Initial Outcomes from NACMI
The North American COVID-19 STEMI Registry

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Disclosure Statement of Financial Interest

I, Timothy D. Henry, have nothing to disclose.

Cardiovascular Manifestations of COVID-19

- Patients with cardiovascular disease have increased risk of mortality with COVID-19
- 15-28% of COVID+ patients admitted to the hospital have elevated Troponin
- 28-45% reduction in STEMI activation and cardiovascular admissions
- COVID+ patients with ST-Segment elevation represent a particularly unique and challenging population

STEMI in COVID-19: Published Data

- 5 publications with a total of 174 COVID+ patients with ST-Elevation (Range 11-78)
- Key findings:
  - More frequent in-hospital presentations
  - More thrombotic lesions and pathologic reports of "microthrombi"
  - More frequent "no-culprit" (range 5-55%)
  - Higher mortality (range 12-72%)
  - Considerable controversy regarding appropriate management
    - SCAI/ACC/ACEP Guidelines

Mahmud E, Dauerman HL, Welt FGP, Messenger JC, Rao SV, Grines C, Mattu A, Kirtane AJ, Jauhar R, Meraj P, Rokos IC, Rumsfeld JS, Henry TD. Management of Acute Myocardial Infarction During the COVID-19 Pandemic: A position statement from the Society for Cardiovascular Angiography and Interventions (SCAI), the American College of Cardiology (ACC), and the American College of Emergency Physicians (ACEP). J Am Coll Cardiol. 2020 Sep 15;76(11):1375-1384.

North American COVID Myocardial Infarction Registry

Goals:

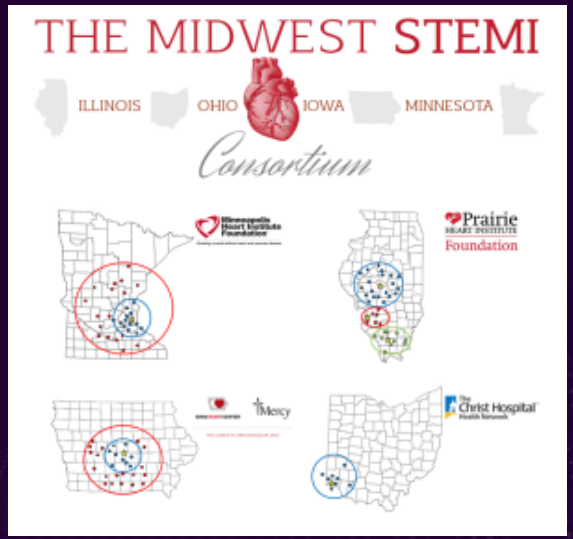
- To create a multi-center database of COVID+ or persons under investigation (PUI) who present with ST-Segment Elevation or new left bundle branch block (LBBB) on ECG
- To *compare* the demographics, clinical findings, outcomes and management strategies of COVID+ Pts to a propensity matched historical control of STEMI activation patients from the *Midwest STEMI Consortium*
- To develop *data-driven treatment plans*, guidelines and diagnostic acumen regarding these unique patients

NACMI: A Unique Collaboration

SCAI
Society for Cardiovascular Angiography & Interventions

CAIC ACCI

AMERICAN COLLEGE of CARDIOLOGY



North American COVID-19 ST-Segment-Elevation Myocardial Infarction (NACMI) registry: Rationale, design, and implications

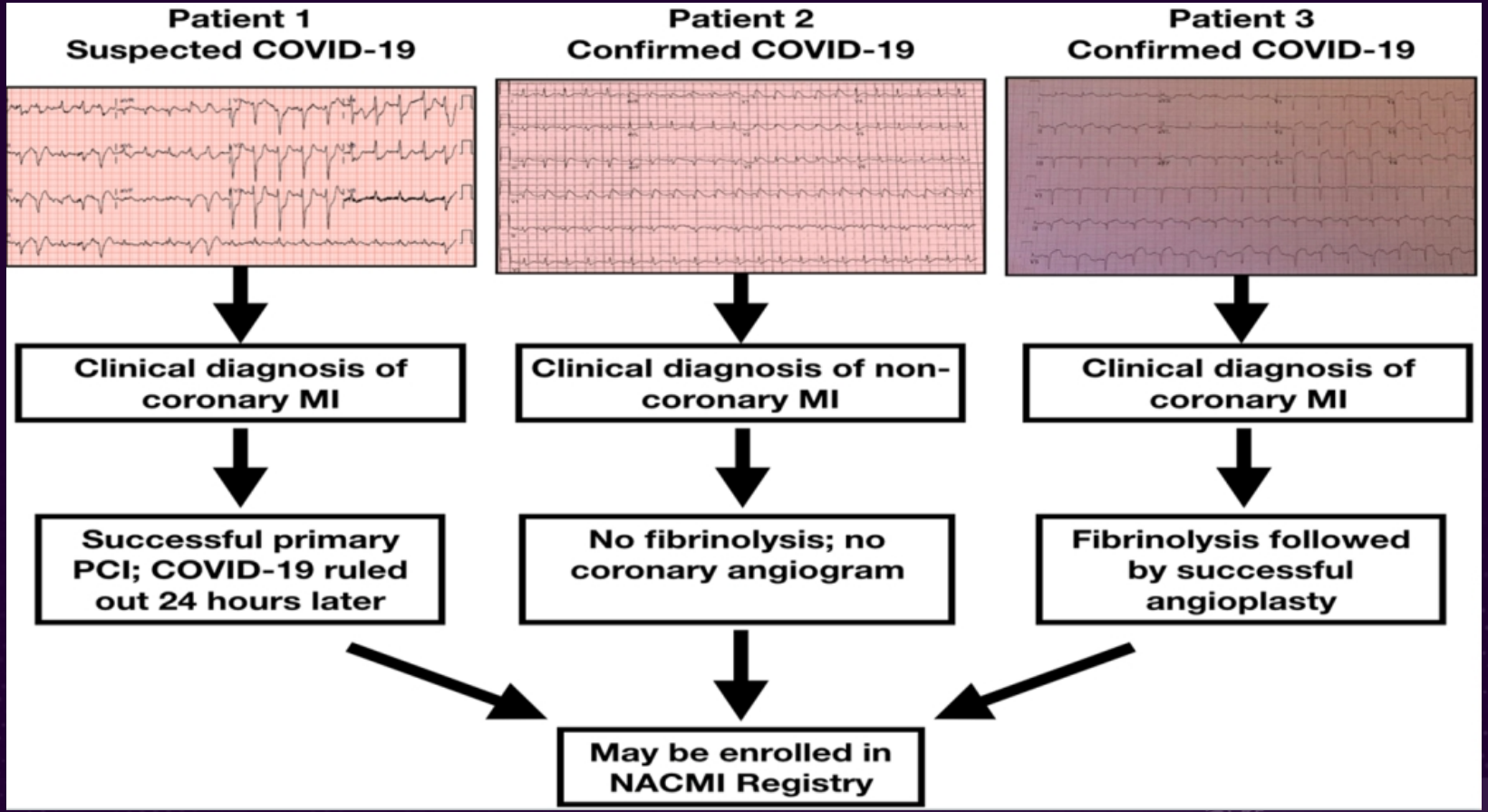
Am Heart J. 2020 Sep;227:11-18.

Inclusion and Exclusion Criteria

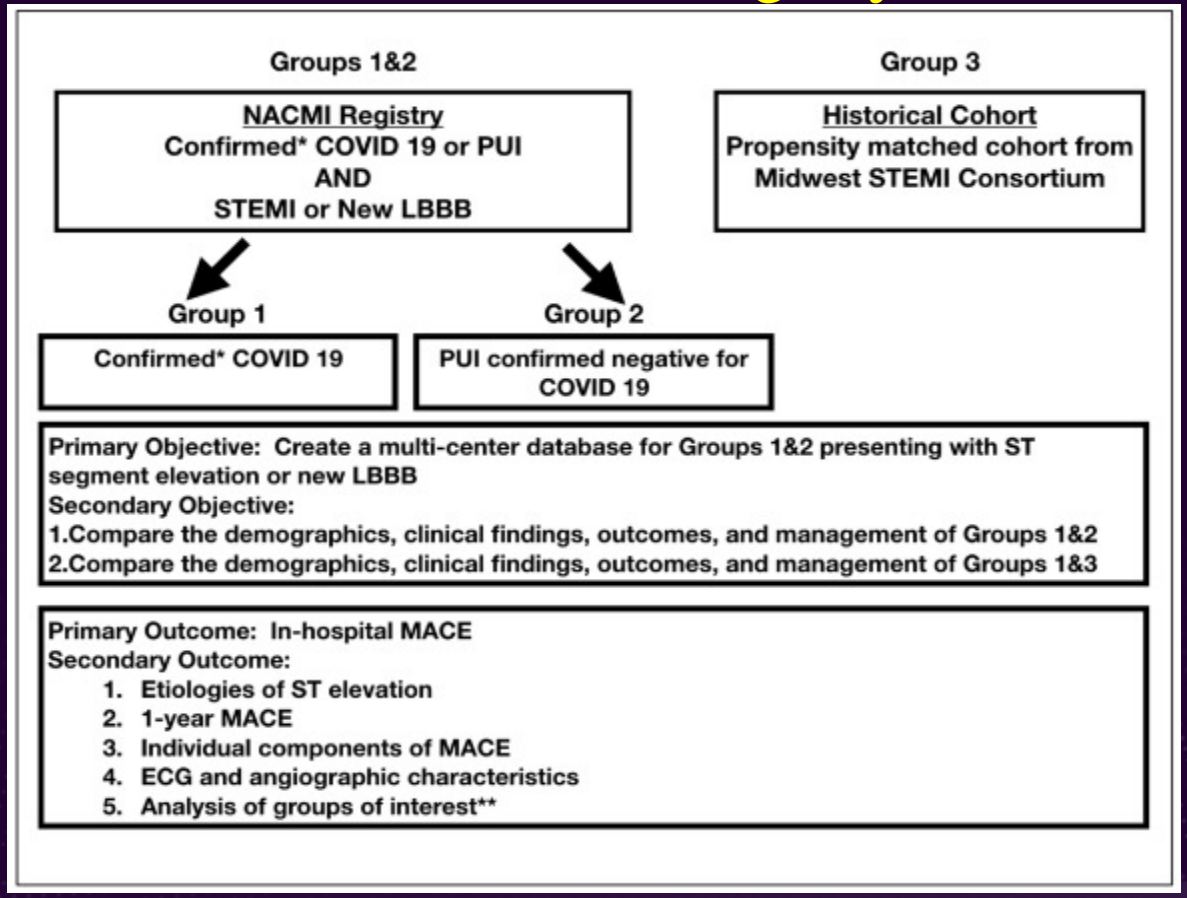
- 1) COVID+ or PUI
- 2) ST-segment elevation or new-onset LBBB on 12-lead ECG
- 3) >18 years of age
- 4) Include a clinical correlate of myocardial ischemia (e.g., chest or abdominal discomfort, dyspnea, cardiac arrest, shock, mechanical ventilation)

- No exclusion criteria

Pathways for enrollment into NACMI



Methods: NACMI Registry



NACMI Sites

Total Active Sites*: 64
(11 in progress)

Total patients enrolled*: 594
(171 COVID+, 423 PUI)

Top Overall sites, USA

Mercy Health St. Vincent = 62
Community Medical = 56
Southcoast Health = 55
Massachusetts General Hospital = 44
Holy Cross Hospital = 32
Northside Hospital = 32
University of Chicago = 21
DMC Harper University Hospital = 20
Mayo Clinic Jacksonville = 16
Northwestern University = 12

Top COVID 19 + sites, USA

Northside Hospital = 24
DMC Harper University Hospital = 10
Medstar Health = 9
Northwestern University = 9
Massachusetts General Hospital = 8
Ochsner Medical Center = 8
Scripps Health = 7
University of Arizona = 7
New York Presbyterian = 6
Cedars Sinai = 5
Cook County Hospital = 5
Southcoast Health = 5

Top overall sites, Canada

Vancouver Coastal = 34
Royal University Hospital = 30
Sunnybrook Research = 20
Regina General Hospital = 14
University of Ottawa = 6
Nova Scotia Health = 4
Windsor Regional Hospital = 3
Horizon Health Network = 2
St. Mary's General Hospital = 2
William Osler Health = 2

Top COVID 19 + sites, Canada

Sunnybrook Research = 3
Windsor Regional Hospital = 3
Royal University Hospital = 2
Lawson Health Research = 1
St. Mary's General Hospital = 1
University of Ottawa = 1
Vancouver Coastal = 1
William Osler Health = 1

*As of 10/4/20

Results: Baseline Characteristics

	COVID + (n=171)	PUI (n=423)	p-value	Propensity-Matched MSC	p- value
Male, n (%)	120 (70)	311 (74)	0.408	253 (74)	0.362
Age group, n (%)			0.351		1.000
18-55	39 (23)	121 (29)		78 (23)	
56-65	52 (30)	135 (32)		104 (30)	
66-75	48 (28)	88 (21)		96 (28)	
76-85	25 (15)	61 (14)		50 (15)	
>85	7 (4)	18 (4)		14 (4)	
Race, n (%)			**<0.001**		**<0.001**
Caucasian	56 (33)	301 (74)		316 (93)	
African American	***45 (27)***	***44 (11)***		***14 (4)***	
Asian	12 (7)	23 (6)		4 (1)	
Hispanic	***41 (24)***	***23 (6)***		***2 (1)***	
Indigenous	4 (2)	7 (2)		3 (1)	
Other	11 (7)	7 (2)			
Diabetes, n (%)	***73 (44)***	***134 (33)***	**0.015**	69 (20)	**<0.001**
Hypertension, n (%)	121 (73)	303 (74)	0.734	209 (61)	**0.010**
Dyslipidemia, n	***77 (48)***	***241 (61)***	**0.004**	187 (55)	0.117

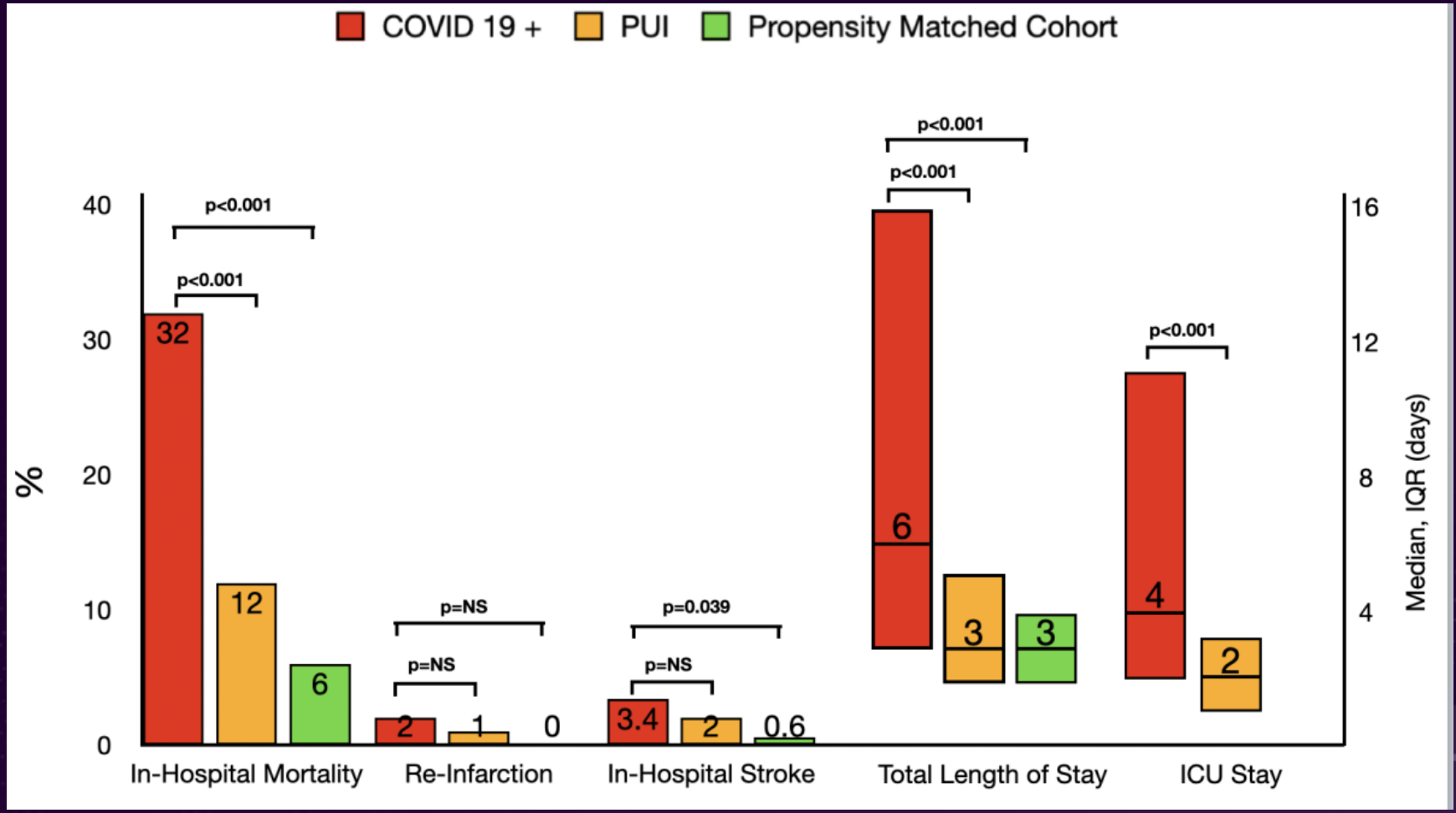
Results: Clinical Presentation

	COVID + (n=171)	PUI (n=423)	p-value	Propensity-Matched MSC	p- value
Cardiac Arrest Pre-PCI, n (%)	17 (12)	70 (17)	0.128	37 (11)	0.771
Card Shock Pre-PCI, n (%)	29 (20)	56 (14)	0.074	14 (5)	<0.001
Ejection Fraction	45 (35, 55)	45 (35, 52.5)	0.948	50 (40, 58)	**0.009**
Chest X-Ray				NA	NA
Infiltrates	84 (49)	71 (17)	**<0.001**		
Pleural effusion	11 (6)	29 (7)	0.852		
Cardiomegaly	15 (9)	23 (5)	0.133		
Symptoms, n (%)				NA	NA
Dyspnea	99 (58)	162 (38)	**<0.001**		
Chest Pain	90 (53)	329 (78)	**<0.001**		
Syncope	1 (1)	22 (5)	0.008		
In-hospital STEMI	10 (6)	7 (2)	**0.005**	NA	NA

Results: Treatment Strategies

	COVID + (n=171)	PUI (n=423)	p-value	Propensity-Matched MSC	p- value
No Angiography, n (%)	33 (21)	19 (5)	**<0.001**	0%	<0.001
Reperfusion Strategy in Patients Undergoing Angiography (p<0.001)					
Thrombolytics	7 (6)	9 (2)	0.069	9 (3)	0.130
Primary PCI	**90 (71)**	**313 (80)**	**0.030**	**277 (81)**	**0.015**
Facilitated/Rescue PCI	3 (2)	8 (2)	0.735	NA	**NA**
Medical Tx	25 (20)	45 (12)	**0.019**	34 (10)	**0.005**
CABG	2 (2)	16 (4)	0.265	10 (3)	0.402
Door-to-balloon time	**80 (54, 127)**	**78 (55, 115)**	**0.773**	**86 (64, 112)**	**0.902**
Culprit Artery in Patients Undergoing Angiography (p=NS)					
LMCA	3 (2)	12 (3)	1.000	2 (1)	0.129
LAD/Diagonal	50 (40)	180 (46)	0.237	106 (32)	0.105
LCx/OM/PDA	13 (10)	67 (17)	0.070	46 (14)	0.326
RCA/PDA	49 (39)	152 (39)	0.948	120 (36)	0.546
Graft	0 (0)	5 (1)	0.343	9 (3)	0.122
Ramus	0 (0)	5 (1)	0.343		

Clinical Outcomes



Summary

Compared to both PUI and propensity matched controls;

- ST-Elevation occurred more frequently in Blacks, Hispanics and Diabetics
- COVID+ patients with ST-Elevation were more likely to present with cardiogenic shock (but not cardiac arrest) with lower LVEF, more atypical symptoms and slightly higher in-hospital presentation
- COVID+ patients with ST-Elevation were more likely to not receive angiography (21%) and to receive medical therapy but still 71% received PPCI and lytics were uncommon.
- No differences in culprit vessel and similar door to balloon times
- COVID+ patients with ST-Elevation had higher in-hospital mortality and in-hospital stroke with longer length of stay

Conclusion

- NACMI represents a successful collaboration of North American Interventional Cardiologists (SCAI/CAIC/ACC Interventional Council)
- COVID+ patients with ST-Elevation represent a unique and high-risk patient population
- Primary PCI is preferable (and feasible) in COVID+ patients with D2B times similar to PUI or COVID– patients, supporting current SCAI/ACC/AHA recommendations

Future Directions

- Ongoing enrollment – and expansion
  - Targeted high COVID prevalence sites/Mexico/South America
- Angiographic and EKG core labs
- Selected topics of interest
  - Ethnic differences
  - Regional and Country Differences
  - Time to Treatment/Transfer/In-Hospital/No Culprit
  - Changes over time
  - Long term outcomes