#AHA20

CABG: coronary artery bypass surgery, MACE: major cardiac adverse events; STEMI: ST elevation myocardial infarction

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Limitations

1. **Observational study and hence susceptible to unmeasured confounding and selection bias.**
2. **Core-laboratory adjudication was not performed.**

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American Heart Association. Scientific Sessions

Conclusions

Early and long term outcomes after STEMI were worse among patients with prior CABG compared to patients without prior CABG, at least partly due to higher risk baseline characteristics.

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American Heart Association.
Scientific Sessions

Thank you for your attention!

judit.karacsonyi8@gmail.com

THE MIDWEST STEMI Consortium
ILLINOIS OHIO IOWA MINNESOTA

#AHA20

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Radial Versus Femoral Access for Coronary Procedures in Patients with Prior Coronary Artery Bypass Grafting Surgery: An Updated Study-Level Meta-analysis

Nikolakopoulos I, Vemmou E, Xenogiannis I, Karacsonyi J, Rangan BV, Rao SV, Alaswad K, Tsigkas G, Milkas A, Bradley S, Gössl M, Wang Y, Chavez I, Garcia S, Burke MN, Brilakis ES

American Heart Association.
Scientific Sessions

Session: Access site Considerations & Complications

9-10 am Nov 13 (CST)

HOPE DISCOVERED HERE
Minneapolis Heart Institute Foundation

40

Background-RCTs

A Randomized Comparison of the Transradial and Transfemoral Approaches for Coronary Artery Bypass Graft Angiography and Intervention

The RADIAL-CABG Trial (RADIAL Versus Femoral Access for Coronary Artery Bypass Graft Angiography and Intervention)

Tesfaldet T. Michael, MD, MPH, Mohammed Alomar, MD, Aristotelis Papayannis, MD, Owen Mogabgab, MD, Vishal G. Patel, MD, Bavana V. Rangan, BDS, MPH, Michael Luna, MD, Jeffrey L. Hastings, MD, Jerrold Grodin, MD, Shuaib Abdullah, MD, Subhash Banerjee, MD, Emmanouil S. Brilakis, MD, PhD

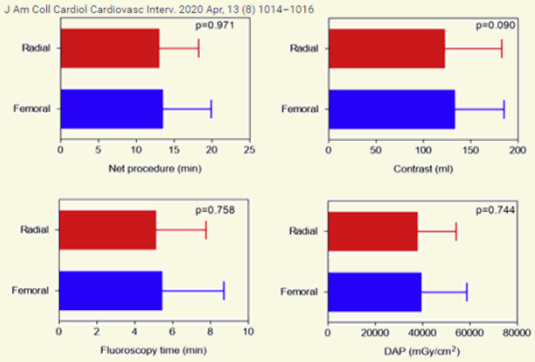
Conclusions In patients who had previously undergone CABG surgery, transradial diagnostic coronary angiography was associated with greater contrast use, longer procedure time, and greater access crossover and operator radiation exposure compared with transfemoral angiography.

The L-RECORD Study

Research Correspondence

Grigorios Tsigkas, Athanasios Makris, Ioannis Tsiafoutis, Michael Koutouzis, Michalis Hamilos, Konstantinos Katsanos, Antonios Ziakas, Emmanouil S. Brilakis, Periklis Davlouros, and George Hahalis

J Am Coll Cardiol Cardiovasc Interv. 2020 Apr, 13 (8) 1014–1016



Radial<Femoral

Radial non inferior

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Background-Observational

Meta-Analysis of Radial Versus Femoral Artery Approach for Coronary Procedures in Patients With Previous Coronary Artery Bypass Grafting

Stefano Rigattieri, MD, PhD[a,*], Alessandro Sciahbasi, MD[a], Emmanouil S. Brilakis, MD, PhD[b], Francesco Burzotta, MD, PhD[c], Sudhir Rathore, MD[d], Francesco R. Pugliese, MD[a], Silvio Fedele, MD[a], Antonios G. Ziakas, MD[e], Yu J. Zhou, MD[f], Luis A. Guzman, MD[g], and Richard A. Anderson, MD[h]

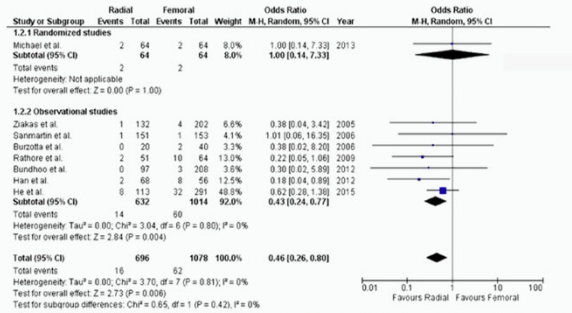

Figure 7. Meta-analysis of access-site complications. The forest plot graphs the odds ratios for access-site complications between the radial approach and the femoral approach.

Radial: Less vascular access complications

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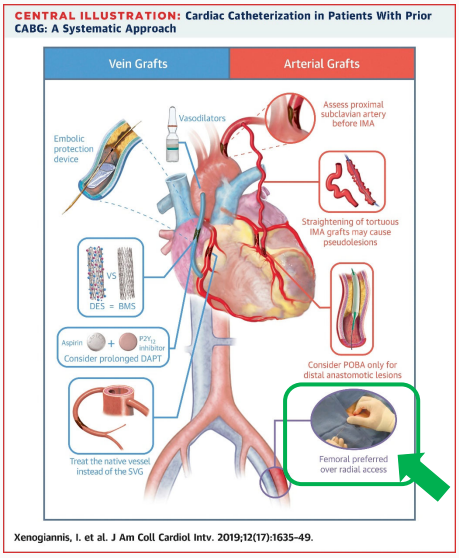
Radial vs femoral debate



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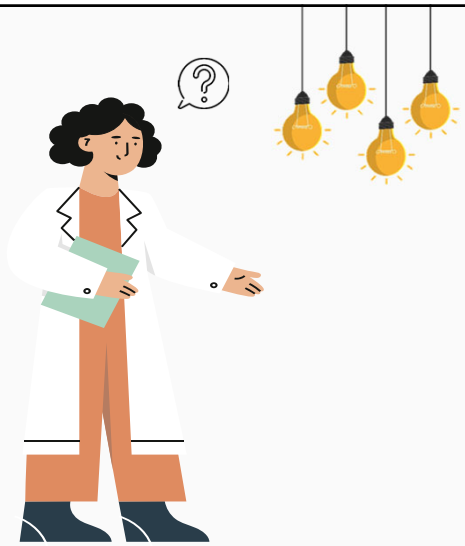

Research question

In patients with prior bypass surgery who undergo coronary angiography and/or percutaneous coronary intervention, is femoral or radial access associated with better outcomes?

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Methods

SEARCH STRATEGY

PubMed Search
("radial"[Title] AND "femoral"[Title] AND ("graft"[Title] OR "grafts"[Title] OR "bypass"[Title]))
OR
("transradial"[Title] AND "transfemoral"[Title] AND ("graft"[Title] OR "grafts"[Title] OR "bypass"[Title]))
OR
("access"[Title] AND ("graft"[Title] OR "grafts"[Title] OR "bypass"[Title]))
+
"similar articles" section
+
references from selected papers

Clinicaltrials.gov search
(radial OR femoral) AND (bypass OR graft) AND access

Cochrane Library search
(radial OR femoral) AND (bypass OR graft) AND access

Conference abstracts
TCT, ACC Scientific Session, SCAI Scientific Sessions

Previous RCTs
Prior CABG data from 4 radial vs femoral RCT requested

INCLUSION CRITERIA

Studies comparing RA with FA for coronary angiography (CA) and/ or percutaneous coronary intervention (PCI) in patients with previous CABG with at least 1 of the following outcomes reported:

(1) procedural time;

(2) contrast volume;

(3) crossover rate to a different vascular access; and

(4) access-site complications.

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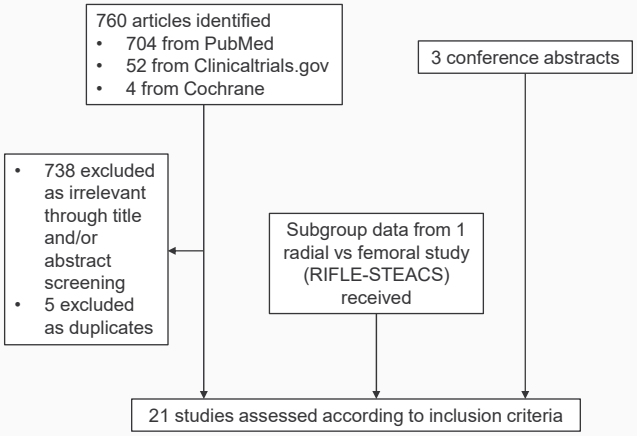
Methods

FLOWCHART



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Methods

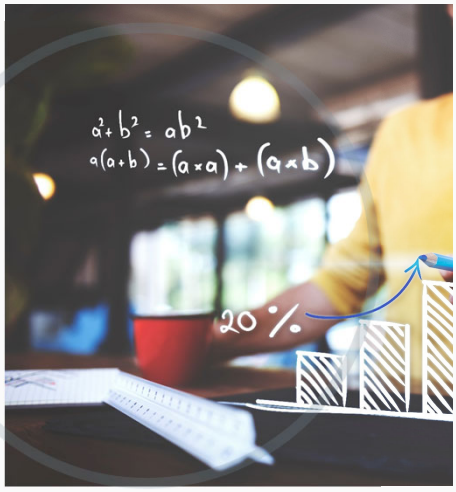
ANALYSIS

BIAS ANALYSIS
Cochrane Risk of Bias 2 Tool
Newcastle- Ottawa Scale
Publication bias assessment

FREQUENTIST METAANALYSIS
Random effects (DerSimonian and Laird)
Revman 5

METAREGRESSION
Random effects (DerSimonian and Laird)
JASP 0.14 (metaphor, stats)

BAYESIAN METAANALYSIS
Random effects
JASP 0.14 (metaBMA)



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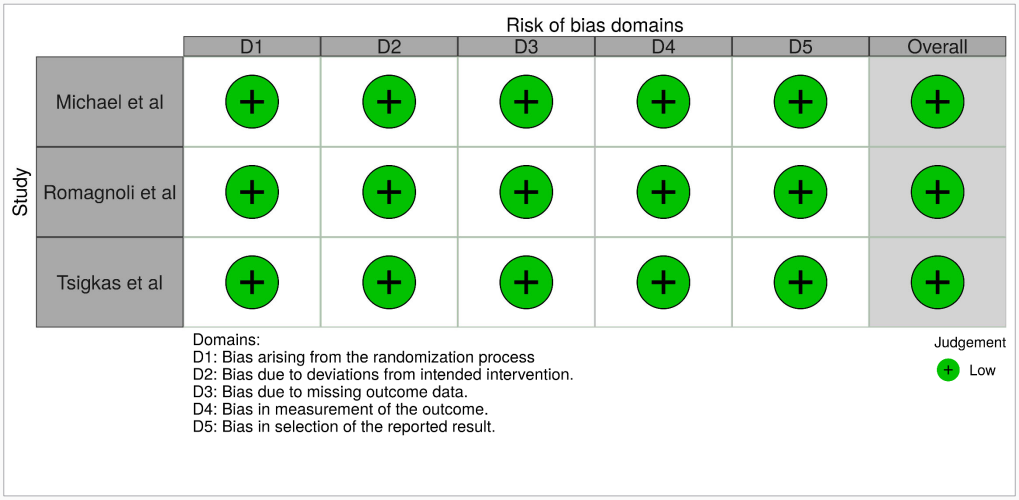
Bias-RCTs



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Bias-observational

Study	Selection	Comparability	Outcome	Total
Amro et al	☆☆☆		☆☆☆	☆☆☆☆☆☆
Balaban et al	☆☆☆		☆☆☆	☆☆☆☆☆☆
Bundhoo et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Burzotta et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Dai et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Duarte et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Han et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
He et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Hirzallah et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Israeli et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Januszek et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Kabir et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Kinnaird et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Orlev et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Pasley et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Rathore et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆
Sanmartin et al	☆☆☆		☆☆☆	☆☆☆☆☆☆
Ziakas et al	☆☆☆☆		☆☆☆	☆☆☆☆☆☆☆

Newcastle Ottawa scale maximum=9

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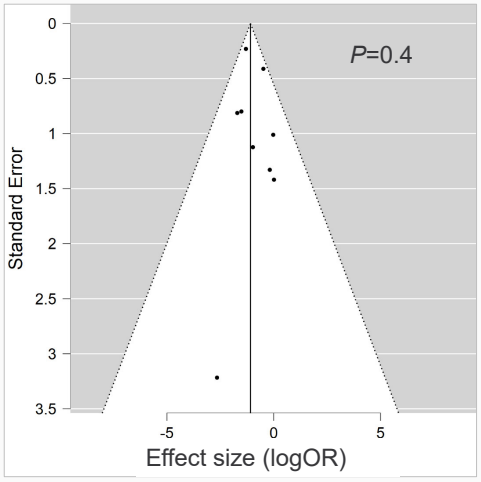
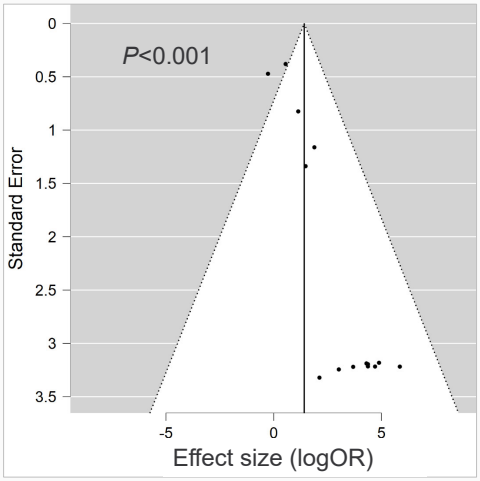
Publication bias (Egger's test)

ACCESS COMPLICATIONS



CROSSOVER RATES



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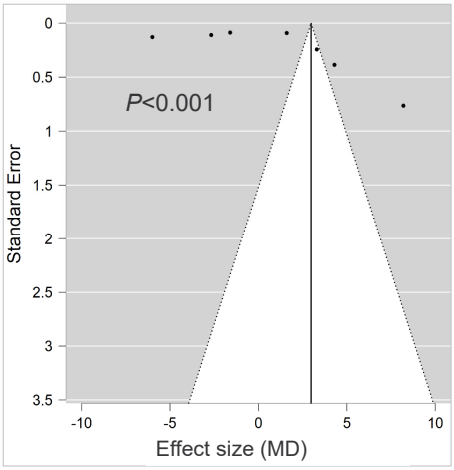
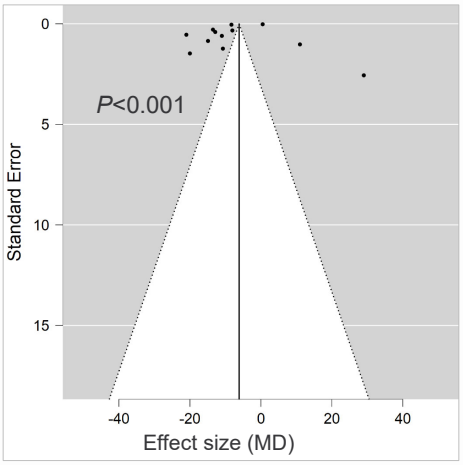
Publication bias (Egger's test)

PROCEDURE TIME



CONTRAST VOLUME



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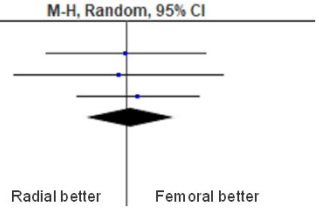
Randomized studies

ACCESS COMPLICATIONS

Study or Subgroup	Radial Events	Radial Total	Femoral Events	Femoral Total	Weight	Odds Ratio M-H, Random, 95% CI
1.1.1 Randomized studies						
Michael et al	2	64	2	64	4.6%	1.00 [0.14, 7.33]
Romagnoli et al	1	7	2	12	3.3%	0.83 [0.06, 11.28]
Tsigkas et al	4	75	3	75	6.0%	1.35 [0.29, 6.26]
Subtotal (95% CI)		**146**		**151**	**13.9%**	**1.13 [0.38, 3.40]**
Total events	7		7			

Heterogeneity: Tau² = 0.00; Chi² = 0.12, df = 2 (P = 0.94); I² = 0%
Test for overall effect: Z = 0.22 (P = 0.83)



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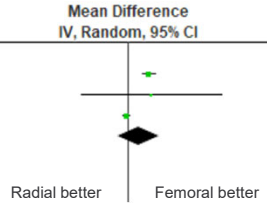
Randomized studies

PROCEDURE TIME

Study or Subgroup	Radial Mean	Radial SD	Radial Total	Femoral Mean	Femoral SD	Femoral Total	Weight	Mean Difference IV, Random, 95% CI
1.3.1 Randomized studies								
Michael et al	34.2	14.7	64	21.9	6.8	64	10.2%	12.30 [8.33, 16.27]
Romagnoli et al	91	51	7	77	26	12	0.3%	14.00 [-26.54, 54.54]
Tsigkas et al	13	5.3	75	13.5	6.5	75	13.5%	-0.50 [-2.40, 1.40]
Subtotal (95% CI)			**146**			**151**	**24.0%**	**6.37 [-5.52, 18.27]**

Heterogeneity: Tau² = 76.98; Chi² = 32.87, df = 2 (P < 0.00001); I² = 94%
Test for overall effect: Z = 1.05 (P = 0.29)



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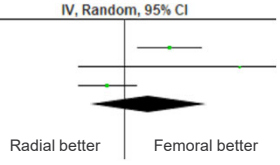
Randomized studies

CONTRAST VOLUME

Study or Subgroup	Radial Mean	Radial SD	Radial Total	Femoral Mean	Femoral SD	Femoral Total	Weight	Mean Difference IV, Random, 95% CI
1.4.1 Randomized studies								
Michael et al	171	72	64	142	39	64	5.3%	29.00 [8.94, 49.06]
Romagnoli et al	312	129	7	238	67	12	0.3%	74.00 [-28.81, 176.81]
Tsigkas et al	122.1	60.8	74	132.8	52.6	75	6.0%	-10.70 [-28.97, 7.57]
Subtotal (95% CI)			**145**			**151**	**11.6%**	**15.73 [-21.55, 53.00]**

Heterogeneity: Tau² = 712.08; Chi² = 9.82, df = 2 (P = 0.007); I² = 80%
Test for overall effect: Z = 0.83 (P = 0.41)



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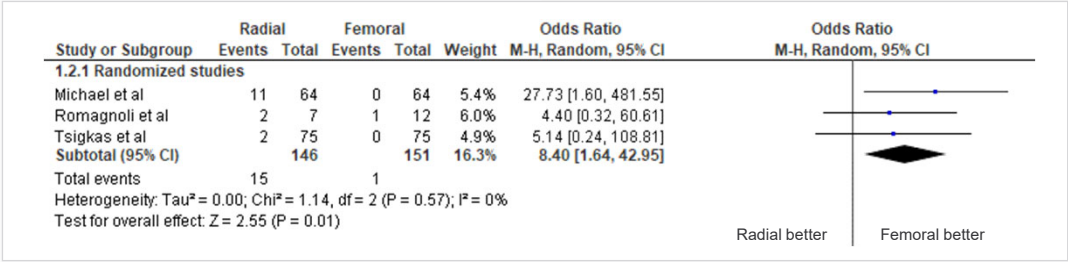
Randomized studies

CROSSOVER RATE



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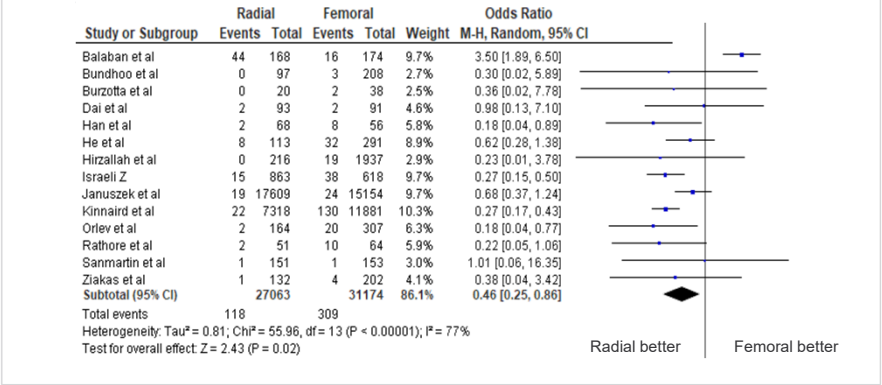
Observational studies

ACCESS COMPLICATIONS



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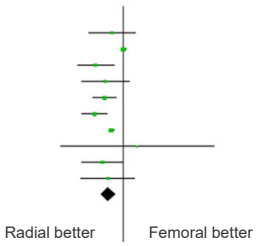
Observational studies

CONTRAST VOLUME

Study or Subgroup	Radial Events	Radial Total	Femoral Events	Femoral Total	Weight	Odds Ratio M-H, Random, 95% CI
Amro et al	119.39	58.87	49	127.43	68.26	535	6.3%	-8.04 [-25.51, 9.43]
Balaban et al	59.5	11.86	268	59	9.31	174	15.6%	0.50 [-1.48, 2.48]
Dai et al	201.5	45.5	93	221.5	49.1	91	8.3%	-20.00 [-33.69, -6.31]
Duarte et al	179.54	121.63	251	192.4	121.63	738	6.4%	-12.86 [-30.28, 4.56]
Hirzallah et al	122.8	59.1	216	136.3	74.4	1937	11.7%	-13.50 [-22.05, -4.95]
Israeli Z	203	82	863	224	99	618	11.0%	-21.00 [-30.53, -11.47]
Januszek et al	204.7	96.9	17609	213	99.8	15154	15.5%	-8.30 [-10.44, -6.16]
Rathore et al	357	154	51	346	157	64	0.9%	11.00 [-46.15, 68.15]
Sanmartin et al	179.6	64.4	151	194.5	72.3	153	7.3%	-14.90 [-30.29, 0.49]
Ziakas et al	223	91	132	234	91	202	5.4%	-11.00 [-30.96, 8.96]
Subtotal (95% CI)			**19683**			**19666**	**88.4%**	**-10.80 [-16.52, -5.07]**

Heterogeneity: Tau² = 45.17; Chi² = 60.74, df = 9 (P < 0.00001); I² = 85%
Test for overall effect: Z = 3.70 (P = 0.0002)

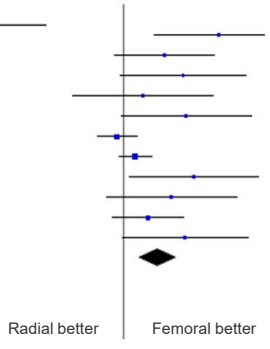


Observational studies

CROSSOVER RATE

Study or Subgroup	Radial Events	Radial Total	Femoral Events	Femoral Total	Weight	Odds Ratio M-H, Random, 95% CI
Amro et al	3	49	0	535	5.1%	80.61 [4.10, 1584.39]
Bundhoo et al	3	97	1	208	7.3%	6.61 [0.68, 64.35]
Dai et al	7	93	0	91	5.3%	15.87 [0.89, 282.03]
Han et al	1	68	0	56	4.5%	2.51 [0.10, 62.85]
He et al	3	113	0	291	5.1%	18.47 [0.95, 360.39]
Hirzallah et al	5	216	58	1937	14.8%	0.77 [0.30, 1.94]
Israeli Z	24	863	10	618	16.0%	1.74 [0.83, 3.66]
Pasley et al	3	72	0	254	5.1%	25.63 [1.31, 502.16]
Rathore et al	3	51	0	64	5.0%	9.31 [0.47, 184.48]
Sanmartin et al	6	151	2	153	10.4%	3.12 [0.62, 15.73]
Ziakas et al	5	132	0	202	5.2%	17.47 [0.96, 318.63]
Subtotal (95% CI)		**1905**		**4409**	**83.7%**	**4.79 [1.99, 11.52]**
Total events	63		71			

Heterogeneity: Tau² = 0.94; Chi² = 21.58, df = 10 (P = 0.02); I² = 54%
Test for overall effect: Z = 3.50 (P = 0.0005)

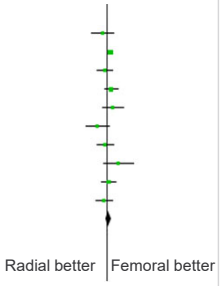


Observational studies

PROCEDURE TIME

Study or Subgroup	Radial Events	Radial Total	Femoral Events	Femoral Total	Weight	Odds Ratio M-H, Random, 95% CI
Amro et al	39.63	26.43	49	42.3	26.87	535 5.3% -2.67 [-10.41, 5.07]
Balaban et al	20.08	4.3	268	17.28	1.68	174 14.8% 2.80 [2.23, 3.37]
Burzotta et al	21	10.4	20	22	7.3	40 8.4% -1.00 [-6.09, 4.09]
Dai et al	70.1	15.8	93	66.8	14.9	91 9.4% 3.30 [-1.14, 7.74]
Han et al	49	23.7	68	44.7	17.3	56 5.8% 4.30 [-2.93, 11.53]
Hirzallah et al	41.5	26.2	216	47.5	163.6	1937 5.0% -6.00 [-14.08, 2.08]
Kabir et al	40	20	54	41	7	44 7.5% -1.00 [-6.72, 4.72]
Rathore et al	52.1	29.5	51	43.9	23.3	64 3.8% 8.20 [-1.71, 18.11]
Sanmartin et al	41.4	22.3	151	39.8	22.9	153 8.4% 1.60 [-3.48, 6.68]
Ziakas et al	60	27.2	132	61.6	24.9	202 7.5% -1.60 [-7.37, 4.17]
Subtotal (95% CI)			**1102**			**3296 76.0% 1.28 [-0.58, 3.15]**

Heterogeneity: Tau² = 2.58; Chi² = 13.75, df = 9 (P = 0.13); I² = 35%
Test for overall effect: Z = 1.35 (P = 0.18)



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Meta-regression to explain heterogeneity

ACCESS COMPLICATIONS

Coefficients

	Estimate	Standard Error	p
intercept	17.365	23.314	0.456
% of GP IIb/IIIa inhibitors	-0.038	0.036	0.287
% Men	-0.049	0.126	0.699
Mean age	-0.159	0.243	0.513
% ACS	-0.029	0.035	0.406
Arterial graft presence (YES)	-1.984	2.803	0.479
Randomized (YES)	5.654	4.409	0.200

	Q	df	p
Omnibus test of Model Coefficients	36.186	1	< .001
Test of Residual Heterogeneity	6.278	8	0.616

Note. *p*-values are approximate.

CROSSOVER RATE

Coefficients

	Estimate	Standard Error	p
intercept	50.709	78.489	0.518
Mean age	-0.734	0.965	0.447
% Men	0.017	0.199	0.932
% of GP IIb/IIIa inhibitors	-0.100	0.176	0.570
% ACS	0.077	0.075	0.303
Randomized (YES)	7.264	17.797	0.683
Arterial graft presence (YES)	-6.137	10.038	0.541

	Q	df	p
Omnibus test of Model Coefficients	2.609	6	0.856
Test of Residual Heterogeneity	0.352	1	0.553

Note. *p*-values are approximate.

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Meta-regression to explain heterogeneity

PROCEDURE TIME

Coefficients

	Estimate	Standard Error	p
intercept	98.926	42.064	0.019
Mean age	-1.514	0.648	0.019
% PCI	-0.038	0.051	0.463
% ACS	0.134	0.092	0.147
Randomized (YES)	14.531	3.597	< .001
Arterial graft presence (YES)	-4.866	3.863	0.208

	Q	df	p
Omnibus test of Model Coefficients	18.551	5	0.002
Test of Residual Heterogeneity	6.301	1	0.012

Note. *p* -values are approximate.

CONTRAST VOLUME

Coefficients

	Estimate	Standard Error	p
intercept	-42.195	30.247	0.163
% PCI	-0.181	0.571	0.751
% ACS	0.839	1.084	0.439
Randomized (YES)	48.711	34.139	0.154
Arterial graft presence (YES)	-2.018	20.298	0.921

	Q	df	p
Omnibus test of Model Coefficients	11.040	4	0.026
Test of Residual Heterogeneity	506.782	2	< .001

Note. *p*-values are approximate.

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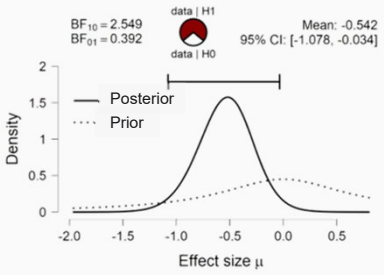
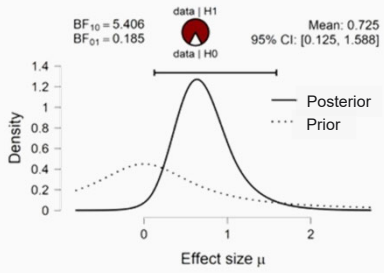
Random effects Bayesian meta-analysis

Non informative prior - Cauchy(0, .707)

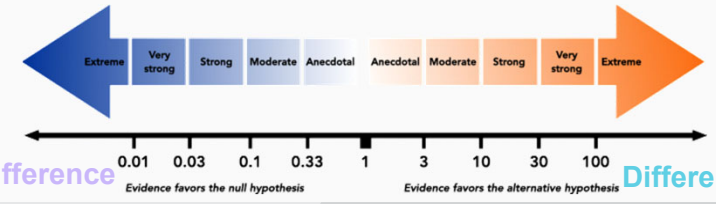
ACCESS COMPLICATIONS



CROSSOVER RATES



BF_{10} interpretation



Jeffreys H. The theory of probability. Oxford: Oxford University Press; 1961.

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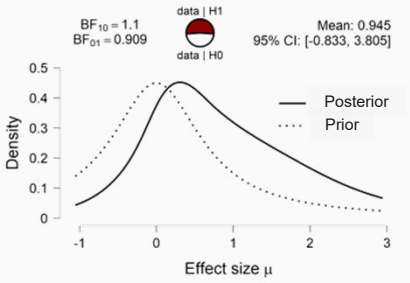
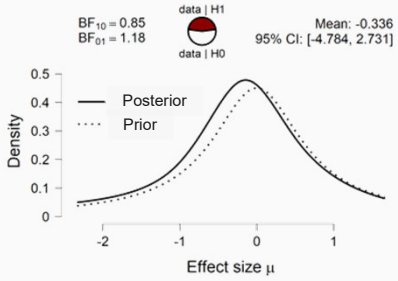
Random effects Bayesian meta-analysis

Non informative prior - Cauchy(0, .707)

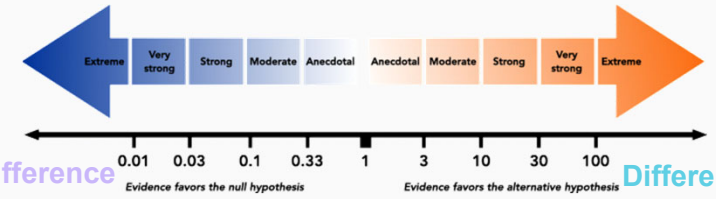
PROCEDURE TIME



CONTRAST VOLUME



BF_{10} interpretation



Jeffreys H. The theory of probability. Oxford: Oxford University Press; 1961.

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Limitations

- **Publication bias.**
- **Moderate/high heterogeneity.**
- **Significant residual heterogeneity.**

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Conclusions

1. Most data published for radial vs. femoral access in prior CABG patients are observational.

2. Radial access is associated with lower vascular access complication rates and contrast volume in observational studies and higher rates of crossover to femoral access in both observational and randomized studies.

3. Bayesian analysis: Likelihood of difference is weak to moderate.

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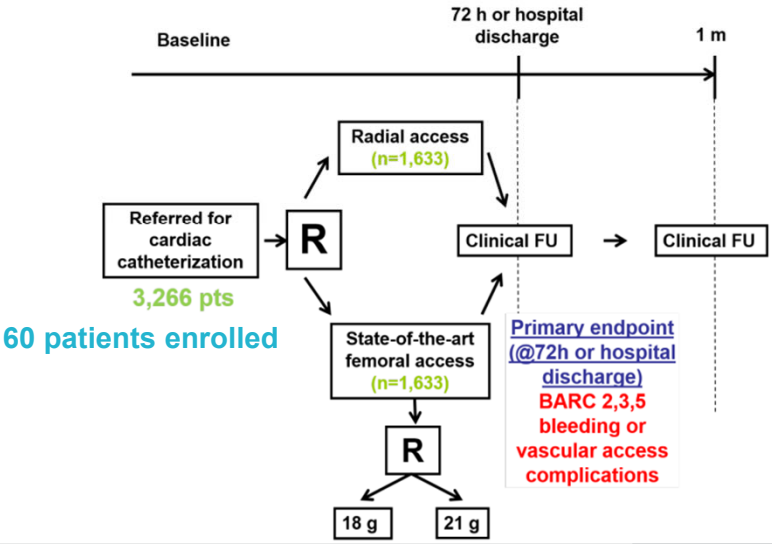
REBIRTH Trial: Radial vs. State-Of-The-Art FEmoral Access for Bleeding and Access SIte Complication Reduction in Cardiac CaTHeterization



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> "It is better to debate a question without settling it than to settle a question without debating it.
>
> - Joseph Joubert

Thank you!

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Observed versus Predicted 10-year Cardiovascular Event Rates In A Rural Population-based Health Program: The Heart Of New Ulm Project

Angela Phillips, Abbey Sidebottom, Marc Vacquier, Gretchen Benson, Scott Sharkey, Thomas Knickelbine, Michael D Miedema

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Disclosures

- None

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Background/Objective

- Background:
  - Estimated 10-year risk for atherosclerotic cardiovascular disease (ASCVD) determined by the Pooled Cohorts Equation (PCE) is an important aspect of the clinician-patient discussion that guides decision making for primary prevention of ASCVD
  - While estimated ASCVD risk is critical to decision-making for primary prevention, the PCE has been shown to be sub-optimally calibrated to many modern populations
- Objective:
  - To evaluate the calibration of the PCE in a modern, rural population participating in a population-based CVD prevention program

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Methods

- The study analyzed the difference between the predicted and observed ASCVD event rate of individuals who participated in heart health screening as part of the Heart of New Ulm (HONU) Project (Table 1).
- 10-year ASCVD risk scores were calculated (via the PCE) using data collected at 2009 Heart Health Screening events.
- MI, stroke, and CVD related death from 2010-2019 were collected from electronic health record and state death data.
- Study Population (n=2,819)
  - Individuals 40-79 years of age who lived within the HONU zip code and had adequate data to calculate predicted 10-year risk
  - No ASCVD at baseline

Table 1. Details of the Heart of New Ulm Project (HONU)
• A 10-year population-based health program, aimed at reducing ASCVD risk in the rural population of New Ulm, Minnesota
• The program conducted over 100 baseline screening events and collected survey data on 5,221 individuals in 2009 with follow up screening in 2011 and 2015
• Interventions identified and prioritized through community screening data were delivered through healthcare, worksites, the community, nutrition and built environment
• Interventions with individual registration components engaged 53% of the population age 40-79

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Results

Table 2. Baseline demographics of the study population (n= 2, 819)

	Mean or %	(n)
Age in years, mean(sd)	56.12 (9.89)	
Gender (female)	59.6%	1681
Race (white)	99.2%	2,795
Current smoker	8.1%	227
Health care coverage (insured)	98.2%	2,754
Diabetes	6.5%	182
Hypertension	44.4%	1,251
Hyperlipidemia	56.6%	1,595

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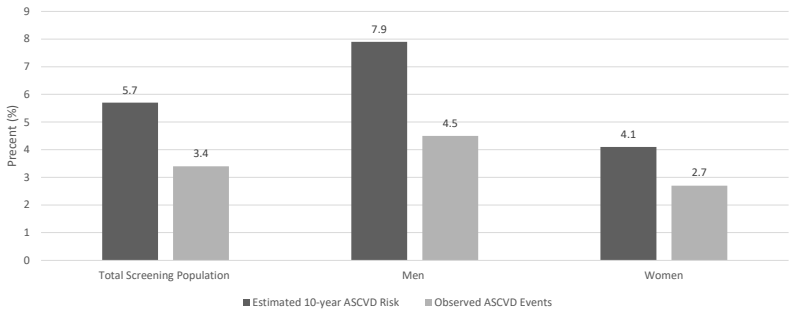
Figure 1. Estimated 10-year ASCVD event rates compared to observed 10-year event rates in a rural sample of men and women participating in a population-based CVD prevention program



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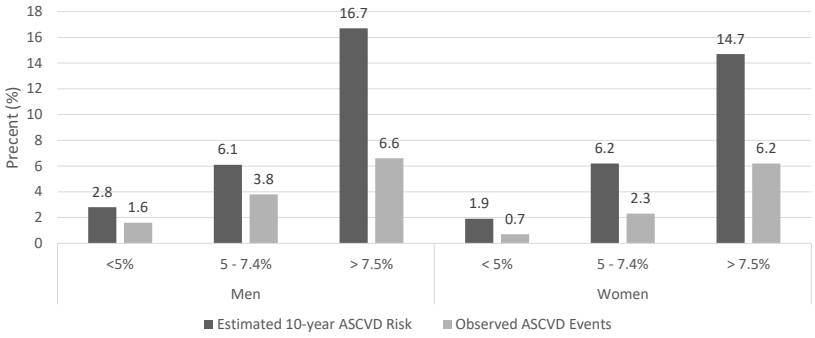
Results

Figure 2. Estimated 10-year ASCVD event rates compared to observed 10-year event rates across all risk categories stratified by gender



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Discussion/Limitation

- In a sample of individuals participating in the HONU screenings, we found that observed ASCVD rates were substantially lower than the rates predicted by the PCE
- The largest difference was observed in the highest risk category which would carry the greatest influence on medical decision making
- New Ulm, Minnesota is a relatively homogeneous, predominantly Caucasian population, therefore the results may not be generalizable to more diverse rural populations.
- Minnesota typically has been found to have high rates of access to healthcare as well as high levels of cardiovascular health compared to other states, which may also affect the generalizability of this study.
- While New Ulm has only a single healthcare system, individuals who received healthcare for ASCVD events at facilities outside of New Ulm may not have been captured.

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Incomplete Revascularization Following Coronary Artery Bypass Grafting (CABG)

Chase Soukup

Christian Schmidt, Carmen Chan-Tram, Ross Garberich, Benjamin Sun MD, Jay Traverse MD

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Overview

- Background
- Methods
- Results
- Conclusion
- Acknowledgements

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The Rate of Incomplete Revascularization Following Coronary Artery Bypass Grafting (CABG) in 2007 vs 2017 at a Single Institution

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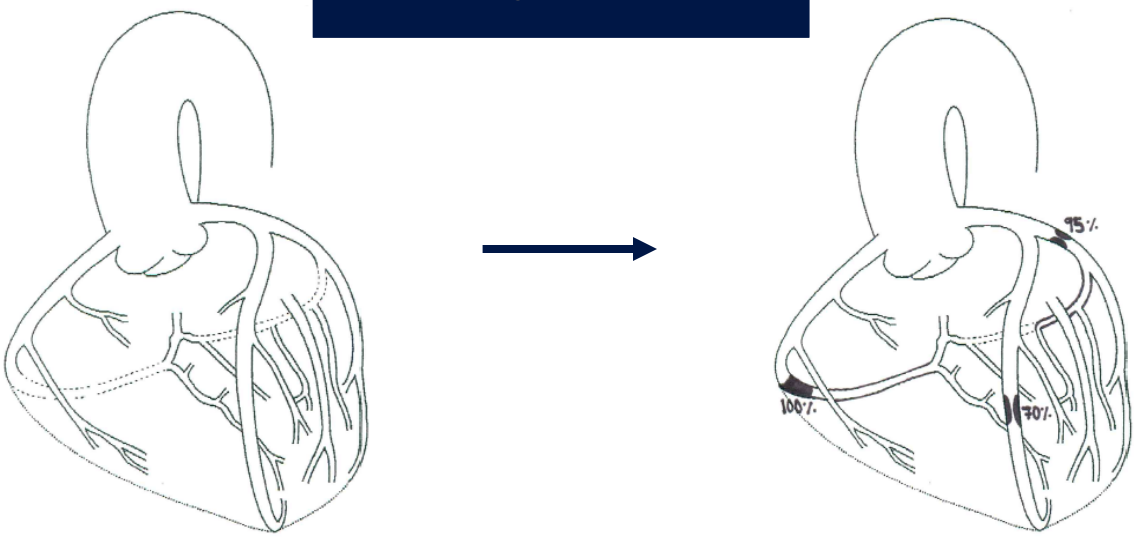
Heart Diagram – Patient 1



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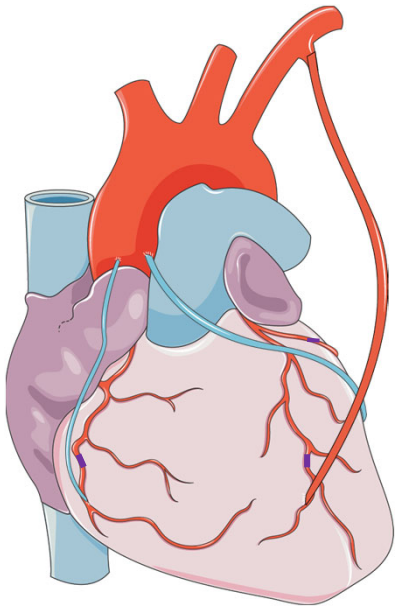
COMPLETE REVASCULARIZATION

- CABG×3
  - LIMA to LAD
  - RSVG to distal RCA
  - RSVG to OM1



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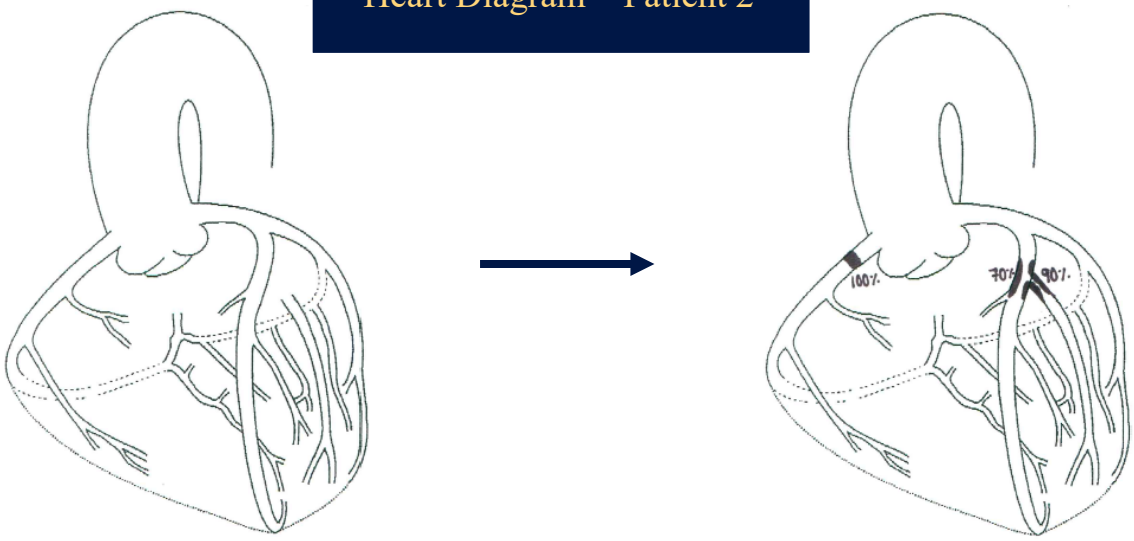
Heart Diagram – Patient 2



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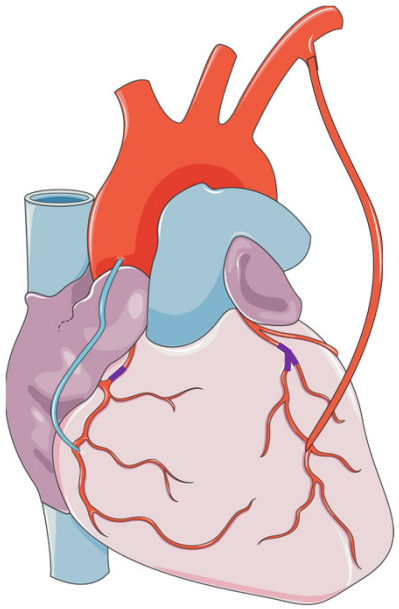
INCOMPLETE REVASCULARIZATION

- CABG×2
  - LIMA to LAD
  - RSVG to RCA



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Background

- Incomplete Revascularization
  - Up to 50% of patients undergoing CABG
  - 30% increase in long-term mortality
  - 22% increase in myocardial infarction
  - 26% increase in repeat revascularization

Garcia S, et al. *J Am Coll Cardiol.* 2013;62(16):1421-1431

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Aims

(1)To estimate the rate of incomplete revascularization in patients undergoing CABG in 2007 and 2017 at the Minneapolis Heart Institute at Abbott Northwestern Hospital

(2)Characterize the main reason(s) for incomplete revascularization

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Methods

- Two cohorts
  - 2007 vs 2017
  - 581 patients
- Angiograms, Heart Diagrams
  → vessel severity
- CABG Operative Reports
  → arteries bypassed and grafts used

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Revascularization Index Score (RIS)

- Major epicardial vessels
  - LAD, OM branch of Cx, and PDA of RCA
    - → 1 point if it was revascularized
- Major side branches
  - First Diagonal and Ramus Intermedius
    - → >2.0mm diameter and length >50% of LAD length
  - PLB and other Major OM branches
    - → >2.0mm diameter

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Complete Revascularization

- All major epicardial vessels and their major branch vessels
  - >2.0mm with stenosis >60-70% bypassed
  - Bypassed directly or indirectly via perfusion from a neighbor vessel
- RIS of 1.0

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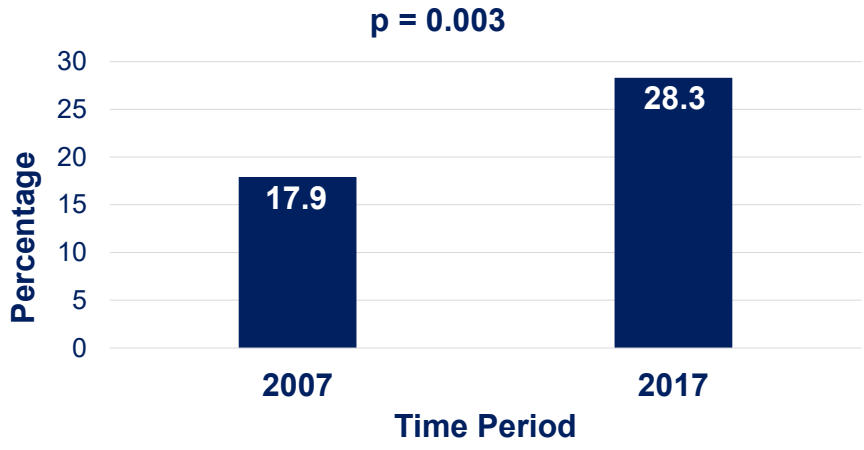
Results

- 2007: 17.9% (52/291)
- 2017: 28.3% (82/290)



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Overall	Overall n=581	2007 n=291	2017 n=290	P-value
Incomplete Revasc (n, %)	134 (23)	52 (17)	82 (28)	0.003
Age (mean, sd)	67 ± 10	65 ± 11	68 ± 8	0.005
Males (n, %)	465 (80)	222 (76)	243 (84)	0.024
Diabetes (n, %)	213 (37)	108 (37)	105 (36)	0.821
Ever Smoker (n, %)	344 (59)	171 (59)	173 (60)	0.827
1-year Mortality (n, %)	8 (1)	0 (0)	8 (3)	0.004
Cardiac Death (1-year) (n, %)	6 (1)	0 (0)	6 (2)	0.015
Off-Pump (n, %)	103 (18)	67 (23)	36 (12)	0.001
Cardiopulmonary Bypass Time (min), median (IQR)	72 (45, 91)	71 (0, 91)	73 (51, 91)	0.212
Previous PCI	144 (25)	65 (22)	79 (27)	0.171

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Results

- 2017 Cohort
  - Older → 65.3 ± 10.5 vs. 67.6 ± 8.4 (p=0.005)
  - More males → 76.3% vs. 83.8% (p=0.024)
  - No difference in diabetes or smoking

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Results

- Off-pump
  - 23.0% to 12.4% (p=0.01)
- 1-year Mortality
  - Total: 0 vs 8 (p=0.004)
  - Cardiovascular: 0 vs 6 (p=0.015)

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Incomplete Revascularization	Overall n=132	2007 n=52	2017 n=82	P-value
Age (mean, sd)	67 ± 9	65 ± 10	68 ± 8	0.098
Males (n, %)	113 (86)	42 (84)	71 (87)	0.681
Diabetes (n, %)	50 (38)	19 (38)	31 (38)	0.982
Ever Smoker (n, %)	77 (58)	27 (54)	50 (61)	0.430
1-year Mortality (n, %)	3 (2)	0 (0)	3 (4)	0.289
Cardiac Death (1-year) (n, %)	3 (2)	0 (0)	3 (4)	0.289
Revascularization Index Score (mean, SD)	0.70 (0.10)	0.73 (0.09)	0.67 (0.11)	0.005
Off-Pump (n, %)	20 (15)	10 (20)	10 (12)	0.225
Cardiopulmonary Bypass Time (min), mean ± SD		90 ± 32	79 ± 32	0.376
Previous PCI, n (%)	30 (23)	8 (16)	22 (27)	0.150
LIMA graft utilized (%)		88	97	0.03
LVEF – pre-CABG (%)		51.3 ± 13.7	53.0 ±13.3	0.18
LVEF – 1-year post (%)		53.0 ± 11.8	56.9 ± 10.3	0.01

93

Results

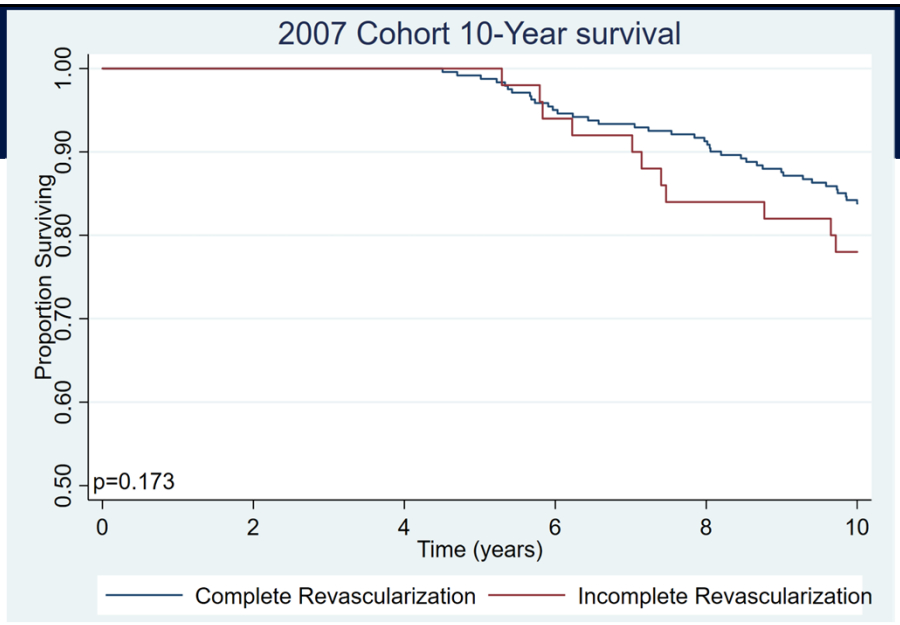
- Baseline demographics
- RIS
  - 0.73 vs. 0.67 (p=0.005)

94

Results

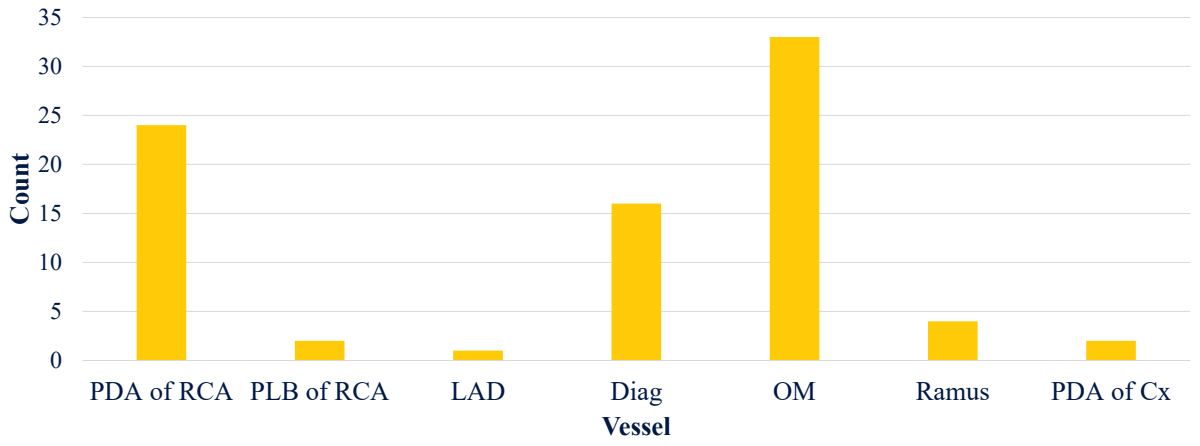
- LIMA graft utilized
  - 88% vs 97% (p=0.03)
- LVEF
  - Before CABG (p=ns)
  - Post-CABG 53.0 ± 11.8 vs. 56.9 ± 10.3 (p=0.01)

95



96

Vessels Missed



97

Conclusion

- Rate and degree of incomplete revascularization has increased

98

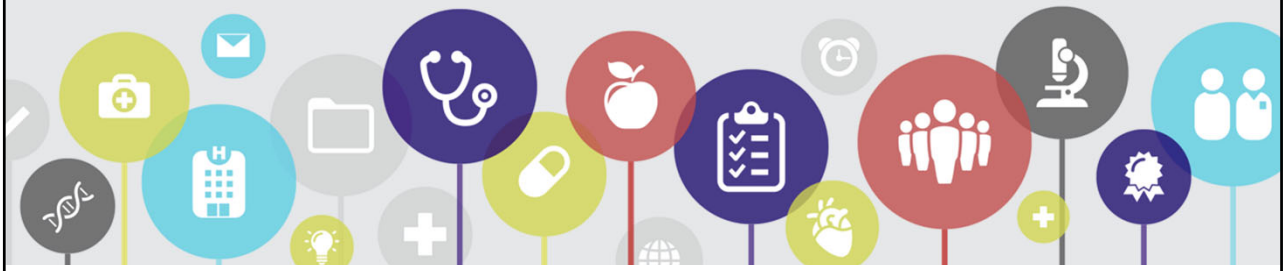
Acknowledgements

- Jay Traverse MD
- Benjamin Sun MD
- Ross Garberich
- Carmen Chan-Tram
- Christian Schmidt
- MHIF Summer Intern Program - Cline and Dianne Hickok

99

Thank you.

Questions?



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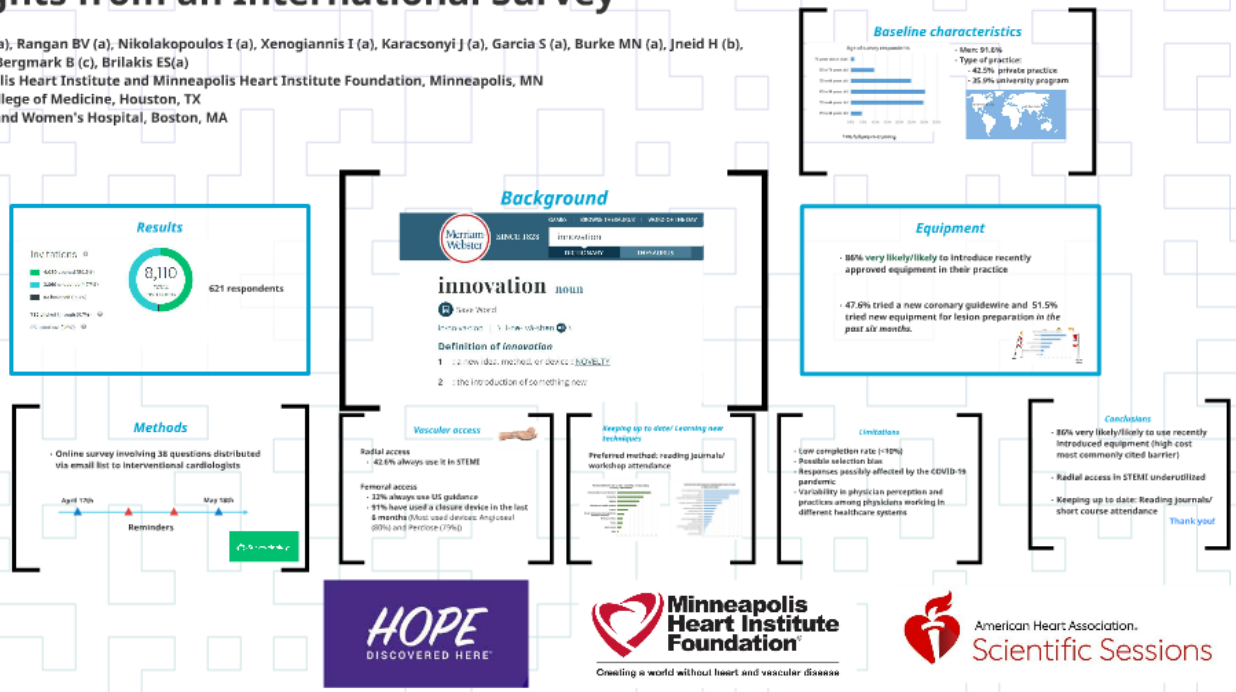

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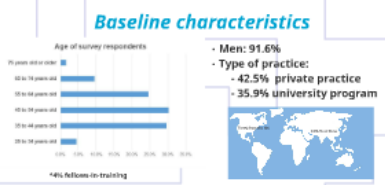
Baseline characteristics



- Men: 91.6%
- Type of practice:
  - 42.5% private practice
  - 35.9% university program

Background

innovation noun

Save Word

in·no·va·tion | \ ˌi-nə-ˈvā-shən \

Definition of *innovation*

1 : a new idea, method, or device : NOVELTY

2 : the introduction of something new

Results

Equipment

- 86% very likely/likely to introduce recently approved equipment in their practice
- 47.6% tried a new coronary guidewire and 51.5% tried new equipment for lesion preparation *in the past six months.*

Methods

- Online survey involving 38 questions distributed via email list to interventional cardiologists

Vascular access

Radial access
- 42.6% always use it in STEMI

Femoral access
- 32% always use US guidance
- 91% have used a closure device in the last 6 months (Most used devices: Angioseal (80%) and Perclose (79%))

Keeping up to date/ Learning new techniques

Preferred method: reading journals/ workshop attendance

Limitations

- Low completion rate (<10%)
- Possible selection bias
- Responses possibly affected by the COVID-19 pandemic
- Variability in physician perception and practices among physicians working in different healthcare systems

Conclusions

- 86% very likely/likely to use recently introduced equipment (high cost most commonly cited barrier)
- Radial access in STEMI underutilized
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Background

Merriam-Webster SINCE 1828

GAMES | BROWSE THESAURUS | WORD OF THE DAY

innovation

DICTIONARY | THESAURUS

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Vascular access

Radial access

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- Online survey involving 38 questions distributed via email list to interventional cardiologists

SurveyMonkey

Results

Invitations

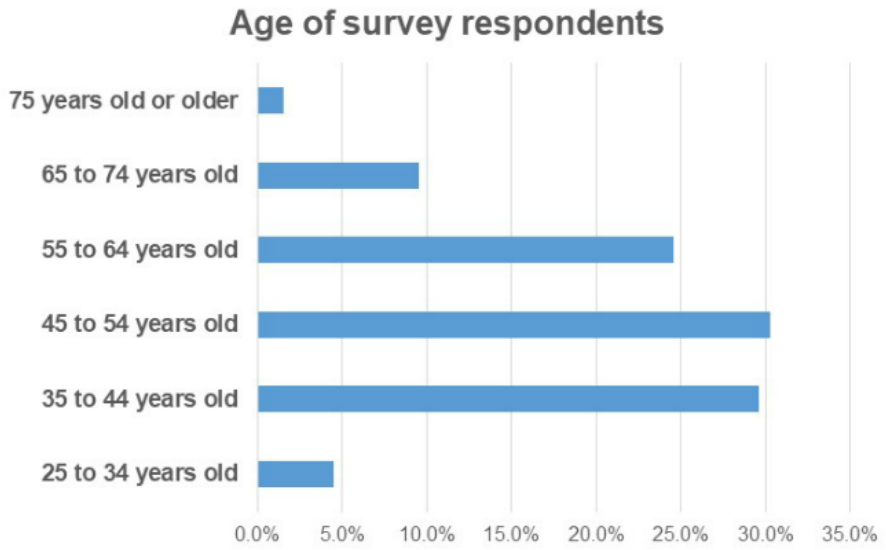
- **4,080** opened (50.3%)
- **3,869** unopened (47.7%)
- **63** bounced (0.8%)

785 clicked through (9.7%)

98 opted out (1.2%)

621 respondents

Baseline characteristics



*4% fellows-in-training

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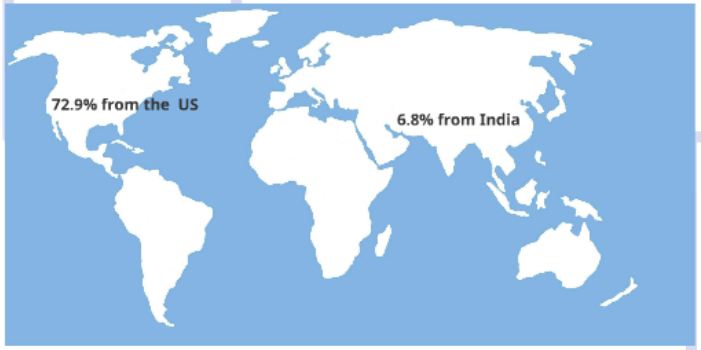

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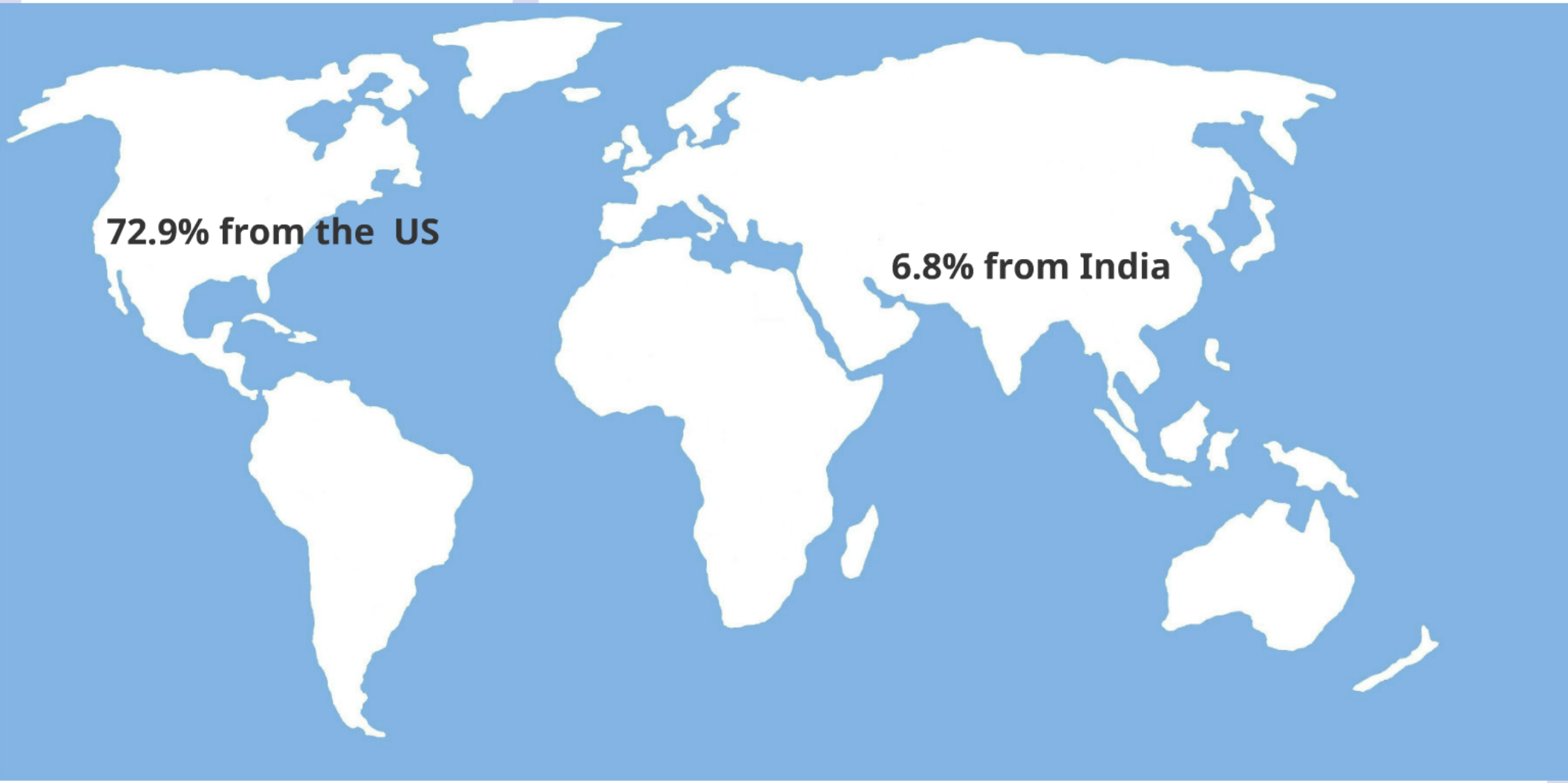

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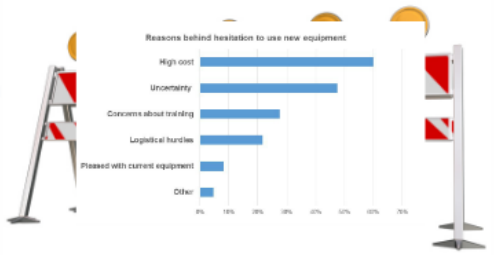
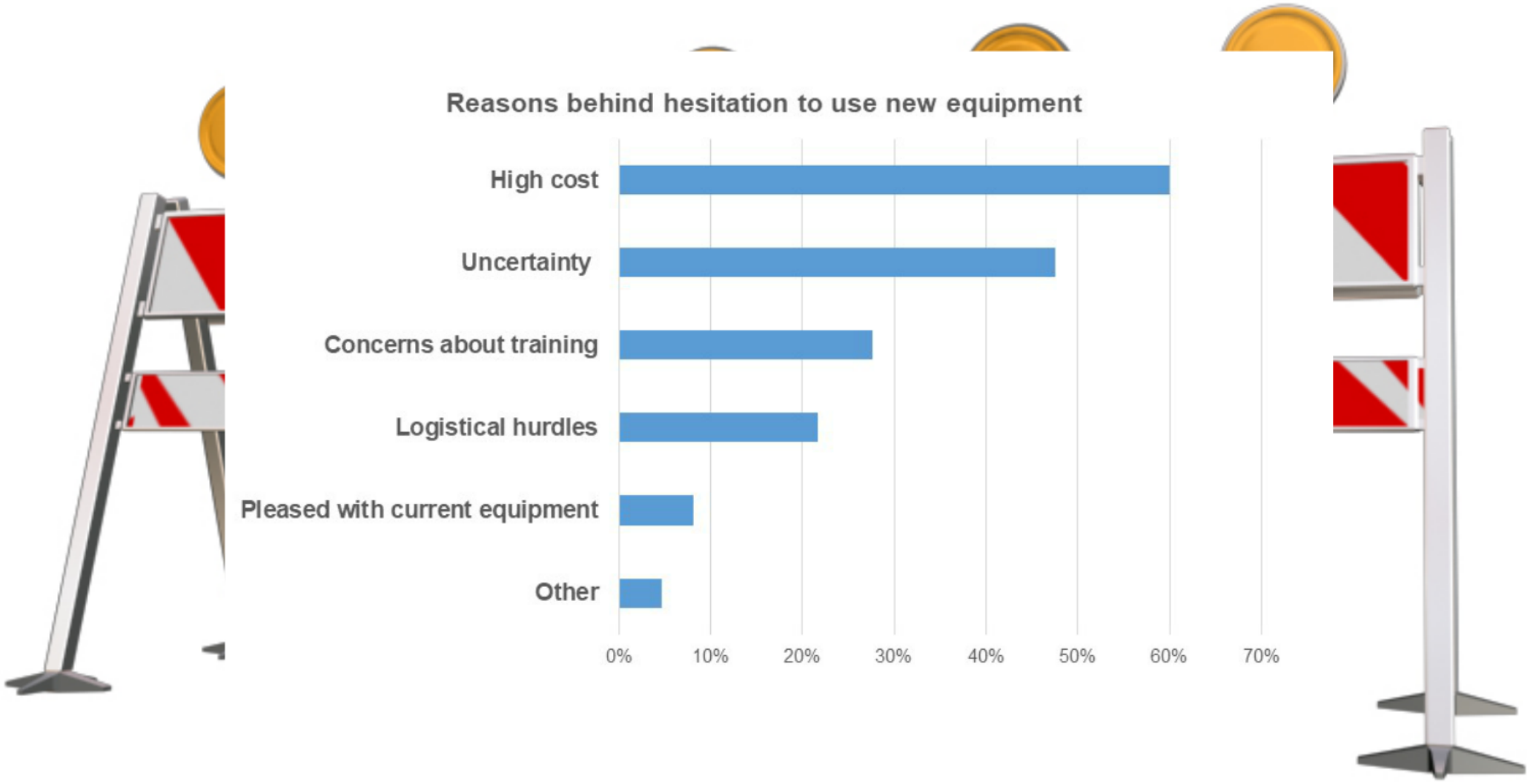
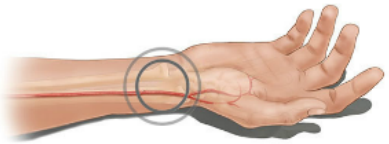


ation in the


Reasons behind hesitation to use new equipment
High cost
Uncertainty
Concerns about training
Logistical hurdles
Pleased with current equipment
Other
0%
10%
20%
30%
40%
50%
60%
70%

Vascular access



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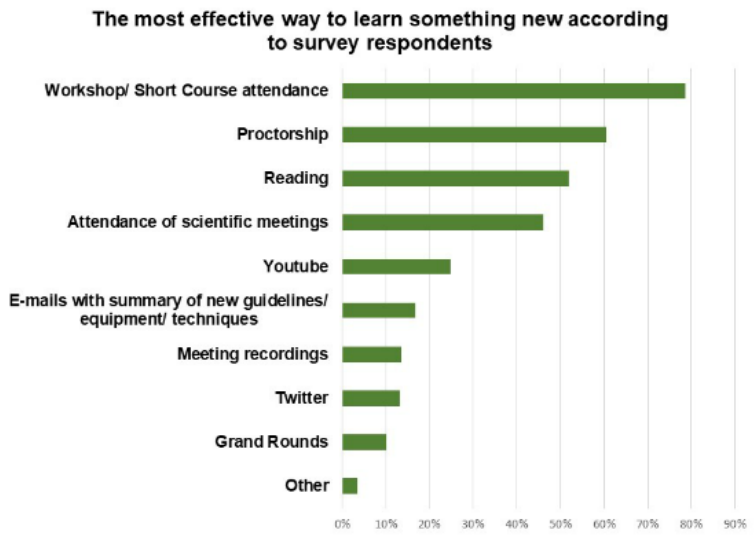
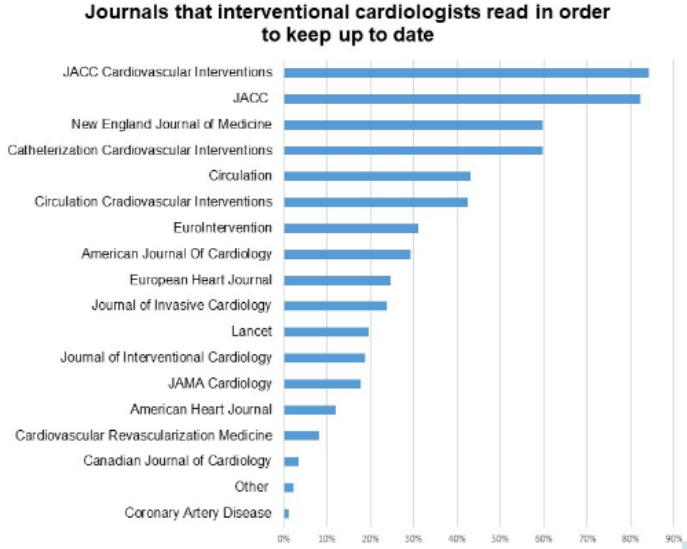
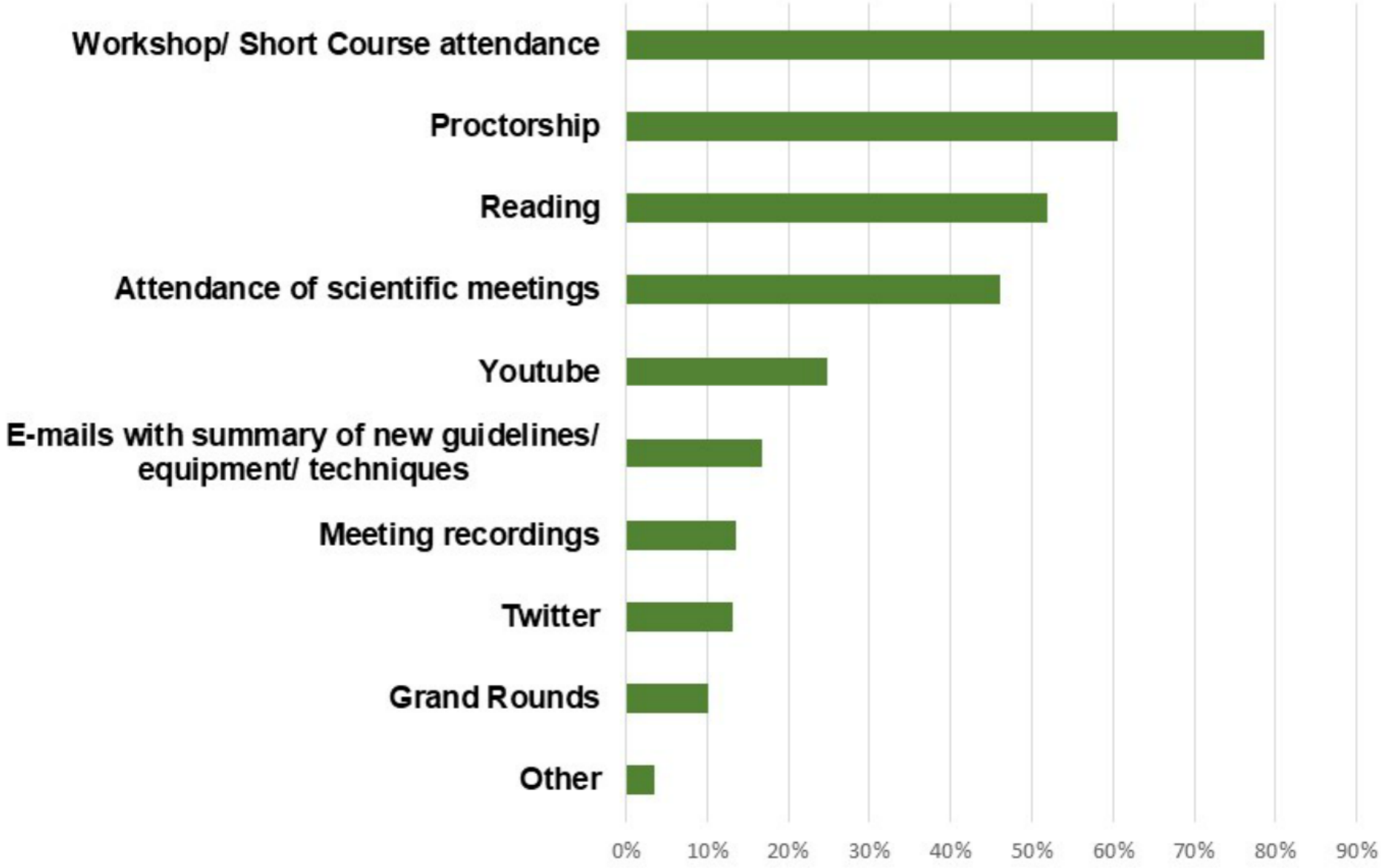
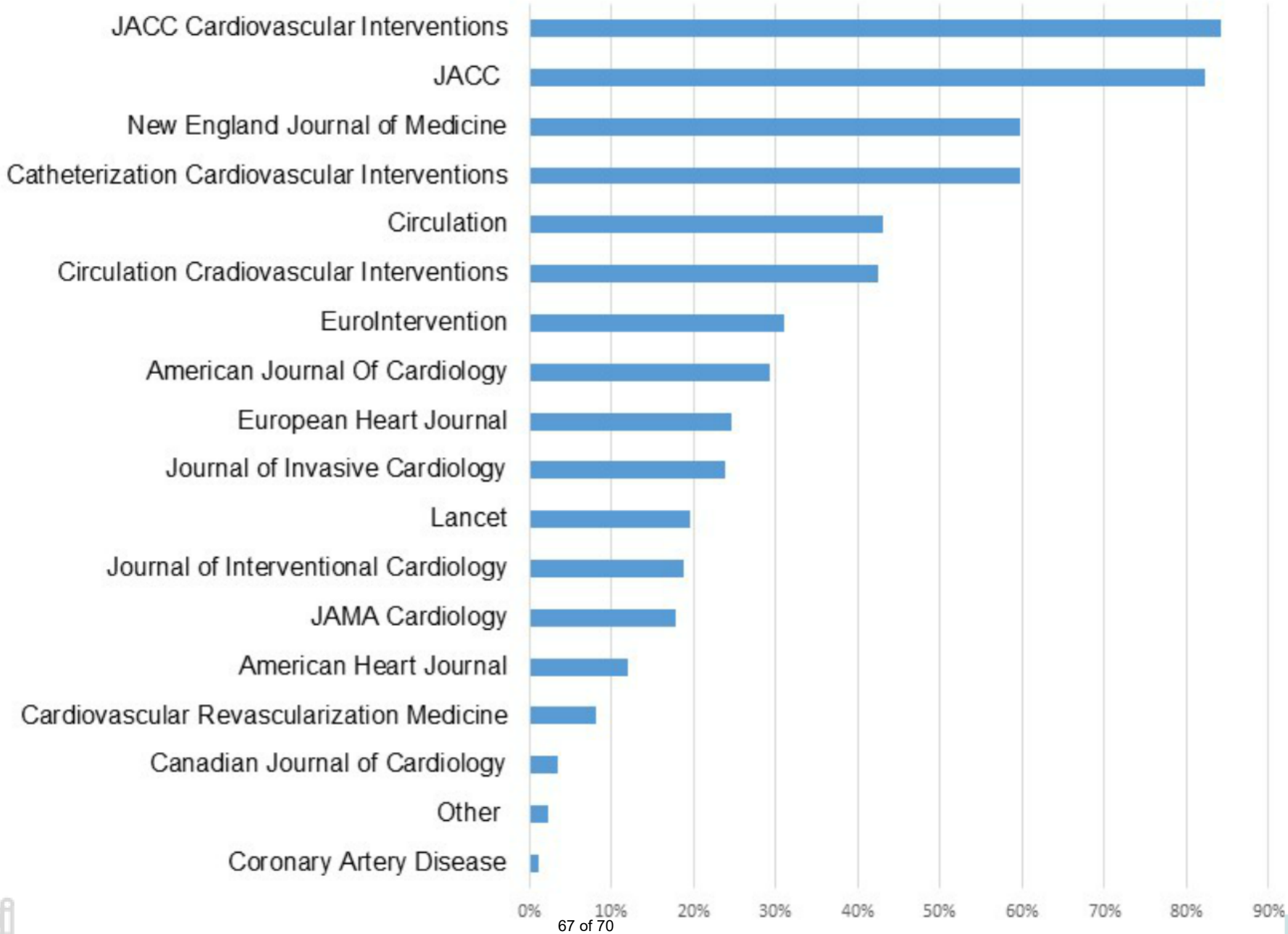




The most effective way to learn something new according to survey respondents



Journals that interventional cardiologists read in order to keep up to date



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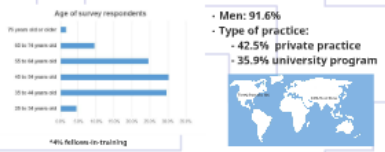

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