



# Sex differences in guideline-directed medical therapy in 2021-22 among patients with peripheral artery disease (PAD)

Mario Enrico Canonico MD<sup>1,2</sup>, Judith Hsia MD<sup>1,2</sup>, Connie N. Hess MD, MHS<sup>1,2</sup>, Marc P. Bonaca MD, MPH<sup>1,2</sup>  
<sup>1</sup>CPC Clinical Research, Aurora, CO, USA; <sup>2</sup>Department of Medicine, University of Colorado, Aurora, CO, USA



## BACKGROUND

Peripheral artery disease (PAD) affects around 230 million worldwide (1,2). Guideline-directed medical therapies (GDMT) for PAD includes statin, antiplatelet therapy, angiotensin-converting enzyme inhibitor (ACEi)/angiotensin receptor blocker (ARB), glycemic control in patients with diabetes mellitus (DM), smoking cessation, healthy diet and exercise therapy in order to improve cardiovascular (CV) outcomes and patient functionality (Table 1). The 2021 AHA Scientific Statement on PAD highlighted underuse of GDMT despite a guideline update 5 years prior.

We examined sex differences in implementation of GDMT to understand whether subpopulations with PAD should be targeted to improve care.

**Table 1.** ACC/AHA and ESC PAD guidelines on medications and behaviour therapy.

ACC/AHA 2016	ESC 2017
<ul style="list-style-type: none"> <li>• Statin</li> <li>• Antiplatelet therapy</li> <li>• ACEi/ARB</li> <li>• Cilostazol</li> <li>• Smoking cessation</li> <li>• Healthy diet</li> <li>• Exercise therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Statin</li> <li>• Antiplatelet therapy</li> <li>• ACEi/ARB</li> <li>• Smoking cessation</li> <li>• Healthy diet</li> <li>• Exercise therapy</li> </ul>

ACC/AHA= American College of Cardiology/American Heart Association; ESC=European Society of Cardiology; ACEi = Angiotensin-Converting Enzyme inhibitor; ARB=Angiotensin Receptor Blocker

## METHODS

We extracted de-identified data from TriNetX for adults with healthcare encounters with a diagnosis of PAD from May 2021-April 2022 in the University of Colorado health system using PAD atherosclerosis ICD-10 codes excluding less specific as I73 (other peripheral vascular diseases). TriNetX collects real world data from electronic medical records. The Colorado Multiple Institutional Review Board provided a waiver of informed consent. Categories were compared by chi-square. A p-value < 0.05 was considered statistically significant.

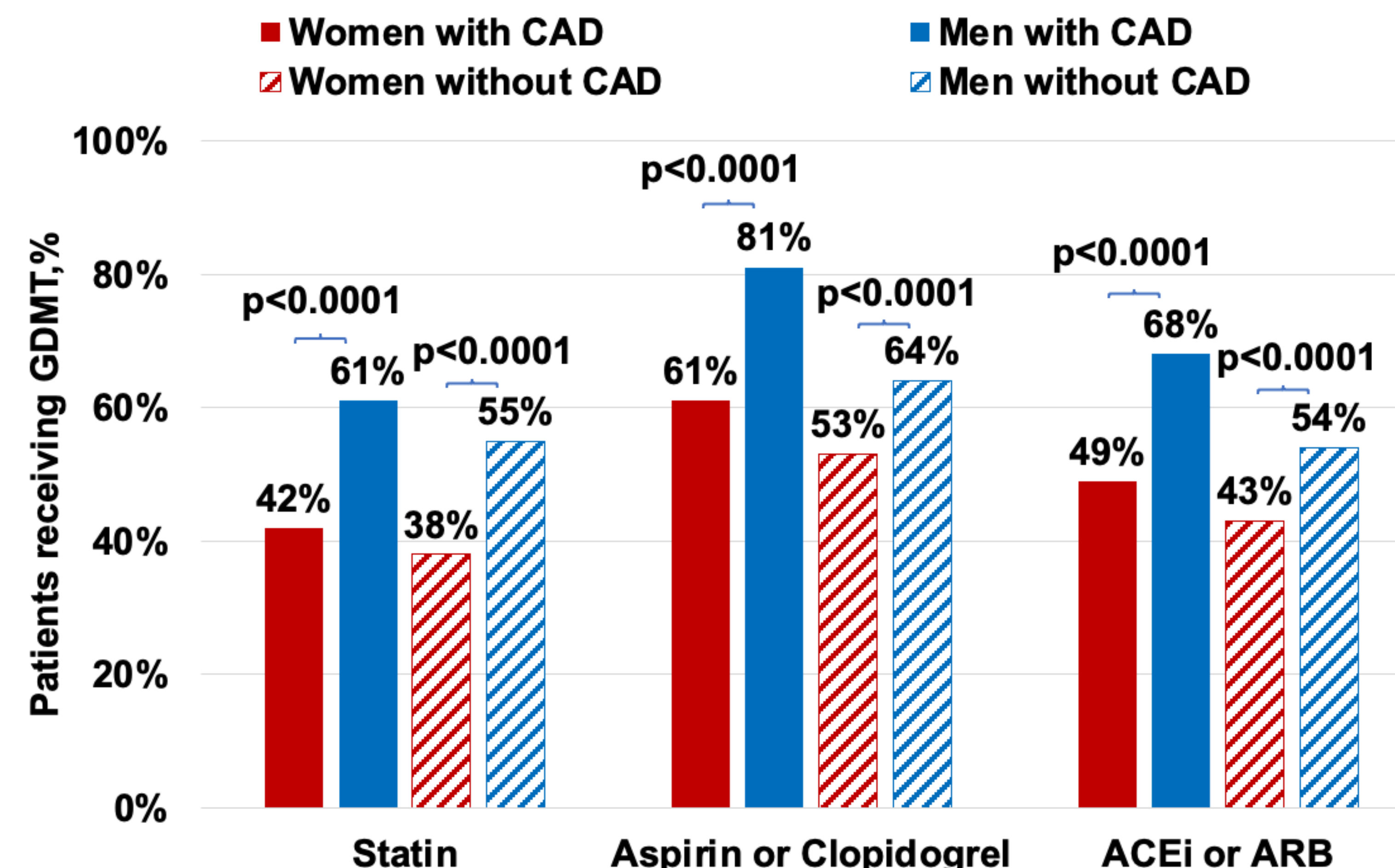
## RESULTS

Among 9,810 patients with PAD identified in the dataset, 50% (n=4,910) were women. Men had a higher prevalence of hypertension, hyperlipidemia, diabetes mellitus and coronary artery disease (CAD) (Table 2). Women were less likely than men to receive GDMT overall and in the subset with no history of CAD (Figure 1). Even among patients with concurrent DM or chronic kidney disease (CKD), defined as estimated glomerular filtration rate < 60 ml/min/1.73m<sup>2</sup>, women were less likely to receive ACEi/ARB than men (all p<0.0001).

**Table 2.** Baseline characteristics of patients with PAD by sex.

Variable	Women (N=4910)	Men (N=4900)	P value
Age, mean (SD)	63 ± 18	63 ± 13	P=NS
Smokers, n (%)	690 (14)	1010 (21)	P<0.0001
Arterial hypertension, n (%)	3142 (64)	3969 (81)	P<0.0001
Hyperlipidemia, n (%)	2504 (51)	3430 (70)	P<0.0001
Diabetes mellitus, n (%)	1280 (26)	1950 (40)	P<0.0001
Coronary artery disease, n (%)	737 (15)	1323 (27)	P<0.0001
Chronic kidney disease, n (%)	1100 (22)	1360 (28)	P<0.0001

**Figure 1.** GDMT use in women and men with PAD with and without CAD.



## DISCUSSION

Patients with PAD are at increased risk for major adverse cardiovascular and limb events. Those with polyvascular disease are at particularly high risk for clinical events (3). Despite updated guidelines and an AHA call to action in 2021, use of GDMT remained suboptimal even in 2021-22 in a large, diverse health system, particularly among women. Whether this is because women are not offered GDMT or do not use GDMT by choice, due to access constraints or for other reasons cannot be determined from this dataset. Targeted efforts to understand reasons for low utilization can be conducted in parallel with implementation science studies to identify practical and effective approaches to improving healthcare of patients with PAD.

Limitations: Our analysis was conducted on retrospective, albeit recent, pooled observational data which lacked patient level information. In addition, these findings reflect a single, large health system.

## CONCLUSION

- GDMT prescription remains suboptimal among women with PAD, irrespective of concurrent CAD, DM or CKD.
- These observations highlight the opportunity to focus implementation efforts toward high risk subpopulations with low uptake of GDMT.

## REFERENCES

- 1) Gerhard-Herman MD, et al. 2016 AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2017 Mar 21;135(12):e726-e779.
- 2) Aboyans V, et al. 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS). *Eur Heart J*. 2018 Mar 1;39(9):763-816.
- 3) Bonaca MP, et al. Polyvascular disease, type 2 diabetes, and long-term vascular risk: a secondary analysis of the IMPROVE-IT trial. *Lancet Diabetes Endocrinol*. 2018 Dec;6(12):934-943.

## DISCLOSURES

The authors receive salary support through their universities from CPC Clinical Research, a non-profit academic research organization affiliated with the University of Colorado, that receives research grant/consulting funding from: Abbott, Agios, Alexion Pharma, Alnylam, Amgen, Angionetics, Anthos, ARCA Biopharma, Array, AstraZeneca, Atentiv, Audentes, Bayer, Better Therapeutics, Brigham and Women's Hospital, Bristol-Myers Squibb, Cardiol Therapeutics, CellResearch, Cook Medical, Cook, Cook Regentec, CSL Behring, Eidos Therapeutics, EP Trading Co, Esperion Therapeutics, EverlyHealth Faraday, Fortress Biotech, HDL Therapeutics, Heartflow, Hummingbird Bioscience, Inmed, Janssen, Kowa Research, Lexicon, Merck, Medtronic, Moderna, Novate Medical, NovoNordisk, Pfizer, PhaseBio, Prothena Biosciences, Regeneron, Regio Biosciences, Sanifit Therapeutics, Sanofi, Smith and Nephew, Stealth BioTherapeutics, Wraser.