



JOHNS HOPKINS
MEDICINE

30TH ANNIVERSARY

**The Johns Hopkins Ciccarone Center
for the Prevention of Cardiovascular Disease**

Facing Off Against Cardiovascular Disease

Annual Update 2020

Staff and Fellows



Top Row: Dominique Ashen, PhD, CRNP; Rick Ferraro, MD; Michael J. Blaha, MD, MPH; Roger S. Blumenthal, MD; Seth S. Martin, MD, MHS; Kathy Byrne, CRNP; Abdulhamied Alfaddagh, MD

Second Row: Elizabeth Ratchford, MD; Francoise Marvel, MD; Miguel Caínzos-Achirica, MD, MPH, PhD; Erin Michos, MD, MHS; Oscar Cingolani, MD; Rhanderson Cardoso, MD; Ty Gluckman, MD

Third Row: Armin A.Zadeh, MD, PhD, MPH; Roberta Florido, MD, MHS; Anum Minhas, MD; Steven Jones, MD; Karan Kapoor, MD; Shireen Khoury, MD, MPH; Seth S. Martin, MD, MHS; Lena Mathews, MD

Fourth Row: Seamus Whelton, MD, MPH; Marios Arvanitis, MD; Wendy Post, MD, MS; Martin Tibuakuu, MD, MPH; Garima Sharma, MD; Wendy Ying, MD

Fifth row: Chiadi Ndumele, MD, MHS, PhD; Khurram Nasir, MD, MPH, MSc; Peter P. Toth, MD, PhD; J. Bill McEvoy, MBBCh, MHS; Gary Gerstenblith, MD; Sudipa Sarkar, MD; Nino Isakadze, MD

Sixth row: Michelle C. Johansen, MD; Eamon Duffy, MD; Vasanth Sathiyakumar, MD; Martin Mortensen, MD, PhD; Cathy Handy Marshall, MD, MPH; Alan Jacobsen, MD

MESSAGE FROM THE DIRECTOR

THE CICCARONE CENTER'S 30TH YEAR – LEADING THE WAY DURING DIFFICULT TIMES



The year 2020 will always be remembered for the COVID-19 pandemic and the disruption and devastation that it caused. The virus also served as a catalyst for much of the important

research and work performed by the staff and fellows of the Ciccarone Center for the Prevention of Cardiovascular Disease, in spite of the difficult times. Following are some highlights of our work in providing excellent clinical care, educating health care practitioners, and studying better ways to prevent cardiovascular disease.

Last year marked the passing of a true heart disease prevention champion and trailblazer, **Irene Pollin**. In 2013, Irene made a transformational \$10 million gift to the Center to expand the clinical research and educational initiatives for our postdoctoral fellows. She was a partner in several of our research endeavors, a close friend, and mentor of mine. I will miss her dearly.



Thanks to Irene, we were able to provide master's degree-level training and other educational opportunities for some of the leading Preventive Cardiologists whom we trained, including **Drs. Bill McEvoy, Parag Joshi, Seth Martin, Haitham Ahmed, Seamus Whelton and Roberta Florido**. This year's Pollin Cardiovascular Prevention Fellow, a key program resulting from Irene's gift, is **Dr. Hamid Al-Faddagh**; he recently published important research on premature cardiovascular disease (CVD) in Middle East and Gulf countries.

Dr. Rhanderson Cardoso, a prior Pollin Fellow, is now in an advanced imaging fellowship program at Harvard. Dr. Cardoso, in conjunction with Ciccarone Center adjunct faculty **Drs. Miguel Cainzos-Achirica** and **Khurram Nasir**, led a fabulous state-of-the-art paper reviewing the use of cardiac CT in the management of adults with diabetes. Three of our other valued adjunct faculty, **Drs. Ty Gluckman, Peter Toth** and Dr. McEvoy, also have worked closely with our residents and fellows and are also international leaders.

Other 2020 highlights include welcoming back our former Ciccarone Center co-director, **Dr. Charles Lowenstein**, who in January became Director of the Division of Cardiology and Co-director of the Johns Hopkins Heart and Vascular Institute. He recently co-authored a superb article in *Circulation* proposing that the severe acute respiratory syndrome that sometimes complicates COVID-19 infection is related to

endothelial cell injury, which promotes thrombosis. An internationally known vascular biologist, Dr. Lowenstein, has led all the Cardiology Division activities during the pandemic.

Also in January, Cardiology Division Director of Research, **Dr. Wendy Post**, and Hopkins medical student **Dr. Amir Heravi** published an important article in *Circulation* explaining how suboptimally controlled HIV infection may raise the risk for sudden cardiac death. More recently, Dr. Post led a nationally broadcast, NIH sponsored workshop on the long-term cardiovascular effects of COVID-19. She also gave a brilliant state-of-the-art lecture on the impact of the virus on the cardiovascular system.

The Associate Director of the Ciccarone Center, **Dr. Erin Michos**, had her most academically productive year, with an unprecedented 110 publications. Among her many impactful articles were a *JACC* paper on new FDA guidance for diabetes drug development and the Kidney Disease Improving Global Outcomes (KDIGO) clinical practice guideline for diabetes management. **Dr. Sudipa Sarkar** and **Caitlin Nass, CRNP**, are diabetes specialists who work closely with us supporting the Ciccarone Center's academic and clinical missions. Dr. Michos also is an amazing mentor of many trainees, and she is in charge of the Women's Cardiovascular Center Research Group, which was funded by an extraordinarily generous gift from long-term Ciccarone Center benefactors, **Richard** and **Katherine Amato**.

Dr. Michael Blaha, the Ciccarone Center Director of Clinical Research, also recorded an amazing academic year with his most impactful publications to date. His research team focuses on ways to improve risk prediction through the use of blood-based biomarkers and cardiac CT. Dr. Blaha was a key co-author of the Endocrine Society's clinical practice guideline on lipid management and the National Lipid Association's Guideline on cardiac CT. Dr. Blaha also serves as Director of a new non-ACGME-accredited preventive cardiology fellowship within the Ciccarone Center, and **Dr. Kunal Jha** from Geisinger is our first fellow.

Drs. Whelton and Blaha had their work featured in the *New York Times*. They showed that even systolic blood pressures in the 100-130 mmHg range may be high enough to promote the development of subclinical CVD. Drs. Whelton and Blaha also have led intriguing research on aortic valve calcification and maintenance of vascular health throughout the lifespan.

Dr. Martin leads our Advanced Lipid Disorders Center with **Drs. Steven**

MESSAGE FROM THE DIRECTOR

Jones, and Drs. Martin and **Francoise Marvel** lead our Digital Health Clinical Research. Dr. Martin is the Co-Director of the AHA Health Technology Association Cardiometabolic Strategically Focused Research Networks (SFRN), through which he works closely with Drs. Michos and Marvel.

We are excited that Dr. Marvel will be joining the faculty in July. Drs. Marvel, Martin, **Nino Isakadze** and their team have had great success with the CORRIE digital health initiative that they created in collaboration with Apple; it empowers patients and their families in their daily heart care plan. Their impressive work led to Hopkins being awarded the SFRN. We are also glad to welcome **Dr. Stacey Schott**, Associate Director of Cardiology Quality & Safety, to our Digital Health research team.

Dr. Martin and I serve as directors of the dyslipidemia/atherosclerosis section of the American College of Cardiology's website, *ACC.org*. Dr. Martin also recently authored a featured editorial in *The New England Journal of Medicine* about a novel mechanism for lipid lowering. Earlier this year, Dr. Martin, a superb educator, received the Frederick L. Brancati Excellence in Mentoring Award from the Department of Medicine at Johns Hopkins; Dr. Michos, a prior David Levine Mentoring Award winner, nominated Dr. Martin. Dr. Blaha is a previous Brancati Award winner.

Dr. Martin's team cares for patients with familial cholesterol disorders, statin intolerance, HDL disorders, and markedly elevated Lp(a). The Advanced Lipid Disorders Clinic has become a model for others around the country, and Dr. Martin is co-chairing a national CME program on lipid management for the ACC.

Drs. Marios Arvanitis and **Alexis Battle**, as well as Drs. Jones and **Thorsten Leucker**, are building a repository of biomarkers from individuals with lipid disorders to study the role of genetic variants on atherosclerosis risk using bioinformatics and tissue engineering techniques. Dr. Arvanitis is leading a collaborative research program in vascular genomics to integrate "multi-omic" data and genome editing experimental techniques to study the genetics of vascular disease.

Dr. Thorsten Leucker is the Director of the Ciccarone Center Basic and Translational Biology. His main interests are focused on prevention of cardiovascular disease, critical care cardiology, and cardiovascular imaging. He leads a basic science laboratory studying endothelial cell biology and also has a special interest in the impact of HDL-cholesterol and PCSK9 (a cholesterol receptor controlling protein) on vascular function.

Together with **Dr. Gary Gerstenblith**, Drs. Blaha, and Jones, Dr. Leucker also studies patients with acute heart attacks and the impact of

PCSK9 inhibition on heart muscle and arterial inflammation using positron emission tomography (PET)/CT imaging. They are investigating the basic cellular effects of evolocumab, a monoclonal antibody medication designed for the treatment of hyperlipidemia, on vascular endothelial cell function.

Their data indicates that PCSK9 is a link between inflammation, advancing age, and frailty-associated increased CVD risk. Dr. Leucker is also collaborating with Dr. Post to determine whether there is a link between inflammation and atherosclerotic disease in conditions such as diabetes and HIV.

Dr. Armin Zadeh, Director of Cardiac CT, and **Dr. Rick Ferraro**, an Osler senior medical resident, led one of the most important featured articles in *JACC* in 2020: "Evaluation and Management of Patients with Stable Angina: Beyond the Ischemia Paradigm," a fabulous review of the secondary prevention of CVD. Current data support early revascularization only for specific patient subgroups. Further efforts are needed to align financial incentives, resource allocation, and patient expectations to promote medical management and preventive care as the initial strategy for patients with stable coronary heart disease.

Another Osler senior medical resident, **Dr. Alan Jacobsen**, wrote a series of important articles on atherosclerosis management and antiplatelet therapy with Dr. McEvoy and me. One of his articles was a featured review in *Circulation* on the changing role of aspirin in secondary prevention. We are fortunate that both Drs. Jacobsen and Ferraro will be starting their cardiology fellowship training with us in July 2021.

Drs. Chiadi Ndumele, Florida, and Gerstenblith lead the Ciccarone Center research related to the links between diabetes, overweight status, metabolic risk factors, and heart failure. Thanks to an extremely generous five-year donation by **Mr. and Mrs. Peter Nicholl**, Dr. Ndumele's team is focused on understanding why some individuals with obesity develop metabolic abnormalities, diabetes, and heart failure, while others do not.

Dr. Ndumele leads one of four American Heart Association's SFRNs and is studying the role of adipokines (proteins secreted by inflammatory cells and fat cells) that affect metabolism. Drs. Ndumele, Florida, **Justin Echouffo-Tcheugui**, and **Elizabeth Selvin** found that suboptimally controlled blood sugars are linked to a greater risk of, and faster progression to, heart failure. Their work has also centered on socioeconomic disparities related to diabetes and heart failure.

Other rising stars in preventive cardiology, such as **Dr. Lena Mathews**, Director of Cardiac Rehabilitation, **Dr. Garima Sharma**, Director of Cardio-Obstetrics, and **Dr. Anum Minhas**, also are focused on disparities in cardiovascular care. Dr. Mathews has collaborated with

MESSAGE FROM THE DIRECTOR

Drs. Kerry Stewart, Marvel and Martin on a home-based cardiac rehabilitation program.

Dr. Sharma is the 2021 Governor of the Maryland Chapter of the ACC and has rapidly become a national leader. She is a member of four AHA/ACC clinical practice guidelines or scientific statement writing groups. In May, she co-authored the AHA scientific statement on cardiovascular considerations in pregnant patients. In July, she was the co-principal author of a CDC-invited review exploring the higher mortality in men from COVID-19. This was partly based on her earlier *JACC* paper with Dr. Michos on sex differences in mortality during the pandemic.

One of the hallmarks of the Ciccarone Center has been its focus on collaboration, education, and mentorship. All of the Ciccarone Center faculty do a marvelous job in these areas. Dr. Sharma is now the Co-director of Scholarship and Education for the many medical residents and fellows who do rotations with us.

Dr. Oscar Cingolani leads our hypertension clinical and research program and excels in his many outpatient and inpatient duties. He published an intriguing article with **Dr. Ed Lakatta**, near the start of the pandemic, describing the interaction between COVID-19 and aging. **Dr. David Kass** and Dr. Cingolani were among the first to describe in the *Lancet* how COVID-19 affected obese adults more severely. Together with **Drs. Erin Goerlich, Anum Minhas, and Allison Hays**, he also described in the *Journal of Cardiac Failure* how the virus affected segmental longitudinal strain on echo.

A native of Argentina, Dr. Cingolani also has been educating the inhabitants of Latin America several times a week about the pandemic. He has written many blogs and done dozens of social media and television interviews explaining the latest research findings. Additionally, Dr. Cingolani had frequent appearances on Univision and has participated in several joint meetings with the ministers of health for Argentina and Chile regarding ways to improve medical care in their countries during the pandemic.

Our Director of Vascular Medicine, **Dr. Elizabeth Ratchford**, recently was the recipient of the Ansell Fellowship Award to establish a Vascular Medicine fellowship program. **Dr. Shireen Khoury** from Duke will work with Drs. Ratchford and Martin during the coming year.

Our superb nurses also have been highly productive over the past year. **Dominique Ashen, CRNP, PhD**, has been playing a pivotal role in the medical and lifestyle management of our patients for the past 18 years. **Kathy Byrne, CRNP**, is a key member of the Advanced Lipid Disorders Center and was one of the first clinicians to make active use of telemedicine before the pandemic. **Dorothy Davis, RN, MSN**, has

been an invaluable resource, helping our patients optimize their lifestyle habits and understand the rationale for their management.

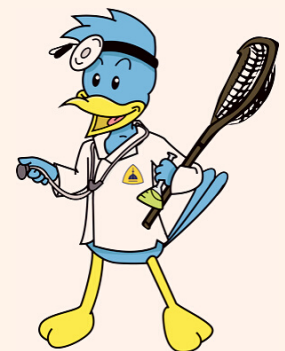
Drs. Blaha, Michos, Lowenstein, Post, Toth, Martin, Nasir, and I were recently named to Stanford University's list of the **top 2% of cited scientific researchers** in the world. The study uses a composite citation-based indicator to list the world's scholars in their prospective fields.

As in years past, it was gratifying to help train superb medical residents, including **Drs. Eamon Duffy and Aparna Sajja**, who both stated that the Ciccarone Center faculty mentorship program was a highlight of their Hopkins experiences. Dr. Duffy will continue his cardiology training at Columbia, and Dr. Sajja will go to Georgetown/Washington Hospital Center. Dr. Duffy recently posted on Twitter that he especially wanted to thank Drs. Cainzos-Achirica, Michos, Martin, and me for exemplary mentorship. He then wrote, "How well you all at the Ciccarone Center weave trainees into your work is truly inspiring."

And, speaking of inspiration, long-time Ciccarone Center chief of staff, **Fran Karas**, recently retired after 23 years of loyal and caring service. We are grateful for the support and dedication she provided to the Ciccarone Center during this time of rapid growth. **Sarah Lewis** now serves as Chief Program Coordinator for the Ciccarone Center, and she works closely with **Grace Lee** and **Jane Ikpeme**.

We all look forward to continuing the Ciccarone Center's outstanding clinical care and research missions. As legendary lacrosse Coach Henry Ciccarone used to say, "The best is yet to come for this great team."

Roger S. Blumenthal, MD, FACC, FAHA, FNLA
The Kenneth Jay Pollin Professor of Cardiology
Professor of Medicine
Director of Johns Hopkins Ciccarone Center for the
Prevention of Cardiovascular Disease



MORE THAN 360!

The Ciccarone Center publishes important original research articles, editorials, and review articles in many of the world's top cardiology, internal medicine, epidemiology, and endocrinology journals. From December 2019 to December 2020, the Center showed amazing productivity, publishing more than 360 articles of significant basic and clinical research findings, commentaries, and review articles in many leading medical journals, including:

American Heart Journal: 5
American Journal of Cardiology: 14
American Journal of Epidemiology: 2
American Journal of Medicine: 9
American Journal of Preventive Cardiology: 20
American Journal of Preventive Medicine: 2
Annals of Internal Medicine: 1
Atherosclerosis: 10
ATVB: 2
Coronary Artery Disease: 2
Circulation: 20
Circ Arrhythmia EP: 3
Circ CV Imaging: 5
Circ CV Interventions: 1
Circ Heart Failure: 1
Diabetes Care: 5
European Heart Journal: 6
Eur. Heart J. CV Imaging: 2
European Journal of Preventive Cardiology: 7
Hypertension: 2
JACC: 18
JACC Case Reports: 3
JACC CV Imaging: 14
JACC CV Interventions: 2
JAHA: 26
JAMA: 4
JAMA Cardiology: 10
JAMA Internal Medicine: 1
JAMA Network Open: 6
Journal of Cardiovascular CT: 7
Journal of Clinical Investigation: 1
Journal of Clinical Lipidology: 3
Lancet: 1
Mayo Clinic Proceedings: 4
Nature: 1
Preventive Medicine: 2
Prevention of Chronic Disease: 1
Radiology: 1

Our Donors Make an Invaluable Difference

While our space here is limited, please know our gratitude is not. Philanthropic support of any amount has been greatly appreciated, but we'd like to take this opportunity to thank the following donors for their extraordinary investment in our clinical research and activities over the past year.

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Dr. Nancy Grasmick

RESEARCH PUBLICATIONS

Research publications by the staff of The Johns Hopkins Ciccarone Center for the Prevention of Cardiovascular Disease, from December 2019 through December 2020.

Assessment of CVD risk

Mortensen MB...Blaha MJ, Nørgaard BL.

Heterogenous distribution of risk for CVD events in patients with stable ischemic heart disease. *JACC Cardiovasc Imaging*. 2020 Nov 16.

Conclusion: The 5-year CVD risk varies substantially in symptomatic persons undergoing CTA, even if obstructive CAD is present; personalized risk assessment can improve cost-effectiveness when allocating preventive therapies.

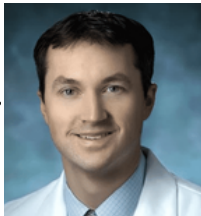
Jaspers NEM, **Blaha MJ, Matsushita K...**

Dorresteijn JAN. Prediction of individualized lifetime benefit from cholesterol lowering, BP lowering, antithrombotic therapy, & smoking cessation in apparently healthy people. *Eur Heart J*. 2020 Mar 14;41(11):1190-1199.

Conclusion: The LIFETIME-perspective CardioVascular Disease (LIFE-CVD) model accurately estimates individual-level prognosis and treatment effects in terms of improved 10-year risk, lifetime risk, and life-expectancy free of CVD; it facilitates personalized medicine and clinician-patient communication.

Blaha MJ, Whelton SP, Al Rifai M, Dardari Z... Matsushita K... Nasir K, Cainzos Achirica M.

Comparing risk scores in prediction of coronary & CVD deaths:



Michael Blaha, MD, MPH

Coronary Artery Calcium (CAC) Consortium.

JACC Cardiovasc Imaging. 2020 Jan 9

Conclusion: CAC can be used for further risk assessment in a broad borderline & intermediate risk group.

Wang FM...**Nasir K... Blumenthal RS,**

Matsushita K, Blaha MJ, Berman DS. CV & all-cause mortality risk by CAC scores & percentiles among older adult males & females. *Am J Med*. 2020 Aug 18.

Conclusion: Both CAC scores & percentiles are strongly predictive of CV & total mortality among older adults with greater risk-stratification among females. Both low CAC scores (0-9) and <25th percentile define very low risk older adults.

Tanaka Y...**Uddin SMI, Feldman DI, Michos ED, Heckbert SR, Greenland P.** Association of Erectile Dysfunction with Incident Atrial Fibrillation: MESA. *Am J Med*. 2020 May;133(5):613-620.

Conclusion: ED was associated with incident atrial fibrillation.

Nasir K, Narula J, Mortensen MB. Message for upcoming chest pain management guidelines: Time to acknowledge the power of zero. *J Am Coll Cardiol*. 2020 Nov 24;76(21):2433-2435.

Conclusion: The absence of coronary artery calcium is associated with a low risk of ischemic chest pain.

Dzaye O, Dardari ZA, Cainzos-Achirica M... Lima JAC, Blumenthal RS, Nasir K, Blaha MJ.

Warranty period of a calcium score of zero: Comprehensive analysis from MESA. *JACC Cardiovasc Imaging*. 2020 Oct 27.

Conclusion: Evidence-based guidance would be to consider rescanning in 3-7 years depending on risk profile.

Rajan T, Rozanski A, Cainzos-Achirica M, Grandhi GR, Dardari ZA... Blaha MJ, Berman D, Nasir K. Relation of absence of CAC to CVD mortality risk among individuals meeting criteria for statin Rx according to ACC/AHA guidelines. *Am J Cardiol*. 2020 Dec 1;136:49-55.

Conclusion: A third of the statin recommended population had no detectable CAC; they had a significantly lower mortality than those with mild CAC.

Grandhi GR...**Blaha MJ, Virani SS... Nasir K.**

Sociodemographic disparities in influenza vaccination among adults with ASCVD in US. *JAMA Cardiol*. 2020 Sep 9:e203978.

Conclusion: Public health initiatives are needed to increase flu vaccine access for underserved populations.

Cainzos-Achirica M, Bittencourt MS, Osei AD, Haque W, Bhatt DL, Blumenthal RS, Blankstein R, Ray KK, Blaha MJ, Nasir K.

Coronary artery calcium to improve efficiency of randomized controlled trials (RCTs) in primary CVD prevention. *JACC Cardiovasc Imaging*. 2020 Nov 13

Conclusion: High CAC scores used as study entry criteria can improve the cost-effectiveness of primary prevention RCTs evaluating incremental efficacy of novel add-on therapies.



Khurram Nasir, MD, MPH, MSc

Cardoso R... Blaha MJ, Blankstein R, Nasir K... Bittencourt MS. Predictors of CAC incidence & progression: (ELSA-Brasil). *Atherosclerosis*. 2020 Sep;309:8-15.

Conclusion: Risk factors associated with CAC progression were hypertension, diabetes, hypertriglyceridemia, & metabolic syndrome.

Dzaye O... Blaha MJ, Mortensen MB.

Danish National Trends in CVD & Cancer Drug Expenditure in Relation to Trends in CVD & Cancer Deaths. *Am J Med*.

2020 Nov;133(11):1350-1353.

Conclusion: There is a very high mortality-adjusted expenditure for cancer drugs compared to cardiovascular disease drugs.

Mehta A...**Blaha MJ, Blumenthal RS, Nasir K, Joshi PH.** Predictive value of CAC score categories for coronary events vs. strokes - impact of sex & race: MESA & DHS. *Circ Cardiovasc Imaging*. 2020 Aug;13(8):e010153.

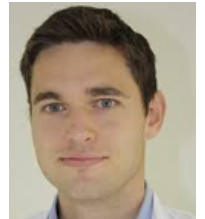
Conclusion: 10-year CHD-to-CVA incidence ratio was higher with increasing CAC score categories across sex & race groups. CAC was a better predictor of CHD than CVA. High CAC burden is comparably associated with increased ASCVD risk across sex and race groups.

Jilani MH...**Blaha MJ... Cainzos-Achirica M, Nasir K.** Associations between particulate matter air pollution, presence & progression of subclinical coronary & carotid atherosclerosis: systematic review. *Atherosclerosis*. 2020 Aug;306:22-32.

Conclusion: There is a clear association between particulate matter exposure & subclinical CAD.

Whelton SP, Rifai MA, Marshall CH, Dardari Z... Matsushita K... Nasir K, Blaha MJ. CAC & the age-specific competing risk of CV vs cancer mortality: CAC consortium. *Am J Med*. 2020 Oct;133(10):e575-e583.

Conclusion: When CAC = 0, cancer was the leading cause of death & the CV mortality was low. The CAC score at which CVD overtakes cancer mortality was about 115 at age 50 and 380 at age 65.



Martin Mortensen, MD, PhD

RESEARCH PUBLICATIONS

Dzaye O, Dardari ZA, Cainzos-Achirica M... Lima JAC, Blumenthal RS, Nasir K, Blaha MJ. Incidence of New Coronary Calcification: Time to Conversion From CAC = 0. *J Am Coll Cardiol.* 2020 Apr 7;75(13):1610-1613.

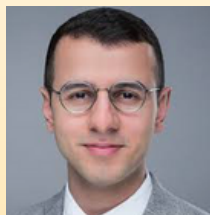
Conclusion: A 3-7 year time frame is reasonable for repeat scanning in individuals with no CAC; the risk varies based on the risk factor profile.

Budoff MJ, Blankstein R, Nasir K, Blaha MJ. Power of zero stronger than "soft" plaque. *J Cardiovasc Comput Tomogr.* 2020 May-Jun; 14(3):279.

Conclusion: There is no added value to characterizing the minimal non-calcified plaque or high-risk plaque in those with CAC=0.

Peng AW, Mirbolouk M, Orimoloye OA, Osei AD, Dardari Z, Dzaye O...Nasir K, Blaha MJ. Long-term all-cause & cause-specific mortality in asymptomatic patients With CAC \geq 1,000: CAC consortium. *JACC Cardiovasc Imaging.* 2020 Jan;13(1 Pt 1):83-93.

Conclusion: Patients with CAC >1,000 are a unique, very high-risk phenotype similar to high-risk secondary prevention.



Dr. Omar Dzaye obtained his MD and PhD in Berlin, Germany. He is presently completing a cardiovascular and radiology research fellowship at the Ciccarone Center, combined with a Master of Public Health degree training at the Bloomberg School of Public Health. Based on his PhD and residency in radiology, Dr. Dzaye has focused his work on subclinical atherosclerosis assessment to improve the accuracy of cardiovascular risk prediction and is mentored by **Dr. Michael Blaha**.

They have focused on the concept that the absence of coronary artery calcium is a marker of healthy vascular aging; this is associated with a very low risk of a cardiovascular event over the next decade. His primary interests involve the use of coronary computed tomography angiography, coronary artery calcium for personalized cardiovascular risk stratification, subclinical inflammation as a cardiovascular and cancer risk factor, epidemiological research methods, and investigations in large databases (e.g., Google Trends).

Dr. Dzaye initiated a research exchange program with European partners at Charité Berlin and LMU Munich. This is an ongoing transatlantic cooperation was designed to give medical students a unique opportunity to work on their doctoral thesis in the US. Drs. Dzaye and Blaha stepped in as scientific supervisors of the program; they are seeking to support the next generation of physician-scientists early in their medical careers and to excite them for research.

Dzaye O, Dudum R, Mirbolouk M, Orimoloye OA, Osei AD, Dardari ZA...Nasir K...Blaha MJ. Validation of the CAC Data & Reporting System (CAC-DRS): Dual importance of CAC score & CAC distribution from the CAC consortium. *J Cardiovasc Comput Tomogr.* 2020 Jan Feb;14(1):12-17.

Conclusion: This system combines the Agatston score & number of vessels with CAC to provide better risk stratification.

Dzaye O, Whelton SP, Blaha MJ. Aortic valve calcium scoring on cardiac CT: Ready for clinical use? *J Cardiovasc Comput Tomogr.* 2019 Nov-Dec;13(6):297-298.

Conclusion: Future studies should focus on the relationship between mild aortic valve calcification & long-term risk for aortic stenosis.

Dzaye O, Al Rifai M, Dardari Z...Handy Marshall C...Matsushita K...Nasir K, Blaha MJ, Whelton SP. CAC as a synergistic tool for age- & sex-specific risk of CV & cancer mortality: CAC consortium. *J Am Heart Assoc.* 2020 Apr 21;9(8):e015306.

Conclusion: CAC can help predict both CVD & cancer mortality.

Blaha MJ, Cainzos-Achirica M, Dardari Z... Dzaye O, Michos ED...Blumenthal RS, Nasir K. All-cause & cause-specific mortality in individuals with zero & minimal CAC: long-term, competing risk analysis in CAC Consortium. *Atherosclerosis.* 2020 Feb;294:72-79.

Conclusion: CAC=0 is associated with low rates of death at 12 years of follow-up. Those individuals merit more flexible treatment goals in primary prevention.

Grandhi GR, Mirbolouk M, Dardari ZA... Krumholz HM, Blaha MJ, Nasir K. Interplay of CAC & risk factors for predicting CVD/CHD mortality: CAC consortium. *JACC Cardiovasc Imaging.* 2020 May;13(5):1175-1186.

Conclusion: A higher CAC score was associated with higher long-term mortality and a greater proportion of deaths due to CVD. Absence of CAC was associated with low risk over 12 years with most deaths due to non-CVD cause.

Sandesara PB...Sathiyakumar V, Martin SS, Blaha MJ, Blumenthal RS, Sperling LS. Clinical significance of zero CAC in individuals with LDL-C \geq 190mg/dL: MESA. *Atherosclerosis.* 2020 Jan;292:224-229.

Conclusion: These persons were typically younger, female, and did not have diabetes; the absence of CAC was associated with a very low risk of CVD events.

Zheng Z, Rebholz CM, Matsushita K, Hoffman-Bolton J, Blaha MJ...Coresh J. Survival advantage of cohort participation attenuates over time: results from 3 long-standing community-based studies. *Ann Epidemiol.* 2020 May;45:40-46.e4. **Conclusion:** The volunteer selection for mortality in long-standing epidemiologic cohort studies diminishes over time.

Mortensen MB, Blaha MJ, Nordestgaard BG. Eligibility & preventive potential for new evidence-based CV drugs in secondary prevention. *JAMA Cardiol.* 2020 Feb 1;5(2):209-215.

Conclusion: Most patients with ischemic heart disease are eligible for additional new expensive secondary prevention therapies; strategies are needed to prioritize their cost-effective use.

Michos ED, Cainzos-Achirica M. Between a rock & a hard place: calcium supplements, calcified atheroma, & CVD risk. *JACC Cardiovasc Imaging.* 2020 Aug 16;S1936-878X(20)30607-0. **Conclusion:** Baseline intake of calcium supplements may be associated with a slightly higher progression of CAC; increased dietary intake of calcium is preferable.

RESEARCH PUBLICATIONS

Orimoloye OA, Banga S, Dardari ZA...Nasir K, Miedema MD, Blumenthal RS, Blaha MJ, Mirbolouk M. CAC as a predictor of CHD, CVD, & all-cause mortality in Asian-Americans: CAC consortium. *Coron Artery Dis.* 2019 Dec;30(8): 608-614.

Conclusion: While Asians are a relatively low-risk group, CAC strongly predicts CHD & total mortality beyond traditional risk factors.

Ravindran R... **Michos ED, Mamas MA.** Cardiac arrest & related mortality in emergency departments in US: Analysis of the nationwide ED sample. *Resuscitation.* 2020 Oct 19;157:166-173.

Conclusion: Survival with cardiac arrest in ED is in <30% of patients.

Khan SU...Nasir K, Michos ED, Alkhouli M. Demographic, regional, & state-level trends of mortality in patients with aortic stenosis in US, 2008 to 2018. *J Am Heart Assoc.* 2020 Nov 9(21):e017433.

Conclusion: The recent reduction in mortality in aortic stenosis patients was no consistent among demographic subsets.

Cardoso R...Blumenthal RS, Hasan RK, Schulman SP. In-hospital management & outcomes of patients with acute MI & influenza. *Am J Cardiol.* 2020 Mar 15;125(6):840-844.

Conclusion: Patients with MI & concomitant influenza have an adverse in-hospital prognosis as compared to those without influenza.

Damluji AA...Resar JR, **Gerstenblith G.** Physical frailty, phenotype & developments of geriatric syndromes in older adults with CHD. *Am J Med.* 2020 Nov 23:S0002-9343(20)31014-7.

Conclusion: Interventions to limit or reduce frailty status for elderly CHD patients are needed.

Virani SS, Alonso A...**Martin SS, Matsushita K, Moran CW;** AHA Council on Epidemiology & Prevention Statistics Committee & Stroke Statistics Subcommittee. 2020 Update: A Report From AHA. *Circulation.* 2020 Mar 3;141(9):e139-e596.

Cainzos-Achirica M, Mortensen MB, Blaha MJ. Exploring intersection between genetic risk scores & CAC - mutually exclusive or complementary? *J Cardiovasc Comput Tomogr.* 2020 Mar-Apr; 14(2):206-7.

Conclusion: Genetic risk scores, atherosclerosis imaging, & traditional risk scores are complementary.

Leucker TM. Highlights from the first ever virtual ACC World Congress of Cardiology 2020 (ACC.20/WCC). *Cardiovasc Res.* 2020 Jun 1;116(7):e75-e77.

Cainzos-Achirica M, Mortensen MB, Blaha MJ. Exploring intersection between genetic risk scores & CAC - mutually exclusive or complementary? *J Cardiovasc Comput Tomogr.* 2020 Mar-Apr; 14(2):206-7.

Conclusion: Genetic risk scores, atherosclerosis imaging, & traditional risk scores are complementary.

Cullen MW, **Sharma G, Sinha SS.** Reflections on the Fellows-in-Training & Early Career Section: Passing the Torch. *J Am Coll Cardiol.* 2020 Jul 7;76(1):118-121.

Conclusion: Fellows in training often have useful novel ideas.

Toth PP. Identification and Rx of those most at risk for premature ASCVD: We just cannot seem to get it right. *Am J Prev Cardiol.* 2020;2:100040.

Toth, PP. The bandwidth of preventive cardiology continues to increase: meeting the challenge head on. *Am J Prev Cardiol* 2020; 4: 100132.

Toth PP. Expanding educational infrastructure for ASPC. *Am J Prev Cardiol.* 2020 Sep;3:100088.

Coylewright M...**Schott SL, Elwyn G, Durand MA.** Learning curve for shared decision-making in symptomatic aortic stenosis. *JAMA Cardiology.* 2020 Apr 1;5(4):442-8.

Conclusion: Use of decision aids was associated with improved shared decision making.

Alfaddagh A, Martin SS, Leucker TM, Michos ED, Blaha MJ, Lowenstein CJ, Jones SR, Toth PP. Inflammation & CVD: From mechanisms to therapeutics. *Am J Prev Cardiol.* 2020;4:100130.

Conclusion: Inflammation strongly contributes to atherosclerosis progression.

Okunrintemi V...Michos ED...Ogunmoroti O, Osundo C, Tibuakuu M, Benson EM, Pawlik TM, Blaha MJ, Nasir K. Association of depression risk with patient experience, healthcare expenditure, & health resource utilization among adults with ASCVD. *J Gen Intern Med.* 2019;34(11):2427-2434.

Conclusion: About 10% of individuals with ASCVD without a prior diagnosis of depression are at high risk for it and they have worse health outcomes compared with those who already have that diagnosis.

Khan SU...Blumenthal RS, Michos ED. Trends in cardiovascular deaths among young adults in US, 1999 to 2018. *Am J Cardiol.* 2020 Aug 1;128: 216-17.

Conclusion: Low socioeconomic status, limited access to quality health care, substance abuse, & lack of awareness about preventive strategies contributes to the growing burden of CVD in young adults.

Turkson-Ocran RA...**Golden SH, Cooper LA, Commodore-Mensah Y.** Comparison of CVD risk factors among African immigrants & African Americans 2010 to 2016 National health interview surveys. *J Am Heart Assoc.* 2020 Mar 3;9(5): e013220.

Conclusion: Data on Blacks in US should be disaggregated by ethnicity & country of origin to help reduce health disparities.

Mahtta D...**Rifai MA...Nasir K, Samad Z, Blumenthal RS...Virani SS.** Autoimmune rheumatic diseases & premature ASCVD: Analysis From VITAL Registry. *Am J Med.* 2020 June 26:S0002-9343(20)30524-6.

Conclusion: Patients with lupus or rheumatoid arthritis have higher odds of both premature & extremely premature ASCVD; it is important to understand the rheumatic disease-specific factors behind this.

Patel J, Sharif M, Stone NJ, Blumenthal RS, Shapiro MD, Rifai M. Power of the pedigree: the family history variable for ASCVD risk stratification. 2020 November. *ACC.org.*

Shaikh A...**Khan SU...Michos ED et al.** Contribution of individual components to composite end points in contemporary CV RCTs. *Am Heart J.* 2020;230:71-81.

Conclusion: Higher event rates in composite end points may create misleading interpretations of treatment impact due to large contributions from less important endpoints.

Cainzos-Achirica M, Kapoor K, Rajan T, Blumenthal RS. Cardiovascular risk assessment in clinical practice. In *Cardiovascular Medicine & Surgery* (Mukherjee & Lange R eds). Publisher Wolters Kluwer. 2020 (In press).

Feldman DI, Dudum R, Alfaddagh A, Marvel FA, Michos ED, Blumenthal RS, Martin SS. Summarizing 2019 in CV prevention using the Johns Hopkins Ciccarone Center for the Prevention of Cardiovascular Disease's ABCs. *Am J Prev Cardiol.* 2020. 100027.

Conclusion: Major RCT findings can be incorporated into an ABCDEF framework.

RESEARCH PUBLICATIONS

Okunrintemi V, Benson E-MA...Blumenthal RS, Tibuakuu M, Ogunmoroti O, Khan SU...Michos ED. Age-specific differences in patient reported outcomes among adults with ASCVD: MEPS 2006–2015. *Am J Prev Cardiol.* 2020;3:100083.

Conclusion: Younger adults with ASCVD were more likely to report poor patient experiences & poor health status; they were also less likely to use preventive medications compared with older adults.

Feldman DI, Dudum R, Blumenthal RS. Shared decision making. In *Precision Medicine in Cardiovascular Disease Prevention.* (Martin SS ed). Publisher Springer. 2020 (In press).

Conclusion: This book chapter explores the impact of an optimal clinician-patient risk discussion.

Segar MW...**Michos ED**...Pandey A. County-level phenomapping to identify disparities in CV outcomes. *Am J Prev Cardiol.* 2020;4:100118.

Conclusion: Unsupervised clustering strategy can identify unique phenogroups with differential risk of CVD mortality & may help develop prevention initiatives to address regional differences.

Al-Abdouh A, Barbarawi M, Khan SU... Zhao D, Michos ED. Colchicine therapy in patients with CAD. *Coron Artery Dis.* 2020. Jul 23.

Conclusion: Colchicine was not associated with a decrease in CV endpoints & mortality in CAD patients.

Al-Abdouh A, Khan SU...Zhao D, Michos ED. Effects of febuxostat (Uloric) on mortality & CV outcomes. *Mayo Clin Proc Innov Qual Outcomes.* 2020;4(4):434-442.

Conclusion: Febuxostat was not associated with an increase in CVD events in patients with gout.

Segar MW...**Michos ED**...Pandey A. County-level phenomapping to identify disparities in CV outcomes. *Am J Prev Cardiol.* 2020;4:100118.

Conclusion: Unsupervised clustering strategy can identify unique phenogroups with differential risk of CVD mortality & may help develop prevention initiatives to address regional differences.



David I. Feldman, MD, MPH, a former research fellow of the Blaha Lab (2013-2015) and current junior assistant resident for the Osler Housestaff, worked on multiple projects in 2020 related to the primary and secondary prevention of cardiovascular disease.

He led two state-of-the-art reviews highlighting recent clinical trials in lipid-lowering and updates to the ABC's of Cardiovascular Prevention.

In collaboration with many of the US Prevention guideline writers, he also led a state-of-the-art review comparing the American and European cholesterol guidelines, which have varying viewpoints for the optimal management of cholesterol levels and cardiovascular disease risk.

Dr. Feldman also worked with **Drs. Ty Gluckman, Ramzi Dudum, and Roger Blumenthal** on three book chapters. The first focused on the importance of shared decision-making in order to facilitate patient-centered care and customize appropriate preventive therapies. The others evaluate the role of inflammation on cardiovascular disease risk assessment. They discuss whether anti-inflammatory therapies should be incorporated into the treatment armamentarium for cardiovascular prevention. Dr. Feldman will also be updating a previous chapter written by **Dr. Seth Martin** on inflammatory markers for the prestigious *Clinical Lipidology: A Companion to Braunwald's Heart Disease* textbook.

Feldman DI, Dudum R, Blumenthal RS. Shared decision making. In *Precision Medicine in Cardiovascular Disease Prevention.* (Martin SS ed). Publisher Springer. 2020 (In press)

Conclusion: This book chapter explores the impact of an optimal clinician-patient risk discussion.

Al-Abdouh A, Barbarawi M, Khan SU... Zhao D, Michos ED. Colchicine therapy in patients with CAD. *Coron Artery Dis.* 2020. Jul 23.

Conclusion: Colchicine was not associated with a decrease in CV endpoints & mortality in CAD patients.

Khan SU... Cainzos-Achirica M, Michos ED. Changing Profile of Autopsies in CV Deaths in US, 2003-2018. *Am J Cardiol.* 2020. Oct 23.

Conclusion: Over the past 20 yrs, Blacks had the highest & Whites the lowest proportions of autopsies.

Oni E, Ogunmoroti O...Martin SS, Zeb I, Cushman M, Joshi PH, Budoff MJ, Blaha MJ, Blumenthal RS, Veledar E, Nasir K. Life's simple 7 & non-alcoholic fatty liver disease: MESA. *Am J Med.* 2020;S0002-9343(20)30908-6.

Conclusion: A more favorable CV health score is associated with a lower prevalence of NAFLD.

Al Rifai M...Cainzos-Achirica M, Patel J...Blaha MJ, Virani SS. Distribution of calcium volume, density, number, & type of coronary vessel with calcified plaque in South Asians in US & other race/ethnic groups: MASALA & MESA. *Atherosclerosis.* 2021;317:16-21.

Conclusion: South Asians have lower CAC volume compared to non-Hispanic Whites but similar to non-Whites; CAC density tends to be higher among South Asians.

Khan SU...Blumenthal RS and Michos ED. Trends in CV Deaths Among Young Adults in US, 1999-2018. *Am J Cardiol.* 2020;128: 216-217.
Conclusion: Low socioeconomic status, limited access to health care, substance abuse, & lack of awareness about prevention strategies contribute to the growing burden of CVD in young adults.

Han D, Cardoso R, Whelton SP... Nasir K... Dardari Z, Blumenthal RS, Blaha MJ, Berman DS. Prognostic significance of aortic valve calcium in relation to CAC for long-term, cause-specific mortality: CAC Consortium. *Eur Hear J - Cardiovasc Imaging.* December 17 2020.
Conclusion: High aortic valve calcium was independently associated with all-cause & CVD deaths.

RESEARCH PUBLICATIONS

Khoury S. Carotid intima-media thickness progression as a surrogate marker for cardiovascular risk: meta-analysis of 119 clinical trials involving 100,667 patients. *PracticeUpdate*. Jun 25, 2020. website.

<https://www.practiceupdate.com/content/carotid-intima-media-thickness-progression-as-surrogate-marker-for-cardiovascular-risk/102566/65/2/1>.

Antiplatelet/Anticoagulant Treatment

Amin AP...**Gluckman TJ**...Masoudi FA. Improving care pathways for ACS: patients undergoing PCI. *Am J Cardiol*. 2020 Feb 1;125(3):354-361.

Conclusion: Transradial access for PCI is preferred in uncomplicated ACS patients.

Jacobsen AP...**Blumenthal RS**, Bhatt DL...**McEvoy JW**.

Lifelong aspirin for all in secondary prevention of chronic coronary syndrome: still sacrosanct or is reappraisal warranted?

Circulation. 2020 Oct 20; 142(16):1579-1590.

Conclusion: Aspirin can be discontinued in stable older patients who are at high risk for bleeding.

Jacobsen AP, Khiew YC, **Blumenthal RS**, **Martin SS**. Aspirin to prevent gastrointestinal cancer - but recent trial data do not fit. *Ann Oncol*. 2020 Sep;31(9):1262-1263.

Conclusion: Recent large RCTs of aspirin do not show a decrease in GI cancer.

Al-Abdoun A... **Zhao D**, **Savji N**, Hasan RK, **Michos ED**. Prasugrel vs ticagrelor for DAPT Rx in patients with ACS undergoing PCI: systematic review & meta-analysis of RCTs. *Cardiovasc Revasc Med*. 2020 May 28;S1553-8389(20)30321-3.

Conclusion: Event rates using prasugrel or ticagrelor when added to aspirin in ACS patients undergoing PCI are similar.

Khan SU...**Michos ED**, Alkhouli M. De-escalation of antiplatelets after PCI: bayesian network meta-analysis of various de-escalation strategies. *Eur Heart J Cardiovasc Pharmacother*.

2020 Apr 9;pvaa025.

Conclusion: Early de-escalation of DAPT (1-3 months) to monotherapy with a P2Y12 inhibitor instead of aspirin may be safer approach than 12 months of DAPT in patients s/p PCI with DES.

Khan SU...**Michos ED**...

Bhatt DL. Dual antiplatelet therapy after PCI & drug-eluting stents: systematic review & network meta-analysis.

Circulation. 2020 Oct 13; 142(15):1425-1436.

Conclusion: Short-term DAPT followed by P2Y12 inhibitor monotherapy reduces major bleeding after PCI with DES, whereas extended-term DAPT reduces MI at expense of more bleeding events.

Awotoye J, **Fashanu OE**, Lutsey PL, **Zhao D**, O'Neal WT, **Michos ED**. Resting heart rate & incident venous thromboembolism (VTE): MESA. *Open Heart*. 2020 Feb 20;7(1):e001080.

Conclusion: Elevated resting heart rate was positively associated with VTE incidence after 14 years, independent of several traditional VTE & inflammatory markers.

Folsom AR...**Fashanu OE**, Misialek JR, Cushman M, **Michos ED**. Resting heart rate & incidence of VTE. *Res Pract Thromb Haemost*. 2019 Dec 13;4(2):238-246.

Conclusion: Elevated resting heart rate is a risk marker for VTE.

Jacobsen AP, **McEvoy JW**. Changing place for aspirin in primary prevention of CVD. *Drug Ther Bull*. 2020 Jan;58(1):3-4.

Conclusion: Generally aspirin is not indicated for CVD primary prevention.

Tomaselli GF...**Florido R**, **Gluckman TJ**, Wiggins BS. 2020 ACC expert consensus decision pathway on management of bleeding in patients on oral anticoagulants: ACC solution set oversight committee. *J Am Coll Cardiol*. 2020 Aug 4;76(5):594-622.

Conclusion: This document provides comprehensive guidance on managing patients on anticoagulants.

Bittl JA, Yong CM, **Sharma G**. When to believe unexpected results for ticagrelor or prasugrel: never rarely sometimes always. *JACC Cardiovasc Interv*. 2020 Oct 12;13(19):2248-2250.

Conclusion: Patients with diabetes are justified in using clopidogrel.



Safi U. Khan, MD

Khan SU...**Savji N**...**Michos ED**. Dual versus triple therapy for atrial fibrillation after PCI: systematic review & meta-analysis. *Ann Intern Med*. 2020 Apr 7;172(7):474-483.

Conclusion: In adults with AF after PCI, dual therapy reduces bleeding risk compared with triple therapy.

Gluckman TJ, Wang L...**Rao SV**. Differential use & impact of bleeding avoidance strategies on PCI-related bleeding stratified by predicted risk. *Circ Cardiovasc Interv*. 2020 Jun;13(6):e008702.

Conclusion: Trans-radial intervention lowers the risk of bleeding.

Wiggins BS...**Gluckman TJ**. Select drug-drug interactions with direct oral anticoagulants: JACC Review Topic of the Week. *J Am Coll Cardiol*. 2020 Mar 24;75(11):1341-1350.

Conclusion: Drug-drug interactions involving DOACs are an important contributor to bleeding risk.

Cainzos-Achirica M, Miedema MD, **McEvoy JW**, **Al Rifai M**, Greenland P, **Dardari Z**, Budoff M, **Blumenthal RS**...**Dzaye O**, Hong J, **Nasir K**, **Blaaha MJ**.

CAC for personalized allocation of spirin in primary prevention of CVD in 2019: MESA. *Circulation*. 2020 May 12;141(19):1541-1553.

Conclusion: CAC is superior to the pooled cohort equations to inform aspirin allocation.



Miguel Cainzos-Achirica, MD, MPH, PhD

Blood Pressure

McEvoy JW, Daya N, **Rahman F**, Hoogeveen RC, **Blumenthal RS**... Selvin E. Association of isolated diastolic hypertension as defined by 2017 ACC/AHA BP guideline with incident CV outcomes. *JAMA*. 2020 Jan 28;323(4):329-338.

Conclusion: Isolated diastolic hypertension was not significantly associated with increased CV outcomes.

Ramezankhani A, **Blaaha MJ**, **Mirbolouk MH**, Azizi F, Hadaegh F. Multi-state analysis of hypertension & mortality: application of semi Markov model in a longitudinal cohort study. *BMC Cardiovasc Disord*. 2020 Jul 6;20(1):321.

Conclusion: Hypertension decreased the number of years lived without CVD.

RESEARCH PUBLICATIONS

Whelton SP, McEvoy JW...

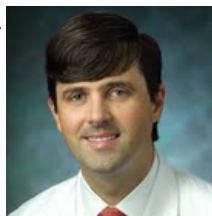
Nasir K, Szklo M, Blumenthal RS, Blaha MJ.

Association of normal systolic BP level with CVD in absence of risk factors.

JAMA Cardiol. 2020

Sep 1;5(9):1011-1018.

Conclusion: Starting at an SBP as low as 95 mmHg, there is a stepwise increase in CAC prevalence & ASCVD risk with increasing SBP.



Seamus Whelton, MD, MPH

Elshazly MB...Rifai MA, Quispe R, Cainzos-Achirica M, Martin SS...Post WS, Nasir K, Budoff MJ, Blumenthal RS, Blaha MJ, McEvoy JW. Role of coronary artery & thoracic aortic calcium as risk modifiers to guide antihypertensive Rx in Stage 1 Hypertension (MESA). *Am J Cardiol.* 2020 Jul 1;126:45-55.

Conclusion: CAC, but not thoracic aortic calcium, can further guide risk-based allocation of Rx in stage 1 hypertension & should be considered as a risk modifier.

Pandey A...**Blaha MJ, McEvoy JW...Joshi PH.** Incorporation of biomarkers into risk assessment for allocation of antihypertensive medication according to 2017 High BP guideline: pooled cohort analysis. *Circulation.* 2019 Dec 17;140(25):2076-2088.

Conclusion: Elevations in hs-cardiac troponin or NT-proBNP identify individuals with hypertension who are at higher than expected risk.

Song L...**Post WS, Guallar E...Jones MR.**

Ambient air pollution as a mediator in pathway linking race/ethnicity to BP elevation: MESA. *Environ Res.* 2020 Jan;180:108776.

Conclusion: Racial disparities in BP were reduced after accounting for particulate matter & ozone while increased after accounting for oxides of nitrogen.

Shan R...**Spaulding EM...Marvel FA, Martin SS.** Early BP assessment after acute MI: Insights using digital health technology. *Am J Prev Cardiol.* 2020 Sep;3:100089.

Conclusion: About 40% of post-MI patients had uncontrolled BP according to recent guideline cutpoints.

van Helmond N, Day W, **Martin SS, Plante TB.** Cuff-less, personal, ambulatory BP devices & disruption of existing BP measurement paradigms. *Am J Hypertens.* 2020 Sep 10;33(9):813-815.

Conclusion: Cuff-less personal BP monitors are now in the consumer market and are disrupting current clinical and personal BP measurement paradigms; validation protocols are needed.

McGrath BP...**McEvoy JW, Chatterjee N.** Isolated diastolic hypertension in UK Biobank: comparison of ACC/AHA & ESC/NICE guideline definitions. *Hypertension.* 2020 Sep;76(3):699-706.

Conclusion: The risks of hypertension accelerate with readings of >140/90.

McGrath BP, **McEvoy JW.** Did the 2017 ACC/AHA BP guideline get it wrong in reducing the diastolic threshold to define hypertension from 90 to 80 mmHg? *J Clin Hypertens.* 2020 Jul;22(7):1200-1201.

Conclusion: Isolated diastolic BP is more metabolically benign than systolic hypertension.

McEvoy JW, Selvin E. Pulse Pressure & Isolated Diastolic Hypertension- Reply. *JAMA.* 2020 Jun 16;323(23):2431-2432.

Mahfoud F...**McEvoy JW...Wijns W.** Proceedings from 3rd European Clinical Consensus Conference for clinical trials in device-based hypertension therapies. *Eur Heart J.* 2020 Apr 21;41(16):1588-1599.

Liew CH, **McEvoy JW.** The diastolic BP J-curve remains an observational research phenomenon that has not yet been proven as causal & should not be used to make invasive Rx decisions.

Eur Heart J. 2020 Nov 6: ehaa627.

Cingolani OH. Cardiovascular Risks & Organ Damage in Secondary Hypertension. *Endocrinol Metab Clin North Am.* 2019 Dec;48(4):657-666.

Conclusion: Early identification of secondary forms of hypertension can mitigate organ damage.

Marvel FA, Whelton SP, Blumenthal RS. A Cardio-Oncology Cardiovascular Prevention Framework. *JACC: Cardiooncology.* 2020; 1(2):252-255.

Conclusion: Lifestyle improvements are important in any patient with hypertension &/or dyslipidemia.

Khan S...Michos ED. Deaths in pulmonary hypertension: US location trends. *BMJ Support Palliat Care.* 2020.

Razavi AC, Bazzano LA, **Whelton SP...Kelly TN.** Race modifies association between animal protein metabolite 1-methylhistidine & BP in middle-aged adults. *J Hypertens.* 2020;38(12):2435-2442.

Conclusion: Serum 1-methylhistidine confers higher hypertension risk in Blacks but not in Whites.

Leef G, Gladstone DE, Cingolani O. ECMO therapy for cardiac lymphoma. *Circulation.* 2020 Sep 22;142(12):1219-1223.

Conclusion: Diffuse infiltration of the heart by lymphoma can mimic fulminant myocarditis with ventricular arrhythmias.

Bolen S, **Khoury SR, Wright JT.** Home blood pressure monitoring: practical instructions for patients. www.cardi-OH.org. Feb 28, 2020.

Bolen S, Holliday M, **Khoury SR, Wright JT.** One simple step to improve medication adherence for blood pressure control. www.cardi-OH.org. Jan 30, 2020.

Biomarkers

Patel RB...**Michos ED, Shah SJ, Lloyd-Jones DM.** Circulating Vascular Cell Adhesion Molecule-1 & Incident Heart Failure: MESA. *J Am Heart Assoc.* 2020 Nov 17;9(22):e019390.

Conclusion: Therapies to decrease endothelial activation may prevent development of heart failure.

Zhao D, Guallar E, Vaidya D, Ndumele CE, Ouyang P, Post WS, Lima JA, Ying W...Michos ED. Cyclic GMP & risk of incident heart failure & other CV events: ARIC. *J Am Heart Assoc.* 2020 Jan 21;9(2):e013966.

Conclusion: The associations of cGMP with heart failure may be explained by NT-proBNP but not for ASCVD and CHD.

Ostovaneh MR...**Post WS...Michos ED, Bluemke DA, Lima JAC.** Change in NT-proBNP (N Terminal Pro-B-Type Natriuretic Peptide) level & risk of dementia. *Hypertension.* 2020 Feb;75(2):316-323.

Conclusion: Increase in NT-proBNP is independently associated with future hospitalized dementia.

Ying W, Zhao D...Ndumele CE, Guallar E, Sharma K...Post WS, Michos ED. Associations Between the cyclic GMP and CV risk factors: MESA. *J Am Heart Assoc.* 2019 Dec 17;8(24):e013149.

Conclusion: Higher BP & greater renal dysfunction were positively associated with cGMP, while adverse metabolic risk factors were inversely associated.

RESEARCH PUBLICATIONS

Osei AD, Blaha MJ. Combining biomarkers & imaging for short-term assessment of CVD risk in apparently healthy adults: paradigm-shifting approach? *J Am Heart Assoc.* 2020 Aug 4;9(15):e017790.

Conclusion: Short-term risk assessment combining biomarkers & imaging is a helpful in adults in high-risk occupations.

McEvoy JW, Liew CH, Connolly NP. Biomarkers to establish low ASCVD risk: it takes two. *J Am Coll Cardiol* 2020 Jul 28;76(4):371-373.

Conclusion: Those adults with no CAC & normal hs-cardiac troponin are at very low risk of CVD events.

Mcclean M...Post WS, Gupta S. Cystatin C based estimation of GFR & association with atherosclerosis imaging markers in people with HIV. *J Acquir Immune Defic Syndr.* 2020 Jul 27.

Conclusion: In persons living with HIV, preclinical atherosclerosis may be more closely correlated with eGFR using formulae that incorporate cystatin C measurements rather than creatinine alone.

Kaze AD...Ndumele CE...Golden SH, Echouffo-Tcheugui JB. Plasma adipokines & glycemic progression among African Americans: Jackson Heart Study. *Diabet Med.* 2020 Nov 25:e14465.

Conclusion: Plasma leptin, hsCRP, & adiponectin have utility in predicting & preventing glycemic progression.

Sandoval Y...Blaha MJ, Michos ED, DeFilippis AP...Jaffe AS. ASCVD risk stratification based on measurements of troponin & CAC. *J Am Coll Cardiol.* 2020 Jul 28;76(4):357-370.

Conclusion: An undetectable hs-cardiac troponin T identifies patients with a similar very low ASCVD risk as those with no CAC.

Feldman DI, Blumenthal RS, Gluckman TJ.

High-sensitivity C-reactive protein: utility in risk assessment & patient management. 2020 (In press)

Conclusion: This book chapter examines the roll of inflammation in CVD risk prediction & pathogenesis.

Sarkar S, Haberen S, Whelton SP...Post WS,

Brown TT. Greater IL-6, d-dimer, & ICAM-1 levels are associated with lower small HDL particle concentration in the Multicenter AIDS Cohort Study. *Open Forum Infectious Disease.* 12; 6(12) 1-8, 2019.

Conclusion: Greater systemic inflammation & HIV infection were associated with lower atheroprotective small HDL-P.

Razavi A...Whelton SP...Kelly TN.

Pseudouridine & N-Formylmethionine associate with LV mass index: metabolome-wide association analysis of cardiac remodeling. *J Mol Cell Cardiol.* 2020 Mar;140:22-29.

Conclusion: Mitochondrial-derived metabolites serve as early biomarkers for LV remodeling & subclinical heart failure.

Cholesterol/Dyslipidemia

Stone NJ, **Blumenthal RS,**

Lloyd-Jones D, Grundy SM. Comparing primary prevention recommendations:

focused look at US & European guidelines on dyslipidemia. *Circulation.* **Roger S. Blumenthal, MD** 2020 Apr 7;141(14):1117-1120.

Conclusion: The AHA/ACC Cholesterol Guideline endorses statin Rx for LDL-C lowering in those primary prevention patients shown to have net benefit in RCTs & puts more emphasis on the clinician-patient risk discussion.



Garg PK...Michos ED, Tsai MY. Lp(a) [Lipoprotein (a)] & Risk for Incident Atrial Fibrillation (AF): MESA *Circ Arrhythm Electrophysiol.* 2020 May;13(5):e008401.

Conclusion: Surprisingly, higher levels of Lp(a) were associated with a lower incidence of AF.

Bhatt DL...Toth PP. Beyond cardiovascular medicine: potential future uses of icosapent ethyl. *Eur Heart J Suppl.* 2020 Oct 6;22(Suppl J):J54-J64.

Conclusion: High dose EPA is now being studied in other inflammatory conditions.

Sandesara PB...Sathiyakumar V, Martin SS, Blaha MJ, Blumenthal RS, Sperling LS.

Association of elevated high-density lipoprotein cholesterol and particle concentration with CAC: MESA. *Circ Cardiovasc Imaging.* 2020 Jul;13(7):e010473.

Conclusion: There is a U-shaped association between HDL-C levels & baseline CAC & an inverse association between elevated HDL-P & CAC.

Jia X, Koh S, Al Rifai M, Blumenthal RS, Virani SS. Spotlight on icosapent ethyl for CV risk reduction: evidence to date. *Vasc Health Risk Manag.* 2020 Jan 9;16:1-10.

Conclusion: The benefits of high dose EPA were also seen in studies prior to REDUCE-IT.

Janovsky CCPS...Blaha MJ, Jones S, Toth PP... Benseñor IM. Differences in HDL particle size in presence of subclinical thyroid dysfunction: ELSA-Brasil. *Atherosclerosis.* 2020 Nov;312:60-65.

Conclusion: Subclinical hypothyroidism was associated with lower small HDL-P subfractions & subclinical hyperthyroidism with lower large HDL-P subfractions.

Berman AN...Blaha MJ...Nasir K, Di Carli MF, Bhatt DL, Blankstein R. ASCVD risk & elevated lipoprotein(a) among young adults with MI: The Partners YOUNG-MI Registry. *Eur J Prev Cardiol.* 2020 Jun 15:2047487320931296.

Conclusion: More people who experience an MI at a young age should undergo Lp(a) testing.

José F Peixoto de Miranda É...Blaha MJ, Jones S, Toth PP...Benseñor IM. Relationship between TSH levels & the advanced lipoprotein profile in the Brazilian Longitudinal Study of Adult Health (ELSA-Brasil). *Endocr Res.* 2020 Aug;45(3):163-173

Conclusion: The highest TSH levels were most positively associated with triglycerides, triglyceride rich lipoproteins, & their remnants; normal TSH levels have little impact on the atherogenic profile.

Khan SU, Michos ED. Bempedoic acid & ezetimibe - better together. *Eur J Prev Cardiol.* 2020 Apr;27(6):590-592.

Conclusion: The combination of these 2 non-statin agents reduces LDL-C by 40%.

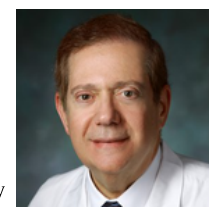
Leucker TM, Gerstenblith G... Jones SR...Hays AG.

Evolocumab, a PCSK9-monoantibody, rapidly reverses coronary artery endothelial dysfunction in people with HIV & people with dyslipidemia. *J Am Heart Assoc.* 2020 Jul 21;9(14):e016263.

Conclusion: PCSK9 inhibition improves coronary health in people with HIV & dyslipidemia.

Khan SU, Michos ED. Bempedoic acid & ezetimibe - better together. *Eur J Prev Cardiol.* 2020 Apr;27(6):590-592.

Conclusion: The combination of these 2 non-statin agents reduces LDL-C by 40%.



Gary Gerstenblith, MD

RESEARCH PUBLICATIONS



Thorsten Leucker, MD, PhD, leads the ongoing translational research work of The Johns Hopkins Advanced Lipid Disorders Program, part of the Ciccarone Center. In order to avoid diseases like progressive atherosclerosis, heart failure, and abnormal heart rhythms and their debilitating consequences, Dr. Leucker and his colleagues continue to explore the vascular biology and lipidology surrounding the condition.

Dr. Leucker is the Director of Basic and Translational Biology within the Ciccarone Center and the Associate Director of the Fellowship Program in the Division of Cardiology. A native of Bonn, Germany, he has focused his interests on the prevention of cardiovascular diseases, critical care cardiology, and cardiovascular imaging.

Dr. Leucker is a true clinician-scientist, combining his clinical and research interests in preventive cardiology. He has distinguished himself as a vascular expert with a special interest in the impact of HDL (“good cholesterol”) and PCSK9 (a cholesterol receptor controlling protein) on vascular function. Dr. Leucker’s innovative bench-to-bedside approach, in collaboration with Ciccarone Center colleagues, has led to several clinical trial designs to directly improve the function of arteries.

Leucker TM, Blaha MJ, Jones SR...Latina J, Schulman SP, Gerstenblith G. Effect of evolocumab on atherogenic lipoproteins during the peri- & early postinfarction period: A Placebo-Controlled, Randomized Trial. *Circulation*. 2020 Jul 28;142(4):419-421.

Conclusion: Evolocumab treatment early after an ACS rapidly and reduces LDL-C in 24 hours; a RCT of this strategy in ACS is warranted.

Singh M, **McEvoy JW, Khan SU...Blumenthal RS, Mishra AK, Michos ED.** Comparison of transatlantic approaches to lipid Management: AHA/ACC/multisociety guidelines vs ESC/EAS guidelines. *Mayo Clin Proc*. 2020 May;95(5):998-101.

Conclusion: The European guidelines consider an ideal setting with unlimited resources as part of their recommendations; the US guidelines incorporate cost value considerations.

Cao J...**Michos ED, Tsai MY.** Apolipoprotein B discordance with LDL-C & non-HDL-C in relation to CAC in MESA. *J Clin Lipidol*. 2020 Jan-Feb;14(1):109-121.

Conclusion: ApoB was associated with CAC among adults at least 45 years of age not on statin therapy; discordantly high apoB relative to LDL-C & non-HDL-C was associated with CAC progression.

Michos ED, Martin SS. Achievement of VLDL-C Levels: Is it time to unlearn concern for hemorrhagic stroke? *Circulation*. 2019 Dec 17;140(25):2063-6.

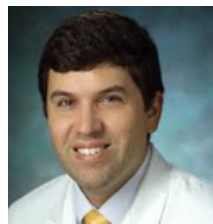
Conclusion: Very low LDL-C levels among those without underlying cerebrovascular disease is safe; undertreatment raises risk of recurrent ischemic stroke & CHD.

Michos ED, McEvoy JW, Blumenthal RS. Lipid management for the prevention of atherosclerotic cardiovascular disease. *N Engl J Med*. 2019; 17;381(16):1557-1567.

Conclusion: This superb state-of-the-art review covers lifestyle & medical management of dyslipidemia.

Martin SS, Elshazly MB, Jones SR. Accuracy of new equation to calculate low-density lipoprotein cholesterol. *JAMA Cardiol*. 2020 Sep 30.

Conclusion: The Martin/Hopkins equation is most useful in patients with hypertriglyceridemia.



Seth Martin, MD, MHS

Vavuranakis MA, **Jones SR, Cardoso R, Gerstenblith G, Leucker TM.** The role of Lipoprotein(a) in CVD: Current concepts & future perspectives. *Hellenic J Cardiol*. 2020 Oct 8;S1109-9666(20)30216-5.

Conclusion: Lp(a)-specific lowering drugs target apolipoprotein(a) synthesis by up to 90%.

Quispe R, Elshazly MB, Zhao D, Toth PP, Puri R, Virani SS, Blumenthal RS, Martin SS, Jones SR, Michos ED.

Total cholesterol/HDL-cholesterol ratio discordance with LDL-C & non-HDL-C & incidence of ASCVD in primary prevention: ARIC.

Eur J Prev Cardiol. 2020 Oct;27(15):1597-1605.

Conclusion: Clinically significant discordance sometimes exists between TC/HDL, non-HDL-C, & LDL-C; this discordance may help inform ASCVD risk management in person with diabetes.

Quispe R, Michos ED, Martin SS, Puri R, Toth PP...Blumenthal RS, Jones SR, Elshazly MB.

High-sensitivity C-reactive protein discordance with atherogenic lipid measures & incidence of ASCVD in primary prevention: ARIC Study.

J Am Heart Assoc. 2020 Feb 4;9(3):e013600.

Conclusion: Inflammation is independently associated with ASCVD, regardless of atherogenic lipid levels & ASCVD risk scores.

Makshood M, Joshi PH...Blaha MJ, Michos ED, Post WS. Lipoprotein (a) & aortic valve calcium in South Asians compared to other race/ethnic groups. *Atherosclerosis*. 2020 Nov;313:14-19.

Conclusion: Although present in Blacks and Whites, there was no association between Lp(a) & aortic valve calcium (AVC) in South Asians; thus, there may be race specific modifying factors that influence the effect of Lp(a) particles on AVC pathogenesis.

Khan SU...Okunrintemi V, Mamas MA, Leucker TM, Blaha MJ, Michos ED. Association of lowering apolipoprotein B with CV outcomes across various lipid-lowering therapies: systematic review & meta-analysis of trials. *Eur J Prev Cardiol*. 2020 Aug;27(12):1255-1268.

Conclusion: Therapies that clear apolipoprotein B by upregulating LDL-receptor expression are more effective in reducing events than therapies which do not.

Feldman DI, Pacor JM, Blumenthal RS, Nasir K. 2019 clinical trials in lipid lowering. *Curr Opin Cardiol*. 2020 Jul;35(4):319-324.

Conclusion: When statin therapy is not sufficient, new therapies like inclisiran, bempedoic acid, & icosapent ethyl may be indicated.



Renato Quispe, MD, MHS

RESEARCH PUBLICATIONS

Brown EE, Byrne KH, Davis DM, McClellan R, Leucker TM, Jones SR, Martin SS. Incorporation of genetic testing significantly increases number of individuals diagnosed with familial hypercholesterolemia. *J Clin Lipidol.* 2020 May-Jun;14(3):331-338.

Conclusion: Incorporating genetic testing diagnoses about 50% more patients with definite FH in comparison to classification solely on clinical grounds.

Toth PP, Jones SR... Banach M. Effect of evolocumab on non-HDL, apolipoprotein B, & Lp(a): pooled analysis of phase 2 & phase 3 studies. *J Am Heart Assoc.* 2020 Mar 3;9(5):e014129.

Conclusion: Evolocumab substantially reduced non-HDL-C, apoB, & Lp(a) compared with placebo over 5 years.



Steven R. Jones, MD

Elshazly MB...Martin SS, Jones SR, Quispe R...

Puri R. Remnant cholesterol, coronary atheroma progression & clinical events in statin-treated patients with CAD.

Eur J Prev Cardiol. 2020 Jul;27(10):1091-1100.

Conclusion: Remnant cholesterol was associated with coronary atheroma progression regardless of conventional lipids, CRP, or traditional risk factors.

Pallazola VA, Sajja A, Derenbecker R, Ogunmoroti O, Park J, Sathiyakumar V, Martin SS. Prevalence of familial chylomicronemia syndrome (FCS) in a quaternary care center. *Eur J Prev Cardiol.* 2019 Nov 13;2047487319888054.

Conclusion: FCS may be 10-fold more common than classically estimated & is likely underdiagnosed; it is frequently complicated by pancreatitis but not ASCVD.

Reiber I...Toth PP. Comparison of LDL-C calculated using the modified Martin/Hopkins estimation or Friedewald formula with direct homogeneous assay measured LDL-C. *Archives of Medical Science.* 2020

Conclusion: The Friedewald equation often underestimates LDL-C levels in high risk settings; the Martin/Hopkins formula is much more accurate.

Fan W...Toth PP, Wong ND. Prevalence of US adults with triglycerides \geq 150 mg/dl: NHANES 2007-2014. *Cardiol Ther.* 2020 Jun;9(1):207-213.

Conclusion: Over 12 million Americans are treated with a statin & have triglycerides > 150 mg/dL.

Janovsky CC...Blaha MJ, Jones S, Toth PP, Lotufo PA, Benseñor IM. Unfavorable triglyceride-rich particle profile in subclinical thyroid disease: (ELSA-Brasil). *Endocrinology.* 2020 Nov 9:bqaa205.

Conclusion: Subclinical thyroid disorders are associated with atherosclerosis.

Sathiyakumar V, Pallazola VA, Park J, Vakil RM, Toth PP, Lazo-Elizondo M, Quispe R, Guallar E, Banach M,



Blumenthal RS, Jones SR and Vasanth Sathiyakumar, MD Martin SS.

Modern prevalence of the Fredrickson-Levy-Lees (FLL) dyslipidemias: findings from the Very Large Database of Lipids & NHANES. *Archives of Medical Science.* 2020;16:1279-1287.

Conclusion: FLL phenotypes are far more prevalent than generally appreciated.

Boden WE, Baum S, Toth PP, Fazio S, Bhatt DL. Impact of expanded FDA indication for icosapent ethyl on enhanced cardiovascular residual risk reduction. *Future Cardiol.* 2020 Sep 22.

Conclusion: Icosapent ethyl (IPE) is indicated for persons with Tg > 150 mg/dL & established ASCVD or diabetes + two additional risk factors.

Toth PP, Shah PK, Lepor NE. Targeting hypertriglyceridemia to mitigate CV risk: review. *Am J Prev Cardiol.* 2020 Sep;3:100086.

Conclusion: IPE has benefit aside from triglyceride lowering.

Wong ND...Toth PP. REDUCE-IT Eligibility & Preventable CV Events in US (NHANES). *Am J Cardiol.* 2020 Nov 1;134:62-68.

Conclusion: An estimated 4.6 million persons are now eligible for IPE with more than 60,000 preventable primary CVD outcomes annually.

Sharma G, Martin SS, Blumenthal RS. Effects of omega-3 fatty acids on major adverse cardiovascular events: what matters most: the drug, the dose, or the placebo? *JAMA.* 2020 Nov 15.

Conclusion: This was a superb analysis of the different results in STRENGTH & REDUCE-IT.

Pallazola VA, Sathiyakumar V, Park J, Vakil RM, Toth PP, Lazo-Elizondo M, Brown E, Quispe R, Guallar E, Banach M, Blumenthal RS, Jones SR...Martin SS. Modern prevalence of dysbetalipoproteinemia (Fredrickson-Levy-Lees type III hyperlipoproteinemia). *Archives of Medical Science.* 2020;16:993-1003.

Conclusion: Dysbetalipoproteinemia (HLP3) is characterized by excess cholesterol-enriched, triglyceride-rich lipoprotein remnants in genetically predisposed individuals that promotes premature ASCVD; its prevalence is about 2%.

Jia X, Ramsey DJ, Rifai MA...Gluckman TJ...Virani SS. Impact of lipid monitoring on Rx intensification of cholesterol lowering therapies (VAHealthcare System). *Am J Cardiol.* 2020 Mar 15;125(6):874-879.

Conclusion: Lipid monitoring is associated with higher rates of Rx intensification in ASCVD patients; this has important implications since high intensity statins and select nonstatins improve outcomes.

Fogacci F, Norata GD, Toth PP, Arca M, Cicero AFG. Efficacy and safety of volanesorsen (ISIS 304801): evidence from Phase 2 & 3 clinical trials. *Curr Atheroscler Rep.* 2020 May 26;22(5):18.

Conclusion: This new agent markedly lowers triglycerides with no significant impact on LDL-C.

Khan SU...Blaha MJ, Blumenthal RS, Michos ED. Efficacy & safety for achievement of guideline-recommended lower LDL-C levels: systematic review & meta-analysis. *Am J Prev Cardiol.* 2020;3:100050.

Conclusion: Intensive lipid-lowering to achieve LDL-C < 70 mg/dL was associated with reduced mortality.

Lorenzatti AJ, Toth PP. New Perspectives on atherogenic dyslipidaemia & cvd. *Eur Cardiol.* 2020 Feb 26;15:1-9.

Conclusion: Residual risk involves hypertriglyceridemia, a preponderance of small, dense LDL particles, remnant lipoproteins, & postprandial hyperlipidemia.

RESEARCH PUBLICATIONS

Mark L... **Toth PP.**
Recommendations of
statin Rx after ACS.
Atherosclerosis.

2020 Jun;303:53-54.

Conclusion: Too few
adults are discharged on
high dose, high intensity
statin after an ACS.



Peter P. Toth, MD, PhD

Toth PP. Familial hypercholesterolemia &
lipoprotein(a): unraveling the knot that binds them. *J
Am Coll Cardiol.* 2020 Jun 2;75(21):2694-2697.

Conclusion: An antisense oligonucleotide to apo(a)-
mRNA reduces Lp(a) by 95%, while evolocumab
reduces it by 25%.

Toth PP...Nichols GA. Risk of CV events in patients
with hypertriglyceridaemia: review of real-world
evidence. *Diabetes Obes Metab.* 2020 Mar;22(3):279-
289.

Conclusion: Elevated triglycerides are commonly
associated with increased CV risk.

Toth PP...Tershakovec AM. Comparing remnant
lipoprotein cholesterol measurement methods to
evaluate efficacy of ezetimibe/statin vs statin Rx.
J Clin Lipidol. 2019 Dec;13(6):997-1007.e8.

Conclusion: Ezetimibe plus statin Rx achieves
greater remnant lipoprotein cholesterol (RPL-C) vs.
statin monotherapy; there is an urgent need to
standardize RLP-C measurements.

Khan SU, Michos ED. CV mortality after intensive
LDL-C lowering: Does baseline LDL-C really
matter? *Am J of Prev Cardiol.* 2020;1:100013.

Conclusion: Greater reductions in LDL-C are
associated with higher absolute risk reductions.

**Feldman DI, Michos ED, Stone NJ, Gluckman TJ,
Cainzos Achirica M, Virani SS, Blumenthal RS.**
Same evidence, varying viewpoints: Three questions
illustrating important differences between US &
European cholesterol guideline recommendations. *Am
J Prev Cardiol.* 2020. 100117.

Conclusion: This review examines the implications
of the differences in the major cholesterol guidelines.

Sathiyakumar V, Blumenthal RS, Elshazly MB.
New information on accuracy of LDL-C estimation.
ACC.org. March 20, 2020.

Conclusion: The Martin/Hopkins formula is most
useful in persons with mixed hyperlipidemia.

**Fox N, Fox NJ, Das T, Blumenthal RS, Tumarkin
E.** Managing cholesterol to prevent atherosclerotic
cardiovascular disease. *Cardiosmart.org.* May 15,
2020.

Conclusion: This article provides a comprehensive
review of lifestyle & pharmacologic Rx of
dyslipidemia.

Harmon D...**Michos ED, Bianco C.** Dramatic LDL-
C elevation with Ketogenic Diet: A Case Series. *Am
J Prev Cardiol.* 2020;3:100053.

Conclusion: Some patients on a ketogenic diet
experience large increases in LDL-C levels, which
may be related to variations in genes regulating
cholesterol absorption.

Dudum R, Garg K, Blumenthal RS. Cumulative
exposure model in LDL-C management. *ACC.org.*
April 24, 2020

Conclusion: The more years a person has moderate
hyperlipidemia, the greater the risk of ASCVD.

Jacobsen A, Duffy E, Blumenthal RS, Martin SS.
Clinical review on triglycerides. *ACC.org.* March 4,
2020.

Conclusion: This article reviews dietary &
pharmacologic Rx of hypertriglyceridemia.

Tibuakuu M, Blumenthal RS, Martin SS.
Bempedoic Acid for LDL-C Lowering: What Do We
Know? *ACC.org* Aug 10, 2020.

Conclusion: Bempedoic acid lowers LDL-C by
about 20% and can be combined with ezetimibe.

**Meddeb M, Blumenthal RS, Gerstenblith G,
Leucker TM.** Are PCSK9 inhibitors the next front-
line therapies to improve vascular dysfunction in
people with pro-inflammatory states? *ACC.org*
Oct 02, 2020.

Conclusion: This analysis looks at the possible
benefits of early aggressive LDL-C reduction.

Valilis E, Blumenthal RS, Sharma G. Lack of
association of ezetimibe with incidence of cancer:
subgroup analysis of IMPROVE-IT. *ACC.org.*
November 2020.

Conclusion: There is no RCT evidence that
ezetimibe increases cancer risk.

Das T, Vakil RM, Blumenthal RS, Martin SS.
Icosapent Ethyl May Act on Plaque. *Cardiology
Today/Healio.com* December 16, 2019

**Lambeth K, Blumenthal RS, Martin SS,
Tumarkin E.** Impressive data on prognostic
importance of lipids may lead to earlier prescription
in those with high long-term ASCVD risk
estimates. *ACC.org.* January 2, 2020

Conclusion: It may be prudent to start young adults
with moderate hyperlipidemia & another risk factor
with a statin.

Sharma G, Martin SS, Blumenthal RS. Effects of
Omega-3 Fatty Acids on Major Adverse
Cardiovascular Events: What Matters Most: the
Drug, the Dose, or the Placebo? *JAMA.* 2020
Nov 15.

Kim JS...**Michos ED, Hoffman EA...Lederer DJ.**
Associations of Omega-3 Fatty acids with
Interstitial lung Disease and lung imaging
abnormalities among adults. *Am J Epidemiol.* 2020.
Conclusion: Higher Docosahexaenoic
acid levels (an omega-3 polyunsaturated fatty acid)
were associated with a lower risk of hospitalization
and death due to ILD and less lung abnormalities
on CT.

Martin SS. Factoring in ANGPTL3 when LDL is
refractory. *N Engl J Med.* 2020 Dec10;383(24):
2385-6.

Conclusion: Angiopoietin-like3 (ANGPTL3) is an
inhibitor of lipoprotein lipase & endothelial lipase.
Evinacumab, a fully human monoclonal antibody
against ANGPTL3, lowers LDL by 50% in patients
with FH & likely will be an important Rx option in
the future.

Cigarette Smoking

Stokes A..., **Blaha MJ...**Robertson RM.
Racial/ethnic differences in associations of
nongovernment tobacco product use with subsequent
initiation of cigarettes in US youths. *Nicotine Tob
Res.* 2020 Sep 19:ntaa170.

Conclusion: White & Hispanic youth were more
likely to initiate cigarettes through e-cigarette use,
while Black youth were more likely to initiate
cigarettes through cigar use.

RESEARCH PUBLICATIONS

Oni ET...McEvoy JW, Blaha MJ, Blumenthal RS...Nasir K. Non-Alcoholic Fatty Liver Disease (NAFLD) Modifies Serum Gamma-Glutamyl Transferase (GGT) in Cigarette Smokers. *J Clin Med Res.* 2020 Aug;12(8):472-482.

Conclusion: Smoking raises oxidative stress as measured by GGT levels among patients with NAFLD.

Biery DW...**Blaha MJ, Di Carli MF, Nasir K, Bhatt DL, Blankstein R.** Association of smoking cessation and survival among young adults with MI in the Partners YOUNG-MI Registry. *JAMA Netw Open.* 2020 Jul 1;3(7):e209649.

Conclusion: Smoking cessation after MI was associated with more than a 50% lower all-cause & CV mortality in those with an MI before the age of 50.

Oshunbade AA...**DeFilippis AP, Blaha MJ...Hall ME.** Cigarette smoking & incident stroke in Blacks of the Jackson Heart Study. *J Am Heart Assoc.* 2020 Jun 16;9(12):e014990.

Conclusion: Current cigarette smoking is associated with a dose-dependent higher stroke risk.

Xie W, Kathuria H, Galiatsatos P, **Blaha MJ...** Stokes AC. Association of electronic cigarette use with incident respiratory conditions among US Adults. *JAMA Netw Open.* 2020 Nov 2;3(11):e2020816.

Conclusion: Users of e-cigs may experience increased rates of respiratory conditions independent of other tobacco product use.

Boakye E, Obisesan OH, **Osei AD, Dzaye O, Uddin SMI, Hirsch GA, Blaha MJ.** The promise and peril of vaping. *Curr Cardiol Rep.* 2020 Oct 9;22(12):155.

Conclusion: While e-cigarettes have the potential to help in smoking cessation, long term use with combustible cigarettes should be strongly discouraged.

Obisesan OH, Osei AD, Uddin SMI, Dzaye O, Mirbolouk M, Stokes A, Blaha MJ. Trends in e Cigarette Use in Adults in the US, 2016-2018. *JAMA Intern. Med.* 2020 Oct 1; 180(10):1394-1398.

Conclusion: There was stable e-cigarette use prevalence in 2016 with a marked increase from 2017-8.

Obisesan OH, Osei AD, Uddin SMI, Dzaye O, Cainzos-Achirica M, Mirbolouk M, Orimoloye OA, Sharma G, Al Rifai M...DeFilippis AP, Blaha MJ.



Olufunmilayo Obisesan, MD, MPH

E-Cigarette use patterns and high-risk behaviors in pregnancy: BRFSS 2016-2018. *Am J Prev Med.* 2020 Aug;59(2):187-195.

Conclusion: About 2% of pregnant women report current e-cigarette use & 0.6% report daily use.

Obisesan OH, Mirbolouk M, Osei AD, Orimoloye OA, Uddin SMI, Dzaye O, El Shahawy O, Al Rifai M...DeFilippis AP, Blaha MJ. Association between e-cigarette use & depression in BRFSS, 2016-17. *JAMA Netw Open.* 2019 Dec 2;2(12):e1916800.

Conclusion: There is a strong association between e-cigarette use & depression.

Orimoloye OA, Osei AD, Uddin SI, Mirbolouk M, Blaha MJ. Electronic cigarettes & CV risk: science, policy & cost of certainty. *Eur Cardiol.* 2019 Dec 18;14(3):159-160.

Osei AD, Mirbolouk M, Orimoloye OA, Dzaye O, Uddin SMI...DeFilippis AP...Blaha MJ. Association between e-cigarette use & COPD by smoking status: BRFSS 2016-17. *Am J Prev Med.* 2020 Mar;58(3):336-342.

Conclusion: There is probably e-cigarette-related lung toxicity across all categories of combustible cigarette smoking status, including those who had never smoked combustible cigarettes.

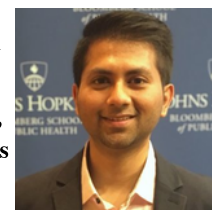
Orimoloye OA, Uddin SMI, Chen LC, Osei AD, Mirbolouk M...Dzaye O... Blaha MJ. Electronic cigarettes & insulin resistance in animals & humans: Results of controlled animal study & NHANES 2013-2016. *PLoS One.* 2019 Dec 31;14(12):e0226744.

Conclusion: e-cigarettes are not linked with insulin resistance.

Keith RJ, Fetterman JL, **Orimoloye OA, Dardari Z...DeFilippis AP, Blaha MJ,** Bhatnagar A. Characterization of volatile organic compound metabolites in cigarette smokers, electronic nicotine device users, dual users, and nonusers of tobacco. *Nicotine Tob Res.* 2020 Feb 6;22(2):264-272.

Conclusion: Sole electronic nicotine delivery systems (ENDS) users had lower levels of most VOC metabolites compared to smokers & dual users.

Uddin SMI, Osei AD, Obisesan OH, El-Shahawy O, Dzaye O, Cainzos-Achirica M, Mirbolouk M, Orimoloye OA...DeFilippis AP, Henry TS, Nasir K, Blaha MJ. Prevalence, trends, & distribution of nicotine and marijuana use



Iftekhar Uddin, MD, MSPH

in e-cigarettes among US adults: BRFSS 2016-2018. *Prev Med.* 2020 Oct;139:106175.

Conclusion: Dual nicotine & marijuana vaping is prevalent; such users are often older and more likely to be Black, Hispanic, & never cigarette smokers.

Mirbolouk M, Kianoush S, Dardari Z...McEvoy JW, Nasir K, Blaha MJ. The association of coronary artery calcium score & mortality risk among smokers. *Atherosclerosis.* 2020 Feb;294:33-40.

Conclusion: Qualitative & quantitative CAC scores can prognosticate risk of total, CVD & cancer mortality behind traditional risk factors in smoker and those eligible for lung cancer screening.

Alfaddagh A...Sharma G, Blumenthal RS, Zubaid M. Clinical characteristics and outcomes of young adults with first myocardial infarction: results from Gulf COAST. *Int J Cardiol Heart Vasc.* 2020;31:100680.

Conclusion: Younger patients with first MI were more likely to be obese, smokers, & have a family history of premature CAD; they were more likely to have better in-hospital & post-discharge mortality.

Khoury SR, Crowe C. Smoking cessation: Updates and frequently asked questions. *www.cardi-OH.org.* Oct 29, 2020.

RESEARCH PUBLICATIONS

CV Imaging with CT/PET/MR

Ferraro R, Latina JM, Alfaddagh A, Michos ED, Blaha MJ, Jones SR, Sharma G...Blumenthal RS, Fuster V, Arbab-Zadeh A. Evaluation & management of patients with stable angina: beyond the Ischemia



Richard Ferraro, MD

paradigm (JACC State-of-the-Art Review). *J Am Coll Cardiol.* 2020; Nov 10;76(19):2252-2266.

Conclusion: Comprehensive risk factor management is the top priority in patients with angina.

Kishi S...**Arbab-Zadeh A.** Comparative effectiveness of coronary artery stenosis & atherosclerotic plaque burden assessment for predicting 30-day revascularization & 2-year major adverse cardiac events. *Int J Cardiovasc Imaging.* 2020 Dec;36(12):2365-2375.

Conclusion: Angiographic & coronary atherosclerotic plaque metrics perform only modestly well for predicting 30-day revascularization & 2-yr. MACE in high-risk patients but improve after excluding patients with known CAD.

Cardoso R, Leucker TM. Applications of PET-MR imaging in cardiovascular disorders. *PET Clin.* 2020 Oct;15(4):509-520.

Mortensen MB...Blaha MJ, Nørgaard BL. CAD Severity on cardiac CTA identifies patients with most benefit of treating LDL-C to ACC/AHA & ESC/EAS Targets. *JACC Cardiovasc Imaging.* 2020 Sep;13(9):1961-1972.

Conclusion: An individualized approach based on CAD severity can identify symptomatic patients that are likely to derive most and least benefit from aggressive lipid lowering.

Reiter-Brennan C, Osei AD, Iftekhar Uddin SM, Orimoloye OA, Obisesan OH, Mirbolouk M, Blaha MJ, Dzaye O. ACC/AHA lipid guidelines: Personalized care to prevent CVD. *Cleve Clin J Med.* 2020 Apr;87(4):231-239.

Rifai MA, Blaha MJ, Patel J, Xiaoming J, Cainzos-Achirica M...Nasir K, Al-Mallah MH, Virani SS. CAC, Statin Use & Long-Term Risk of ASCVD Events (MESA). *Am J Cardiol.* 2020 Mar 15;125(6):835-839.

Conclusion: Current statin use does not weaken the prognostic utility of CAC.

Greenland P, **Michos ED...Blaha MJ...Nasir K,** Sterling MR, Thanassoulis G. Primary Prevention Trial Designs Using Coronary Imaging: NHLBI Workshop. *JACC Cardiovasc Imaging.* 2020 Sep 11;S1936-878X(20)30650-1.

Conclusion: This NIH workshop was co-chaired by Dr. Erin Michos.

Al-Abdoun A... **Zhao D, Savji N...Michos ED.** Complete revascularization in patients with STEMI & multi-vessel disease: meta-analysis of RCTs. *Cardiovasc Revasc Med.* 2020 May;21(5):684-691.

Conclusion: Complete revascularization was associated with a lower risk of major adverse cardiac events, CV mortality, & repeat revascularization compared with culprit-only revascularization.

Rahman F, Zhang Z, Zhao D...Guallar E, Post WS, McEvoy JW. Association of high-sensitivity troponin (hs-cTnI) with cardiac CTA evidence of myocardial & coronary disease in a primary prevention cohort of men: MACS. *J Appl Lab Med.* 2019 Nov;4(3):355-369.

Conclusion: Among primary prevention men with, or at risk for HIV, hs-cTnI concentrations were strongly associated with MI but were not associated with HIV infection or treatment status or with coronary plaque type or stenosis.

Arbab-Zadeh A. Does "vulnerable" atherosclerotic plaque modify coronary blood flow? How myths perpetuate. *JACC Cardiovasc Imaging.* 2020 Mar;13(3):757-759.



Armin Zadeh, MD, MPH, PhD

Weintraub WS, **Arbab-Zadeh A.** Should We Adjust LDL-C Management to the Severity of CAD? *JACC Cardiovasc Imaging.* 2020 Sep;13(9):1973-1975.

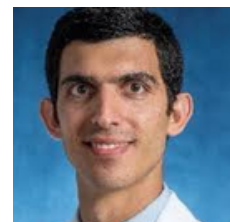
Razavi AC... Whelton SP, Carmichael OT, Bazzano LA. Left ventricular mass index is associated with cognitive function in middle-age: Bogalusa Heart Study. *Circ Cardiovasc Imaging.* 2020 Aug;13(8).

Conclusion: Cardiac remodeling partially mediates the association between lifespan SBP burden & adult cognition in individuals without dementia or clinical CVD.

Stojan G, Li J, Budoff M, **Arbab-Zadeh A,** Petri MA. High-risk coronary plaque in SLE: low-attenuation non-calcified coronary plaque & positive remodeling index. *Lupus Sci Med.* 2020 Jul;7(1):e000409.

Conclusion: Both low-attenuation non-calcified plaque & positive remodeling are common in SLE

Cardoso R, Dudum R, Ferraro RA...Blaha MJ, Nasir K, Rajagopalan S, Michos ED, Blumenthal RS, Cainzos-Achirica M. Cardiac CT for



Rhanderson Cardoso, MD

personalized management of patients with type 2 diabetes mellitus.

Circ Cardiovasc Imaging. 2020 Sep;13(9):e011365.

Conclusion: CCTA has a well-established role in the evaluation of patients with diabetes & stable chest pain and reduces ASCVD events through increased adoption of preventive therapies

Choi JW...**Arbab-Zadeh A...Whelton S...Al'Aref SJ.** The Journal of Cardiovascular Computed Tomography year in review - 2019. *J Cardiovasc Comput Tomogr.* 2020 Mar-Apr;14(2):107-117.

Schuijff JD...**Arbab-Zadeh A...Lima JAC.** Ischemia & no obstructive stenosis (INOCA) at CT angiography, CT myocardial perfusion, invasive coronary angiography (ICA, & SPECT: The CORE320 Study. *Radiology.* 2020 Jan;294(1):61-73. **Conclusion:** CTA/CT perfusion or ICA/SPECT-defined INOCA occurred in about 10% of participants; those with INOCA had greater atherosclerotic burden & more adverse plaque features on CT compared to those with no obstructive stenosis & no ischemia.

Nakanishi R, Delaney JA, **Post WS,** Dailing C, **Blaha MJ...Budoff MJ.** A novel density-volume calcium score by non-contrast CT predicts coronary plaque burden on coronary CTA: Results from multicenter AIDS cohort study (MACS) *J Cardiovasc Comput Tomogr.* 2020 May Jun;14(3):266-271.

Conclusion: The new density-volume calcium score obtained from non-contrast CT demonstrated an improvement in estimating the number of partially calcified plaques & total plaque burden on CCTA relative to the Agatston score.

RESEARCH PUBLICATIONS

Michos ED, Greenland P. Coronary Computed Tomography Angiography in Stable Chest Pain to Prevent Myocardial Infarction and Reduce Costs-Seeing is Believing. *JAMA Netw Open*. 2020 Dec 1;3(12):e2030996.

Li Z, Zhang J...**Arbab-Zadeh A**, Yan F, Tu S. Diagnostic accuracy of a fast computational approach to derive FFR from coronary CTA. *JACC Cardiovasc Imaging*. 2020 Jan;13(1 Pt 1):172-175.

Rodriguez-Granillo GA...**Arbab-Zadeh A**. Invasive coronary angiography findings across the CAD-RADS classification spectrum. *Int J Cardiovasc Imaging*. 2019 Nov;35(11):1955-1961.

Duffy E, Blumenthal RS, Zadeh AA. CCTA as a tool for prevention in patients with stable chest pain. *ACC.org* Sep 11, 2020.

Ipek EG, Blumenthal RS, Sharma G. Non-Invasive Assessment of Myocardial Viability. *ACC.org* Aug 14, 2020.

Feldman D, Ferraro RA, Sharma G, Martin SS, Blumenthal RS. Determining the role of coronary artery disease severity measured by coronary CTA in ASCVD risk management. *ACC.org* Jul 20, 2020.

Duvall C, Ferraro R, Blankstein R, **Blumenthal RS**. The growing role of coronary CTA in stable CAD. *Healio.com* November 11, 2020. *Cardiology Today* December 2020.

Juric M, Blumenthal RS, Gulati M. The risk of heart inflammation in college athletes. *Cardiosmart.org* October 15, 2020.

Sreenivasan J...**Michos ED**...Panza JA. Rate, causes, & predictors of 90-day readmissions & association with index hospitalization revascularization following NSTEMI. *Catheter Cardiovasc Interv*. 2020.

Conclusion: Readmissions following NSTEMI carry higher mortality than the index hospitalization; revascularization for NSTEMI is associated with a lower readmission rate at 90 days.

Diabetes

Reiter-Brennan C, **Cainzos-Achirica M**...**Blaha MJ**, Eckel RH. Cardiometabolic medicine - the US perspective on a new subspecialty. *Cardiovasc Endocrinol Metab*. 2020 Jul 16;9(3):70-80.

Conclusion: Cardiometabolic medicine is important for Cardiologists to become more familiar with.

Mszar R...**Blaha MJ, Nasir K**. Cumulative burden of financial hardship from medical bills across the spectrum of diabetes mellitus & ASCVD among non-elderly adults in US. *J Am Heart Assoc*. 2020 May 18;9(10):e015523.

Conclusion: We need more effective public health policies that protect persons with diabetes & ASCVD from financial hardship.

Ferro EG, **Michos ED**...**Elshazly MB**. New decade, new FDA guidance for diabetes drug development: lessons learned & future directions. *J Am Coll Cardiol*. 2020 Nov 24;76(21):2522-2526.

Conclusion: It is important to strike a balance between accelerating drug development & insuring the safety and efficacy of new drugs.

Carvalho LSF...**Blaha MJ**...**Toth PP, Jones SR**...Sposito AC; ELSA-Brasil study. Increased particle size of triacylglycerol-enriched remnant lipoproteins, but not their plasma concentration or lipid content, augments risk prediction of incident type 2 diabetes. *Diabetologia*. 2020 Nov 7.

Conclusion: Remnant lipoprotein particle diameter may promote development of type 2 diabetes even before glucose abnormalities are apparent.

Echouffo-Tcheugui JB...**Ndumele CE**...Selvin E. Severe hypoglycemia, cardiac structure & function, and risk of CV events among older adults with diabetes. *Diabetes Care*. 2020 Nov 16;dc200552.

Conclusion: Prior severe hypoglycemia is associated with alterations in cardiac function & is an important marker of future risk in older adults.



Erin Michos, MD, MHS

de Boer IH, Caramori ML...**Michos ED**, Navaneethan SD...Rossing P. Executive summary of the 2020 KDIGO Diabetes Management in CKD Guideline: Evidence-based advances in monitoring and treatment. *Kidney Int*. 2020 Jul 9;S0085-2538(20)30798-5.

Navaneethan SD,...**Michos ED**... Khunti K. Diabetes Management in Chronic Kidney Disease: Synopsis of the 2020 KDIGO Clinical Practice Guideline. *Ann Intern Med*. 2020 Nov 10.

JDias JP, Joseph JJ...**Golden SH**. The longitudinal association of changes in diurnal cortisol features with fasting glucose: MESA.

Psychoneuroendocrinology. 2020 Sep;119:104698.
Conclusion: Cortisol has a detrimental role in worsening glycemia among persons with diabetes.

Tang O, **Matsushita K**, Coresh J, **Ndumele C**, **McEvoy JW**...Selvin E. High-sensitivity cardiac troponin I & T for Risk Stratification in Adults With Diabetes. *Diabetes Care*. 2020 Oct;43(10):e144-6.

Conclusion: Elevated hs-cardiac troponin I without CVD identifies a high risk-group with comparable mortality risk as those with a history of clinical CVD.

Joseph JJ...**Golden SH**, Lin S. Association of ARMC5 with the renin-angiotensin-aldosterone system, BP, & glycemia in African Americans. *J Clin Endocrinol Metab*. 2020 Aug 1;105(8):2625-33.

Conclusion: Germline mutations in armadillo repeat containing 5 (ARMC5) on chromosome 16 is an adrenal gland tumor suppressor gene associated with primary aldosteronism; this may underlie cardiometabolic disease in African Americans.

Al-Sofiani ME...**Golden SH**, Gudzone KA, Lee CJ. The relationship of acculturation to CVD risk factors among U.S. South Asians: MASALA. *Diabetes Res Clin Pract*. 2020 Mar;161:108052.

Conclusion: South Asian women who employed an assimilation strategy had a more favorable cardiometabolic profile compared to women using a separation strategy.

Bayram F...**Toth PP**, Satman I. Utilization of statins & LDL-C target attainment in Turkish patients with type 2 diabetes -a nationwide cross-sectional study. *Lipids Health Dis* 2020 Nov 11;19(1):237.

Conclusion: Fewer than half of the patients with type 2 diabetes who should be on statin treatment were receiving them; there is a large gap between guidelines & real-world patient data.

Razavi AC, Wong N...**Blumenthal RS, Blaha MJ, Whelton SP**. Predicting long-term absence of CAC in metabolic syndrome & diabetes: MESA *JACC Cardiovasc Imaging*. 2020 Oct 27;S1936-878X(20)30804-4.

Conclusion: More than 40% of adults with MetS or T2DM & baseline CAC=0 had a long-term absence of CAC; this was strongly associated with the absence of extracoronary atherosclerosis & a low MetS score.

RESEARCH PUBLICATIONS

Ferrières J...**Toth PP**...Gitt AK. Lipid-lowering Rx & LDL-C target achievement in patients with type 2 diabetes & ACS. *Arch Cardiovasc Dis*. 2020 Oct;113(10):617-629.

Conclusion: Statin monotherapy of intermediate potency was the predominant treatment in these ACS patients.

Wallace R, Blumenthal RS, Whelton SP Predicting long-term absence of coronary artery calcium in metabolic syndrome & diabetes. *ACC.org*. December 2020.

Chilazi M, Duffy E, Cainzos-Achirica M, Blumenthal RS. Use of cardiac CT to improve medical management in adults with diabetes: CAC in the asymptomatic patient (Part I). *ACC.org* Nov 4, 2020.

Conclusion: CAC scoring identifies those at the lowest and highest ASCVD risk among asymptomatic persons with diabetes.

Wondmagegn A, Martin SS, Blumenthal RS, Sarkar S. Approaching statin therapy in adults with and without diabetes. 2020. *ACC.org*. Oct 26, 2020

Conclusion: There are 2 ongoing large RCTs of statin therapy in older patients.

Chilazi M, Duffy E, Cardoso R, Cainzos-Achirica M, Blumenthal RS. Use of cardiac CT to improve medical management in adults with diabetes: CCTA in the symptomatic patient (Part II). *ACC.org* November 23, 2020.

Conclusion: In stable chest pain patients, CCTA leads to optimization of medical therapy.

Diet/Weight/Nutrition

Ferraro RA, Fischer NM, Xun H, Michos ED. Nutrition & physical activity recommendations from the US & European CV guidelines: a comparative review. *Curr Opin Cardiol*. 2020 Sep;35(5):508-516.

Rooney MR...Michos ED...Lutsey PL. Serum magnesium & incidence of CAD over a median 27 years of follow-up in ARIC Study & a meta-analysis. *Am J Clin Nutr*. 2020 Jan 1;111(1):52-60.

Conclusion: Serum magnesium was inversely associated with CAD risk.

Jensen JC, Dardari ZA, Blaha MJ... Nasir K, Miedema MD. Association of BMI with CAC & subsequent CV mortality: CAC Consortium. *Circ Cardiovasc Imaging*. 2020 Jul;13(7):e009495.

Conclusion: Obesity was associated with a higher risk of CAC & subsequent CVD & all-cause mortality. However, overweight individuals did not have a higher risk of mortality despite higher risk for CAC.

Sobel MH, Sanchez TR...Blaha MJ...Navas-Acien A. Rice intake, arsenic exposure, & subclinical CVD among US adults in MESA. *J Am Heart Assoc*. 2020 Feb. 18;9(4):e015658.

Conclusion: Rice intake, a main source of dietary arsenic, was not associated with subclinical CVD markers.

Yu Z, Grams ME, Ndumele CE...Coresh J. Association between midlife obesity & kidney function trajectories: ARIC Study. *Am J Kidney Dis*. 2020 Sep 23;S0272-6386(20)31003-9.

Conclusion: Obesity status is a risk factor for future decline in kidney function & development of kidney failure with replacement therapy in Black and White women, with less consistent associations among men.

Vaishnav J... Ndumele CE...Sharma K. Highest obesity category associated with largest decrease in N-Terminal Pro-BNP in patients hospitalized with HFpEF. *J Am Heart Assoc*. 2020 Aug 4;9(15):e015738.

Conclusion: In hospitalized patients with HFpEF, NT-proBNP was inversely related to BMI.

Giglio RV...Toth PP, Rizzo M. Pasta supplemented with opuntia ficus-indica extract improves metabolic parameters & reduces atherogenic small dense LDL (sdLDL) in patients with risk factors for metabolic syndrome: a 4-week intervention study. *Metabolites*. 2020 Oct 26;10(11):428.

Conclusion: The study suggests that pasta enriched with an opuntia ficus-indica extract may have beneficial effects on some metabolic parameters & LDL particle sizes, reducing atherogenic sdLDL.

Patti AM... Toth PP, Rizzo M. Daily use of extra virgin olive oil with high oleocanthal concentration reduced body weight, waist circumference, ALT, inflammatory cytokines & hepatic steatosis in subjects with metabolic syndrome: 2-month intervention study. *Metabolites*. 2020 Oct 2;10(10):392.

Conclusion: Olive oil supplementation has beneficial effects on anthropometric & biochemical parameters, including inflammatory cytokines & FLI as well as abdominal fat distribution.

Ogunmoroti O, Osibogun O, McClelland RL, Lazo M, Mathews L, Okunrintemi V, Oni ET, Burke GL, Michos ED. Alcohol type & ideal CV health among adults of MESA. *Drug Alcohol Depend*. 2020 Oct 18:108358.

Conclusion: Moderate consumption of wine was associated with favorable cardiovascular health. However, heavy consumption of beer or liquor was associated with poorer CVH.

Duffy EY, Hiremath PG... Blaha MJ, Michos ED, BlumenthalRS, Martin SS, Cainzos-Achirica M.

Opportunities to improve cardiovascular health in the new american workplace.

Am J Prev Cardiol.

December 2020:100136.

Conclusion: Access to healthy meals and exercise facilities is important for cardiovascular health.

Kim JS...Michos ED...Lederer DJ. Associations of Omega-3 Fatty acids with interstitial lung disease (ILD) & lung imaging abnormalities among adults. *Am J Epidemiol*. 2020.

Conclusion: Higher docosahexaenoic acid levels (an omega-3 polyunsaturated fatty acid) were associated with a lower risk of hospitalization & death due to ILD & fewer lung abnormalities on CT.

Razavi AC, Bazzano LA, He J, Whelton SP... Kelly TN. Consumption of animal & plant foods & risk of LV diastolic dysfunction: Bogalusa Heart Study. *ESC Hear Fail*. 2020;7(5):2700-2710.

Conclusion: Diets higher in animal foods and lower in plant foods are associated with an increased risk for left ventricular diastolic dysfunction.

Leucker TM, Schulman SP, Gerstenblith G. Stable IHD: how to keep it that way. *J Clin Invest*. 2020 Mar 2;130(3):1055-1057.

Conclusion: Comprehensive risk factor modification requires lifestyle optimization.

Mazidi M...Toth PP, Judd S, Blaha MJ...Banach M; International Lipid Expert Panel (ILEP) Lipid & BP Meta-analysis Collaboration (LBPMC) Group. Association of types of dietary fats & all-cause & cause-specific mortality: A prospective cohort study & meta-analysis of prospective studies with 1,164,029 participants. *Clin Nutr*. 2020 Apr 3;S0261-5614(20)30146-1.

Conclusion: Higher saturated fat intake was associated with a modest increase in CHD mortality. Higher intakes of monounsaturated & polyunsaturated fats were associated with lower stroke mortality.



Eamon Duffy, MD

RESEARCH PUBLICATIONS

Cicero AFG... **Toth PP**..., Banach M; International Lipid Expert Panel. Nutraceutical support in heart failure: position paper of ILEP. *Nutr Res Rev*. 2020 Jun;33(1):155-79.

Conclusion: Hawthorn, coenzyme Q10, l-carnitine, d-ribose, vitamin D, probiotics & n-3 PUFA need to be studied in early heart failure stages.

Tibuakuu M...Savji N... Blumenthal RS, Michos ED.

Nondietary CV health metrics with patient experience & loss of productivity among US adults without CVD: MEPS 2006 to 2015. *J Am Heart Assoc*. 2020 Oct 1:e016744.



Martin Tibuakuu, MD, MPH

Das TM, Kapoor K, Blumenthal RS. Results from EVAPORATE trial suggest that cardioprotective benefits of eicosapentaenoic acid (EPA) are related to plaque reduction & stabilization. *ACC.org* Sep 22, 2020

Das T, Vakil RM, Blumenthal RS, Martin SS. Icosapentyl ethyl may act on plaque. *Cardiology Today/Healio.com* December 16, 2019.

Das TM, Vakil RM, Blumenthal RS. Risk factor modification reduces atrial fibrillation. *American Heart Association Professional Heart Daily*. March 9, 2020.

Conclusion: Atrial fibrillation management should begin with aggressive risk factor modification through patient-focused, multi-disciplinary programs.

Yueh N, Fischer N, Latina J, Davis DM, Blumenthal RS, Martin SS. New insights into heart healthy dietary habits: what the clinician needs to know. *ACC.org*. March 27, 2020.

Conclusion: Clinician expertise should complement patient goals & resources to create a dietary plan for optimal health. Adults should be encouraged to read food labels & control portion sizes.

McAleer S, Gawlik K, Seeholzer E, **Khoury SR.** Implementing a low-sodium DASH diet: Practical tips for counseling patients. *www.cardi-OH.org*. Mar 31, 2020.

Exercise/Fitness

Al Rifai M, Blaha MJ...Al-Mallah MH. Cardiorespiratory fitness & incident stroke types: The FIT (Henry Ford Exercise Testing) project. *Mayo Clin Proc*. 2020 Jul;95(7):1379-1389.

Conclusion: Cardiorespiratory fitness is inversely associated with risk for stroke.

Whelton SP, McAuley PA, Dardari Z, Orimoloye OA...Blaha MJ. Association of BMI, fitness, & mortality in patients with diabetes: evaluating the obesity paradox in FIT. *Diabetes Care*. 2020 Mar;43(3):677-682.

Conclusion: Among patients with diabetes, the obesity paradox was less pronounced for patients with the highest fitness level, & these patients also had the lowest risk of mortality.

Thomas IC...**Michos ED**...Criqui MH. Associations of recreational & non-recreational physical activity with CAC density vs. volume & CVD events: MESA *Eur Heart J Cardiovasc Imaging*. 2020 Feb 1;21(2):132-140.

Conclusion: Physical activity may affect CAC composition; however, associations of physical activity with CVD risk appear to be independent of CAC.

Osibogun O, Ogunmoroti O, Spatz ES, Fashanu OE, Michos ED. Ideal cardiovascular health & resting heart rate in MESA. *Prev Med*. 2020 Jan;130:105890.

Conclusion: Favorable CV health is unlikely to be associated with an elevated resting heart rate.

Florida R, Kwak L, Lazo M, Michos ED, Nambi V, Blumenthal RS, Gerstenblith G... Coresh J, **Ndumele CE.** Physical Activity & incident heart failure (HF) in high-risk subgroups: ARIC. *J Am Heart Assoc*. 2020 May 18;9(10):e014885.

Conclusion: Higher physical activity was associated with lower HF risk among several subgroups known to be at high risk for HF, including those with hypertension, obesity, diabetes, & metabolic syndrome.

Florida R, Zhao DI, Ndumele CE...**Michos ED.** Change in physical activity & cardiac structure over 10 Years: MESA. *Med Sci Sports Exerc*. 2019;51(10):2033-2040.

Conclusion: Higher levels of moderate & vigorous physical activity (PA) & higher increases in PA over time were associated with a more eccentric-type of left ventricular remodeling pattern.

Oni E, Ogunmoroti O...**Martin SS**...**Blaha MJ, Blumenthal RS, Veledar EM, Nasir K.** Life's Simple 7 & Non-Alcoholic Fatty Liver Disease (NAFLD): MESA. *Am J Med*. 2020 Dec 4:S0002-9343(20)30908-6.

Conclusion: Favorable cardiovascular health score was associated with a lower prevalence of NAFLD.

Mehta A...**Blumenthal RS, Virani SS.** Cardiovascular disease prevention in focus: Highlights from the 2019 American Heart Association sessions. *Current Atherosclerosis Reports*. 2020, January 1; 20:3.

Fox N, Fox NJ, Blumenthal RS, Cainzos-Achirica M, Florido R. Physical activity & heart failure in high-risk subgroups. *ACC.org*. May 15, 2020.

Ferraro RA, Davis DM, Blumenthal RS, Martin SS. Comparison of dietary & exercise recommendations on both sides of the Atlantic. *ACC.org* Aug 24, 2020.

Fox NJ, Fox N, Davis D, Blumenthal RS, Cainzos-Achirica M. Staying young at heart: it's never too early to start healthy habits. *Cardiosmart.org*. October 3, 2019.

Fox N, Fox NJ, Ying W, Cainzos-Achirica M, Blumenthal RS. Reframing primary prevention for young adults. *Cardiosmart.org*. October 26, 2020.

Ferraro R, Blumenthal RS, Gulati M, Sharma G. Evaluation & management of patients with chest pain due to heart disease. *Cardiosmart.org*. November 19, 2020.

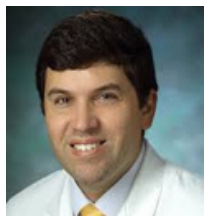
Sajja A, Blumenthal, RS, Al Faddagh A. The primary prevention of CVD. In *The ASPC Manual of Preventive Cardiology*. (Wong N, Toth P eds) 2020.

RESEARCH PUBLICATIONS

Digital/Mobile Health Technology

Hung G, Yang WE, **Marvel FA, Martin SS.**

Mobile health application platform 'Corrie' personalises & empowers the heart attack recovery patient experience in the hospital & at home for an underserved heart attack survivor.



Seth Martin, MD, MHS

BMJ Case Rep. 2020 Feb 17;13(2):e231801.

Conclusion: Mobile health (mHealth) is a promising approach to reinforce guideline-directed medical therapy & lifestyle modification.

Cohen AB, **Martin SS.** Innovation without integration. *NPJ Digit Med.* 2020 Feb 3;3:15.

Shan R, Yanek LR, **Silverman-Lloyd LG, Kianoush S, Blaha MJ, German CA, Graham GN, Martin SS.**

Using mobile health tools to assess physical activity guideline adherence & smoking urges: secondary analysis of mActive-s smoke. *JMIR Cardio.* 2020 Jan 6;4(1):e14963.

Conclusion: Prevalence of moderate-to-vigorous physical activity was low in adult smokers who rarely met national guidelines for physical activity.

Yang WE, **Spaulding EM...Marvel FA...Martin SS.** Strategies for successful implementation of a novel iPhone loaner system (iShare) in mHealth Interventions: prospective study. *JMIR Mhealth Uhealth.* 2019 Dec 16;7(12):e16391.

Conclusion: The Corrie iShare program demonstrates the potential for a sustainable & scalable mHealth loaner program, enabling broader population reach while optimizing user experience.

Shan R, Ding J, Plante TB, **Martin SS.** Mobile health access & use among individuals with or at risk for CVD: 2018 Health Information National Trends Survey (HINTS). *J Am Heart Assoc.* 2019 Dec 17;8(24):e014390.

Conclusion: There was a high prevalence of smartphone ownership but incomplete mHealth uptake.

Shan R...**Spaulding EM...Marvel FA, Martin SS.** Early BP assessment after acute MI: insights using digital health technology. *Am J Prev Cardiol.* 2020 Sep;3:100089.

Conclusion: About 40% of post-AMI patients had uncontrolled BP according to recent guidelines, while hypotension occurred rarely.

Isakadze N, Martin SS. How useful is the smartwatch ECG? *Trends Cardiovasc Med.* 2020 Oct;30(7):442-448.

Spaulding EM, Marvel FA...Martin SS, Han HR. Interprofessional education & collaboration among healthcare students & professionals: systematic review & call for action. *J Interprof Care.* 2019 Dec 21:1-10.

Conclusion: Interprofessional education was effective in improving both pre-licensure learners & professionals' attitudes toward other disciplines & a team-based approach for improving outcomes.

Spaulding EM, Marvel FA, Piasecki RJ, Martin SS, Allen JK. User engagement with smartphone applications & CVD health behavior change & risk factor outcomes: systematic review. *JMIR Cardio.* 2020.

Wongvibulsin S...**Spaulding EM...Marvel FA...Martin SS.** Digital interventions for cardiac rehabilitation: systematic literature review. *JMIR.* 2020.

Conclusion: Digital technologies can increase access & participation in cardiac rehabilitation by mitigating the challenges associated with traditional cardiac rehabilitation.

Huynh PP...**Marvel FA, Sharma G, Martin SS.** Accuracy of apple watch heart rate measurements in patients with obstructive sleep apnea & atrial fibrillation. *JMIR Cardio.* 2020.



Francoise Marvel, MD

Khan MS...**Michos ED, Kalra A.** The Kardashian Index of Cardiologists: Celebrities or Experts? *JACC Case Rep.* 2020;2(2):330-332.

Gender/Sex Differences

Griffith DM, **Sharma G...Blumenthal RS.** Men & COVID-19: Biopsychosocial approach to understanding sex differences in mortality & recommendations for practice & policy interventions. *Prev Chronic Dis.* 2020 Jul 16;17:E63.

Conclusion: A biopsychosocial approach takes into account the range of factors that determine risk and where we might intervene within a population health framework that considers biomedical & public health interventions.

Okunrintemi V, Tibuakuu M...Leucker TM, Blumenthal RS, Michos ED. Sex differences in age of diagnosis for CVD & its risk factors among US adults; Trends from 2008-17, MEPS. *J Am Heart Assoc.* 2020 Nov 9:e018764.

Conclusion: The trend in decreasing age at diagnosis for CVD & its risk factors in the US appears to be more pronounced among women.

Osman M...**Michos ED, Alkhouli M.** Sex-stratified analysis of the safety of percutaneous left atrial appendage occlusion. *Catheter Cardiovasc Interv.* 2020 Oct 13.

Conclusion: Among patients undergoing left atrial appendage occlusion, women carry higher risk for major in-hospital adverse events, nonhome discharge, & 30-day readmission rates.

Mahtta D...**Michos ED...Itchhaporia D, Nasir K...Virani SS.** Statin prescription rates, adherence, & associated clinical outcomes among women with PAD & ischemic cerebrovascular disease (ICVD). *Cardiovasc Drugs Ther.* 2020 Dec;34(6):745-754.

Conclusion: Women with peripheral artery disease or ICVD had lower odds of receiving statin Rx or being statin adherent.

Nasir K, Sharma G, Blumenthal RS. Sex differences in coronary plaque composition & progression: will it influence clinical management? *JACC Cardiovasc Imaging.* 2020 Nov;13(11):2397-2399.

Conclusion: This insightful editorial examines sex differences in coronary atherosclerosis.

Zhao D, Guallar E, Ballantyne CM, Post WS...Nduemele CE, Hoogeveen RC, Michos ED. Sex hormones & incident heart failure in men & postmenopausal women: ARIC. *J Clin Endocrinol Metab.* 2020 Oct 1;105(10):dgaa500.

Conclusion: Low levels of endogenous testosterone & DHEA-S in men & low levels of DHEA-S in postmenopausal women were associated with development of HF.

RESEARCH PUBLICATIONS

Khan SU, Khan MZ... Blaha MJ, Blumenthal RS, Gulati M, Michos ED.

Participation of women & older participants in RCTs of lipid-lowering therapies: A Systematic Review.

JAMA Netw Open. 2020

May 1;3(5):e205202.

Conclusion: Enrollment of women & older participants increased over time, but these subgroups remained consistently underrepresented in RCTs of lipid-lowering therapies.



Erin Michos, MD, MHS

Minhas A, Michos ED. Cardiac device clinical trials: where are the women & what are their outcomes? *J Womens Health* 2020 Oct;29(10):1235-1236.

Cho L, Davis M...**Michos ED**...Volgman AS; ACC CVD Womens Committee Members. Summary of updated recommendations for primary prevention of CVD in Women: JACC State-of-the-Art Review. *J Am Coll Cardiol.* 2020 May 26;75(20):2602-2618

Conclusion: Women have unique risk factors for CVD such as PCOS & pregnancy-associated conditions that increase future risk of CVD; women sometimes have different manifestations of CVD.

Khan MS, Shahid I...**Michos ED.** Ten-Year trends in enrollment of women & minorities in pivotal trials supporting recent US FDA approval of novel cardiometabolic drugs. *J Am Heart Assoc.* 2020 Jun 2;9(11):e015594.

Conclusion: Women & minorities, particularly Blacks, have continued to be inadequately represented in pivotal trials for novel cardiometabolic drugs during the past decade.

Sharma G, Volgman AS, Michos ED. Sex differences in mortality from COVID-19 pandemic: are men vulnerable & women protected? *JACC Case Rep.* 2020 Jul 15;2(9):1407-1410.

Conclusion: Sex is an important driver of risk of mortality during the COVID-19 pandemic.

Agarwala A, **Michos ED**...Virani SS. Use of sex-specific factors in assessment of women's CV risk. *Circulation.* 2020 Feb 18;141(7):592-599.

Conclusion: This primer discusses sex-specific CVD risk factors in women, highlights the importance of a thorough obstetrical & gynecological history, & provides a framework for how to incorporate these factors in treatment recommendations.

Khan MS, Mahmood S...**Sharma G, Michos ED.** Women training in cardiology & its subspecialties in the US: a decade of little progress in representation. *Circulation.* 2020 Feb 18;141(7):609-611.

Conclusion: A marked sex disparity still prevails for training within Cardiology & its subspecialties, with little change over the past decade.

Raber I...**Michos ED, ...McEvoy JW.** Gender differences in industry payments among cardiologists. *Am Heart J.* 2020 May;223:123-131.

Conclusion: There are significant gender differences in industry payments to Cardiologists in both the US & UK.

Osibogun O, Ogunmoroti O, Michos ED.

Polycystic ovary syndrome & cardiometabolic risk: opportunities for CVD prevention. *Trends Cardiovasc Med.* 2020 Oct;30(7):399-404.

Ogunmoroti O, Osibogun O...Sharma G, Vaidya D, Michos ED. Multiparity is associated with poorer CV health among women from MESA. *Am J Obstet Gynecol.* 2019 Dec;221(6):631.e1-631.e16.

Conclusion: Multiparity was associated with poorer CV health, especially for women with ≥ 5 live births.

Wong ND...**Whelton SP, Budoff MJ, Nasir K...**

Blaha MJ, Berman DS. Sex differences in CAC & mortality from CHD, CVD, & all causes in adults with diabetes: CAC Consortium. *Diabetes Care.* 2020 Oct;43(10):2597-2606.

Conclusion: Greater CAC predicts CVD & total mortality more strongly in women.

Suthahar N, Lau ES, **Blaha MJ**...de Boer RA. Sex-specific associations of CV risk factors & biomarkers with incident heart failure. *J Am Coll Cardiol.* 2020 Sep 22;76(12):1455-1465.

Conclusion: CV risk factors are strongly & similarly associated with incident HF in both sexes.

Fonseca MIH...**Toth PP, Jones SR, Blaha MJ**...Ferreira SRG; ELSA-Brasil Research Group. Changes in lipoprotein subfractions following menopause in the Longitudinal Study of Adult Health (ELSA-Brasil). *Maturitas.* 2019 Dec;130:32-37.

Conclusion: Deterioration of the lipid profile following menopause was confirmed, which could contribute to increased ASCVD risk.

Wang F, **Blumenthal RS...Blaha MJ, Berman DS.** Age- & gender-adjusted percentiles for number of calcified plaques in CAC scanning. *J Cardiovasc Comput Tomogr.* 2019 Dec;13(6):319-324.

Conclusion: The number of calcified plaques may add to CAC score in assessing patient prognosis.

Okunrintemi V, Tibuakuu M... Leucker TM, Blumenthal RS, Michos ED. Sex differences in age of diagnosis for CVD & its risk factors among US adults; trends from 2008-2017, MEPS. *J Am Heart Assoc.* 2020 Nov 9:e018764.

Conclusion: There was a decreasing trend in the age at diagnosis for CVD & its risk factors, which is more pronounced among women.

Gheorghie G, **Toth PP**...Diaconu CC. Cardiovascular risk & statin therapy. Considerations in women. *Diagnostics (Basel).* 2020 Jul 16;10(7):483.

Ogunwole SM, Dill M, Jones K, **Golden SH.** Trends in internal medicine faculty by sex & race/ethnicity, 1980-2018. *JAMA Netw Open.* 2020 Sep 1;3(9):e2015205.

Conclusion: Continued improvement of recruitment & retention efforts for women & groups who are underrepresented in medicine as medical students & faculty in medicine is needed.

Mansour O, **Golden SH, Yeh HC.** Disparities in mortality among adults with & without diabetes by sex & race. *J Diabetes Complications.* 2020 Mar;34(3):107496.

Conclusion: There are marked disparities in diabetes mortality by sex & race/ethnicity in the past decade.

Sharma G, Blumenthal RS, Mehta LS. A decade of lost ground in the awareness of heart disease symptoms in women: a call to action. *American Heart Association Professional Heart Daily.* 2020 Sept 21.

Conclusion: Awareness that heart disease is the leading cause of death among women declined from 2009 to 2019.

Osman M...**Michos ED, Bianco C.** Association between breast arterial calcification on mammography & CAD: systematic review & meta-analysis. *Am J of Prev Cardiol.* 2020;3:100052.

RESEARCH PUBLICATIONS

Osman M...**Michos ED**, Bianco C. Association between breast arterial calcification on mammography & CAD: systematic review & meta-analysis. *Am J Prev Cardiol.* 2020;3:100052.

Elder P, **Sharma G**, Gulati M, **Michos ED**.

Identification of female-specific risk enhancers throughout lifespan of women to improve CVD prevention. *Am J Prev Cardiol.* 2020;2:100028.

Conclusion: Identification of female-specific risk factors is important for determining CVD risk & for planning preventive & therapeutic interventions.

Jia X...**Matsushita K**, Selvin E, **Michos ED**, Hoogeveen RC, Ballantyne CM. Plasma dehydroepiandrosterone sulfate & CVD risk in older men & women. *J Clin Endocrinol Metab.* 2020;105(12):1-24.

Conclusion: Low DHEA-S was associated with increased risk for subclinical myocardial injury, HF hospitalization, & death.

Akbar A, Liu K, **Michos ED**...Kramer H. Racial differences in urinary incontinence prevalence, overactive bladder & associated bother among men: MESA. *J Urol.* 2020. Sept 10.

Conclusion: Urinary incontinence prevalence differs by race/ethnicity.

Kazzi BE, **Michos ED**. Calcified Coronary Plaque among Patients with Type 2 Diabetes Mellitus Confers Greater Cardiovascular Mortality Risk in Women: Insight from the CAC Consortium. *ACC.org.* Nov 23, 2020.

Cardio-Obstetrics

Sharma G, Zakaria S, **Michos ED**...Mehta L. Improving CV workforce competencies in cardio-obstetrics: current challenges & future directions. *J Am Heart Assoc.* 2020 Jun 16;9(12):e015569.

Mehta LS, Warnes CA...**Sharma G**...Volgman AS. Cardiovascular considerations in caring for pregnant patients: AHA Scientific Statement. *Circulation.* 2020 Jun 9;141(23):e884-e903

Conclusion: This scientific statement highlights the need for a multidisciplinary cardio-obstetrics team for management of CVD during a high-risk pregnancy.



Dr. Garima Sharma leads the Cardio-Obstetrics (Cardio-Ob) program and the post-partum Cardiovascular Prevention clinic for the Ciccarone Center. The multidisciplinary Cardio-Ob clinic treats high-risk cardiac disease in pregnancy with maternal fetal medicine (MFM). The co-lead from MFM is Dr. Jason Vaught and other key physicians include **Drs. Erin Michos, Sammy Zakaria, Andrea Creanga, Ari Cedars** (adult congenital heart disease), as well as fellows-in-training **Anum Minhas** and **Wendy Ying**.

The MFM clinic is supported by specialists in advanced heart failure and electrophysiology. The post-partum hypertension clinic sees patients with severe hypertension, with complicated deliveries, who are followed for blood pressure control, lifestyle modification, and risk assessment.

Dr. Sharma also serves on several national and regional committees. She is the incoming governor of the Maryland chapter of the American College of Cardiology (ACC) and serves on the National Women in Cardiology Leadership Council, as well as the ACC Cardio-Ob work group. She is also a key faculty member of the American Heart Association's (AHA's) Research Goes Red Committee that is in charge of AHA's scientific mission to reduce cardiovascular disease in women.

Dr. Sharma has been appointed to several national guideline statements, including serving as the co-chair of the AHA Maternal Health Policy Statement and a member of the AHA Cardiovascular Disease Prevention Statement for Racial and Ethnically Underrepresented Women, which also includes **Dr. Roger Blumenthal**. Her research focuses on different aspects of preeclampsia from population sciences to translational aspects of disease progression. In the last year, her research has been published in *JACC, Circulation, JAMA* and other prominent journals.

She also leads the Ciccarone Center research on adverse pregnancy outcomes and the impact of social determinants of health and acculturation. Additionally, she works closely with Dr. Blumenthal in developing a focused curriculum in preventive cardiology for residents and fellows.

Sharma G, Lindley K, Grodzinsky A. Cardio-obstetrics: developing a niche in maternal cardiovascular health. *J Am Coll Cardiol.* 2020 Mar 24; 75(11): 1355-1359.

Conclusion: The authors discuss the evolving spectrum of CVD in pregnancy, the need for multidisciplinary care & registry data, & the need for core competencies in cardio-obstetrics.

Ouyang P, **Sharma G**. Potential for pregnancy heart teams to reduce maternal mortality in women with CVD. *J Am Coll Cardiol.* 2020 Nov 3;76(18):2114-16.

Mszar R...**Cainzos-Achirica M, Sharma G, Nasir K**. Disparities in cholesterol screening among a nationally representative sample of pregnant women in the US. *Eur J Prev Cardio.* Nov. 2020.

Conclusion: One in three pregnant women lacked cholesterol screening in the prior 12 months.

Minhas AS, Ying W...Michos ED, Blumenthal RS, Sharma G. Association of adverse pregnancy outcomes and CVD: current knowledge & future directions. *Current Treatment Options in Cardiovascular Medicine.* 2020;22:61-1-15.

Conclusion: Adverse pregnancy outcomes, including preeclampsia & hypertensive disorders of pregnancy, gestational diabetes mellitus, & preterm delivery, are associated with future maternal CVD.

Sharma G, Ying W, Silversides C. Importance of CV risk assessment & pregnancy heart team in the management of CVD in pregnancy. *Current Cardiology Reports.* 2020; Nov.

Conclusion: Multidisciplinary team-based care (comprised of Cardiology and Obstetric team members) is the cornerstone of optimal CVD management in pregnancy.

RESEARCH PUBLICATIONS

Sharma G, Ying W, Vaught AJ. Understanding the rural & racial disparities in pre-pregnancy hypertension: important considerations in maternal health equity. *J Am Coll Cardiol.* 2020 Nov 7;S0735-1097(20)37397-6.

Conclusion: To reduce the maternal mortality rate, we need to divert health care expenditures towards preventive health in young women.

Sharma G, Hays A, Blumenthal RS. Management of Hypertensive Disorders of Pregnancy. How can we reduce long-term CV events? *J Am Coll Cardiol.* Dec. 2020.

HIV

Heravi AS, Etzkorn LH...Post WS. HIV infection is associated with variability in ventricular repolarization: MACS. *Circulation.* 2020 Jan 21;141(3):176-187.

Conclusion: Increased ventricular repolarization lability could signal higher susceptibility to ventricular dysrhythmias.

Chai JC, Deik AA...Post WS... Qi Q. Association of lipidomic profiles with progression of carotid artery atherosclerosis in HIV infection. *JAMA Cardiol.* 2019 Dec 1;4(12):1239-1249.

Conclusion: HIV/antiretroviral therapy-associated lipidome alteration may be linked with carotid artery atherosclerosis.

Wu KC, Bhondoekhan F...Post WS. Associations between QT interval subcomponents, HIV serostatus, & inflammation. *Ann Noninvasive Electrocardiol.* 2020 Mar;25(2):e12705.

Conclusion: The study findings suggest possible mechanisms whereby longer corrected QT interval (QTc) increases arrhythmic risk.

Schneider EE, Sarkar S, Margolick JB, Martin SS, Post WS, Brown TT. Comparison of calculated LDL-C values in HIV-infected and HIV-uninfected men using the traditional Friedewald and the novel Martin-Hopkins LDL-C Equations. *AIDS Res Hum Retroviruses.* 2020 Mar;36(3):176-179.

Brusca RM, Hanna DB...Post WS. Subclinical cardiovascular disease in HIV controller & long-term nonprogressor populations. *HIV Med.* 2020 Apr;21(4):217-227

Conclusion: Subclinical CVD was similar in HIV controllers, long-term nonprogressors and HIV-uninfected individuals.

Hiremath PG...Post WS...Wu KC. Testosterone use & shorter electrocardiographic QT interval duration in men living with and without HIV. *HIV Med.* 2020 Dec 3.

Conclusion: Recent testosterone use was associated with a shorter corrected QT interval (QTc) interval.

Genetics

Arvanitis M, Tampakakis E...Post WS, Battle A. Genome-wide association & multi-omic analyses reveal ACTN2 as a gene linked to heart failure. *Nat Commun.* 2020 Feb 28;11(1):1122.



Wendy Post, MD, MS

Conclusion: The combined meta-analysis revealed one previously identified & two novel loci associated with clinical heart failure.

Bennett JA, Mastrangelo MA...Lowenstein CJ. The choline transporter Slc44a2 controls platelet activation & thrombosis by regulating mitochondrial function. *Nat Commun.* 2020 Jul 13;11(1):3479.

Conclusion: Slc44a2 is a thrombosis regulator & may be an important therapeutic target.

Mosley JD...Post WS...Wang TJ. Predictive accuracy of a polygenic risk score compared with a clinical risk score for incident CHD. *JAMA.* 2020 Feb 18;323(7):627-635.

Conclusion: Polygenic risk scores may not enhance risk prediction for incident CHD compared with a clinical risk score.

Hatchell KE...Michos ED, Wood AC, Engelman CD. Multi-ethnic analysis shows genetic risk & environmental predictors interact to influence 25(OH)D concentration & optimal vitamin D intake. *Genet Epidemiol.* 2020 Mar;44(2):208-217.

Conclusion: Available UV radiation & vitamin D intake interact with genetics to influence 25(OH)D.

Hoekstra M...Post WS...Engert JC. Genome-wide association study highlights APOH as a novel locus for lipoprotein(a) levels. *Arterioscler Thromb Vasc Biol.* 2020 Oct 29;ATVBAHA120314965.

Conclusion: The novel APOH variant was associated with increased Lp(a) levels in individuals of European ancestry.

Chen TK...Post WS...Peralta CA. Association of APOL1 genotypes with measures of microvascular & endothelial function & BP in MESA. *J Am Heart Assoc.* 2020 Sep;9(17):e017039.

Conclusion: Among Black participants, APOL1 risk status was not associated with vascular & endothelial function or changes in BP.

Collins RL, Brand H...Post WS...Talkowski ME. A structural variation reference for medical & population genetics. *Nature.* 2020 May;581(7809):444-451.

Conclusion: Structural variants rearrange large segments of DNA & have profound consequences in human disease.

Arvanitis M, Qi G, Bhatt DL, Post WS, Chatterjee N, Battle A, McEvoy JW. A linear & non-linear mendelian randomization analysis of the association between diastolic BP & CV events: J curve revisited. *Circulation.* 2020 Nov 30.



Marios Arvanitis, MD

Conclusion: There was no evidence for a non-linear J- or U-shaped relationship between DBP & adverse CVD outcomes including MI.

Duvall C, Ipek EG, Brown E, Blumenthal RS, Leucker T. Genetic Testing for Managing Dyslipidemia. *ACC.org.* Nov 16, 2020

Conclusion: This provides a concise review of genetic testing in lipid disorders.

Vascular Disease/ Aortic Disease/ Heart Failure



Shireen Khoury, MD, MPH

Khoury SR, Martin SS, Ratchford EV.

Vascular disease patient information page: Understanding cholesterol. *Vasc Med.* 2020 Oct;25(5):507-510.

RESEARCH PUBLICATIONS

Treat-Jacobson D, **Ratchford EV**. Vascular disease patient information page: Exercise for peripheral artery disease. *Vasc Med*. 2020 Feb;25(1):95-97.



Elizabeth Ratchford, MD

Conclusion: Exercise improves leg symptoms related to PAD.

Fischer NM, Pallazola VA, Xun H, Cainzos-Achirica M, Michos ED. Evolution of the heart-healthy diet for vascular health: A walk through time. *Vasc Med*. 2020 Apr;25(2):184-193.

Conclusion: This review highlights landmark events in nutrition science & how these have framed current understandings of diet & health. The DASH, Mediterranean, & healthy vegetarian diets have the strongest evidence for reduction of CVD risk.

Rao VN...**Michos ED, Felker GM**. Regional adiposity & heart failure with preserved ejection fraction. *Eur J Heart Fail*. 2020 Sep;22(9):1540-1550.

Conclusion: Regional adiposity is an important driver in the incidence & pathogenesis of HFrEF among overweight individuals.

Ding N...**McEvoy JW...Matsushita K**. Fibrosis & inflammatory markers & long-term risk of PAD: ARIC Study. *Arterioscler Thromb Vasc Biol*. 2020 Sep;40(9):2322-2331.

Conclusion: Galectin-3 & hsCRP were associated with PAD, supporting the involvement of fibrosis & inflammation in the pathophysiology of PAD.

Florido R, Lee AK, McEvoy JW...Blumenthal RS, Ndumele CE...Selvin E. Cancer survivorship & subclinical myocardial damage. *Am J Epidemiol*. 2019 Dec 31;188(12):2188-2195.

Conclusion: Cancer survivorship was associated with higher likelihood of elevated hs-cTnT, a marker of subclinical myocardial damage & CVD risk.

Mgbojike N, **Jones SR, Leucker TM, Brotman DJ**. In reply: Infective endocarditis: Don't forget the ICE. *Cleve Clin J Med*. 2020 Apr;87(4):192.

Shahid I...**Michos ED, Krasuski RA**. Deaths from heart failure & cancer: location trends. *BMJ Support Palliat Care*. 2020 Jun 22;bmjspcare-2020-002275.

Conclusion: Deaths in hospital or nursing facilities account for half of cancer or heart failure deaths.

Razavi AC...Whelton SP, Blumenthal RS, Lloyd-Jones D, Bazzano LA. Pooled cohort equations heart failure risk score predicts CVD & all-cause mortality in a nationally representative sample of US adults. *BMC Cardiovasc Disord*. 2020 Apr 25;20(1):202.

Conclusion: Pooled cohort equations heart failure risk score predicts CVD & all-cause mortality among Whites & Blacks.

Ärnlov J...**Michos ED...Blahe M, Post WS, Matsushita K**. Endothelial dysfunction & risk of heart failure in a community-based study: MESA. *ESC Heart Fail*. 2020 Oct 20.

Conclusion: Endothelial dysfunction was primarily associated with development of HFrEF & heart failure with prior myocardial infarction.

Pirruccello JP...**Post WS...Aragam KG**. Analysis of cardiac MRI in 36,000 individuals yields genetic insights into dilated cardiomyopathy. *Nat Commun*. 2020 May 7;11(1):2254.

Conclusion: 45 previously unreported common genetic loci associated with LV structure & function were linked to dilated cardiomyopathy.

Scheel PJ 3rd, Florido R...Gilotra NA. Safety & utility of cardiopulmonary exercise testing in ARVD/C. *J Am Heart Assoc*. 2020 Feb 4;9(3):e013695.

Conclusion: Cardiopulmonary exercise testing is safe to perform in patients with ARVD/C.

Cohen LP, Vittinghoff E...**Ndumele CE...Zhang Y**. Association of midlife cardiovascular risk factors with risk of heart failure subtypes later in life. *J Card Fail*. 2020 Nov 22.

Conclusion: Higher pulse pressure during midlife is the most important risk factor for HFpEF.

Fashanu OE, Bizanti A... Michos ED. Progression of valvular calcification & risk of incident stroke: MESA. *Atherosclerosis*. 2020 Aug;307:32-38.

Conclusion: Progression of mitral annular calcium but not aortic valve calcium was associated with stroke risk.

Fashanu OE, Upadhrasta S, Zhao D... Michos ED. Effect of progression of valvular calcification on LV structure & frequency of incident heart failure (MESA). *Am J Cardiol*. 2020 Nov 1;134:99-107.

Conclusion: Progression of valvular calcification was associated with increased risk of heart failure.



Oluwaseun Fashanu, MD, MPH

Heckbert SR...**Post WS... Psaty BM**. Differences by race/ethnicity in prevalence of clinically detected & monitor-detected atrial fibrillation: MESA. *Circ Arrhythm Electrophysiol*. 2020 Jan;13(1):e007698.

Conclusion: Clinically detected AFib was less common in African Americans than in Whites, but AF detection by ambulatory monitoring revealed little difference by ethnicity.

Jang S, **Ogunmoroti O, Ndumele CE, Zhao D, Rao VN, Fashanu OE, Tibuakuu M, Otvos JD, Benson EM, Ouyang P, Michos ED**. Association of the novel inflammatory marker GlycA & incident heart failure & its subtypes of preserved & reduced ejection fraction: MESA. *Circ Heart Fail*. 2020 Aug;13(8):e007067.

Conclusion: Higher GlycA levels were associated with increased risk of any heart failure & particularly with HFpEF.

Razavi AC... Whelton SP... Kelly TN. Novel findings from a metabolomics study of LV diastolic function: Bogalusa Heart Study. *J Am Heart Assoc*. 2020 Feb 4;9(3):e015118.

Conclusion: There are novel metabolite associations with LV diastolic function.

RESEARCH PUBLICATIONS

Toth PP...Granowitz C. Elevated triglycerides (≥ 150 mg/dL) & high triglycerides (200-499 mg/dL) are significant predictors of new heart failure diagnosis: Real-world analysis of high-risk statin-treated patients. *Vasc Health Risk Manag.* 2019 Dec 4;15:533-538.

Conclusion: Both elevated triglycerides (TG) & high TG were predictors of new-onset HF in statin-treated patients at high CV risk.

Wu CM, Albert NM, **Gluckman TJ...**Weintraub WS. Facilitating the identification of patients hospitalized for acute MI & heart failure & assessment of their readmission risk through the patient navigator Program. *Am Heart J.* 2020 Jun;224:77-84.

Conclusion: Implementation of a coordinated quality improvement campaign increases the number of facilities identifying acute MI & heart failure patients pre-discharge & better assesses readmission risk.

Khan SU...**Michos ED,** Alkhouli M. Trends of comorbidities in clinical trials of atrial fibrillation. *Am J Cardiol.* 2020;131:127-128.

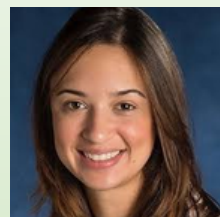
Conclusion: The reporting on comorbidity was consistently low in AF trials over the last 3 decades.



Chiadi Ndumele, MD

Drs. Chiadi Ndumele and Roberta Florido, along with their collaborators, are progressing with exciting work related to the links between obesity, metabolic risk factors, and diabetes and their relationship to the development of heart failure. Dr. Ndumele co-leads one of the four American Heart Association Cardiometabolic Strategically Focused Research Networks (SFRNs). The Hopkins SFRN is focused on understanding why some individuals with obesity develop metabolic abnormalities and diabetes while others do not. Our group is also aiming to understand pathways that lead to heart failure.

A central focus of their work is on the role of adipokines, proteins secreted by fat cells and nearby inflammatory cells that affect the metabolic and cardiovascular systems. In an initial exciting project, they directly examined the production of adipokines in fat tissue. The combination of high leptin levels and low adiponectin levels in abdominal fat tissue has a greater association with the constellation of abnormalities termed the “metabolic syndrome” and with diabetes in obese individuals.



Roberta Florido, MD

A high leptin-to-adiponectin ratio was associated with a markedly increased odds of having metabolically unhealthy obesity (metabolic syndrome present) and diabetes. This suggests that adipokines may predict the risk of metabolic abnormalities and the development of heart failure in obesity and may serve as a future therapeutic target.

Working with **Drs. Justin Echouffo-Tcheugui**, and **Elizabeth Selvin**, Drs. Ndumele and Florido also led important work studying the association of diabetes with progression to heart failure in the large, prospective Atherosclerosis Risk in Communities (ARIC) study. Suboptimally controlled diabetes (hemoglobin A1c $> 7\%$) was linked to a greater risk of, and faster progression to, heart failure among those with early and not yet clinically recognized heart dysfunction. Additionally, they are examining the impact of diabetes duration on heart failure risk.

To further understand the pathways linking obesity and diabetes to heart failure, they studied biomarkers of cardiac dysfunction. Dr. Florido found that obesity was associated with elevated levels of galectin-3, a biomarker of cardiac inflammation and fibrosis. Interestingly, this association was stronger among women and Blacks. The combination of severe obesity and elevated galectin-3 was associated with a greater than four-fold higher risk of developing heart failure. Dr. Echouffo demonstrated that metabolic abnormalities associated with obesity are linked to greater elevations in galectin-3, and that metabolic risk levels and galectin-3 provide complementary prognostic information.

Drs. Florido and Ndumele’s work has also centered on socioeconomic disparities related to metabolic risk factors, and heart failure. Working with trainees **Robert Okyere** and **Carine Hamo**, they demonstrated that the degree of heart failure attributable to metabolic risk factors is greater among blacks and those with low socioeconomic status. This identifies a key focus for healthy equity efforts.

In another project led by trainee **Amira Collison**, they found that the association of low socioeconomic status with the development of heart failure is magnified by the presence of diabetes. While 21% of individuals with high socioeconomic status and no diabetes developed heart failure, the risk increased to 73% for individuals with low socioeconomic status and diabetes.

Because metabolic risk factors often co-exist, Dr. Ndumele is working with **Dr. Carine Hamo** to examine how collective control of diabetes, obesity, and hypertension relate to the development of heart failure. Poor collective control of multiple risk factors is associated with markedly increased heart failure risk, with heart failure rates rising 4-fold from those with all-controlled risk factors to those with multiple uncontrolled risk factors. Importantly, they found that almost a quarter of heart failure cases could potentially be attributed to uncontrolled but modifiable risk factors.

These and ongoing projects are providing important insights regarding the processes underlying the development of metabolic risk factors and diabetes among those with obesity, and the pathways leading to heart failure. This work will inform new strategies to prevent the development of heart failure.

RESEARCH PUBLICATIONS

Al-Abdoun A, Upadhrasta S, Fashanu O...Michos ED. TAVR in low-risk patients: meta-analysis of RCTs. *Cardiovasc Revascularization Med.* 2020;21(4):461-466.

Conclusion: TAVR was not associated with change in mortality. However, TAVR was associated with a lower risk of acute kidney injury, new-onset Afib, lower risk of bleeding, & a higher risk of moderate-severe paravalvular leak & permanent pacemaker.

Sreenivasan J...**Khan SU...Michos ED, Panza JA.** Rate, causes, & predictors of 30-day readmission following hospitalization for acute pericarditis. *Am J Med.* 2020;133(12):1453-1459.e1.

Conclusion: After hospitalization for acute pericarditis, readmission within 30 days was common and associated with increased mortality.



Gluckman TJ...Joynt Maddox KE. Trends in diagnosis related groups for inpatient admissions & associated changes in payment from 2012 to 2016. *JAMA Netw Open.* 2020; 3(12):e2028470.

Conclusion: The proportion of admissions assigned to a Diagnosis Related Group (DRG) with major complication or comorbidity increased for 15 of the top 20 reimbursed DRG families.

Prasada S...**Michos ED, Polak JF, Greenland P.** Ankle-brachial index & incident heart failure with reduced versus preserved ejection fraction: MESA. *Vasc Med.* 2019 Dec;24(6):501-510.

Conclusion: Low ABI was associated with higher risk for incident HF_rEF but not HF_pER in persons free of known CVD.

Damluji AA...**Gerstenblith G, O'Connor CM, Batchelor W.** Sarcopenia & health-related quality of life in older adults after TAVR. *Am Heart J.* 2020 Jun;224:171-181.

Conclusions: Skeletal muscle wasting is prevalent in TAVR patients; further study is needed into how body composition influences post-TAVR recovery.

Feldman DI, Cuomo K, Blumenthal RS, Florida R. A closer look at how to manage heart failure. *Cardiosmart.org.* January 30, 2020.

Oren O, Yang EH, Molina JR, Bailey KR, Blumenthal RS, Kopecky SL. Cardiovascular Health & Outcomes in Cancer Patients Receiving Immune Checkpoint Inhibitors. *Am J Cardiol.* 2020; 125(12):1920-1926.

Conclusion: CV factors are associated with clinical outcomes in cancer patients receiving immune checkpoint inhibitors (ICIs) & could be used to predict mortality.

El Asmar M, Ying W, Ferraro RA, Minhas A, Zadeh AA, Blumenthal RS, Boden WE, Sharma G. Management strategies for patients with LV systolic dysfunction and stable CAD – revascularization or continued optimal medical therapy. *ACC.org.* Oct 15, 2020.

Conclusion: There were few patients with a history of heart failure & impaired EF in ISCHEMIA.

Juric M, Blumenthal RS, Gulati M. Hispanic/Latino patients with peripheral artery disease underuse heart medications. *Cardiosmart.org.* October 26, 2020.

Ratchford EV, Khoury S. Smoking cessation in peripheral artery disease. *ACC.org.* Mar 05, 2020.

Neurologic Sequelae of CVD

Johansen MC, Geocadin RG, Kamel H. Embolic stroke of unknown source clinical trials & advances in research. *Ann Neurol.* 2020;88(3):462-463.

Al Rifai M, Blaha MJ...Johansen MC...Al-Mallah MH. Cardiorespiratory fitness & incident stroke types: FIT Project. *Mayo Clin Proc.* 2020;95(7):1379-1389.
Conclusion: Cardiorespiratory fitness is inversely correlated with risk for CVA.

Johansen MC, Gottesman RF, Urrutia VC. Cerebral venous thrombosis: associations between disease severity & cardiac markers. *Neurol Clin Pract.* 2020;10(2):115-121.

Conclusion: Markers of cerebral venous thrombosis severity were associated with higher odds of cardiac troponin elevation.

Johansen MC...Ndumele C...Gottesman RF. Associations between atrial cardiopathy & cerebral amyloid: ARIC-PET study. *J Am Heart Assoc.* 2020 Dec 15;9(24):e018399.

Conclusion: There is an association between changes in left atrial structure or function & elevated brain amyloid by PET in healthy older adults, but this is not present in persons with afib.



Michelle Johansen, MD, PhD is an assistant professor of neurology at Johns Hopkins University School of Medicine in the department of Neurology. Her pursuits in the area of cerebrovascular neurology stem from a fervent desire to be an exceptional care provider and clinical researcher. Her research focus is how changes in the heart (cardiac structure and function) impact neurological outcomes; she has a special interest in ischemic stroke etiology, subclinical infarcts, brain white matter disease, and vascular contributions to cognitive decline. Dr. Johansen was the first research chief resident while training at the University of Virginia, where she realized her own passion for clinical research. Her father's stroke in 2015, further solidified her resolve to push the bounds of scientific knowledge in this critical area. Relying on her background in chemistry combined with her PhD in Clinical Investigation from the Bloomberg School of Public Health, Dr. Johansen has already established a relationship between cardiac echocardiogram markers and brain changes, such as stroke, in her own patients at Johns Hopkins; she has worked closely with the Ciccarone Center. She has found similar predictors of brain health using cardiac measures in large epidemiologic cohort studies, such as the Atherosclerosis Risk in Communities study and the GeneSTAR study. With funding from the American Heart Association and the National Institutes of Health, Dr. Johansen using advanced cardiac imaging methods, such as Cardiac CTA and blood-based biomarkers to diagnose the cause of strokes and to determine the impact of cardiac changes on cognition over time. As an early-career investigator, she credits her collaborations with Hopkins Cardiologists, such as Dr. Michael Blaha, as instrumental to her success. Dr. Johansen is excited to begin to provide mechanistic insight into the heart-brain connection.

RESEARCH PUBLICATIONS

Johansen MC, Sheth KN. Is incident stroke associated with increased risk of major adverse CV events? *Neurology.* 2020 ;94(15):644-645.

Conclusion: Patients with ischemic stroke are at increased risk for additional CVD events.

Sreenivasan J, Khan MS, **Khan SU...Blumenthal RS, Michos ED.** Mental health disorders among patients with acute MI in US. *Am J Prev Cardiol.* 2020:100133.

Conclusion: There was an increase in the prevalence of major depression, bipolar disorder, anxiety disorders, & PTSD among patients with acute MI over 10 years.

Vitamin D

Fogacci S...**Michos ED...Blaha MJ, Toth PP, Borghi C, Cicero AF.** Vitamin D supplementation & incident preeclampsia: systematic review & meta-analysis of RCTs. *Clin Nutr.* 2020 Jun;39(6):1742-1752.

Conclusion: Vitamin D supplementation may be useful in preventing preeclampsia.

Zhang M, **Michos ED...Mueller NT.** Associations of cord blood vitamin D & preeclampsia with offspring BP in childhood & Adolescence. *JAMA Netw Open.* 2020 Oct 1;3(10):e2019046.

Conclusion: Maternal preeclampsia was associated with higher child BP from early childhood to adolescence.

Fashanu OE, Zhao D... Guallar E...Michos ED. Mid-life serum vitamin D concentrations were associated with incident dementia but not late-life neuropsychological performance in ARIC. *BMC Neurol.* 2019 Oct 22;19(1):244.

Conclusion: Lower 25(OH) D concentrations were associated with dementia but were not associated with late-life performance on neuropsychological, or depression testing.

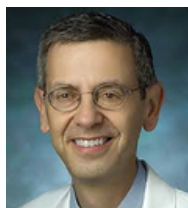
Appel LJ, **Michos ED**,..., Coresh J,....Roth DL and Tonascia J. The Effects of Four Doses of Vitamin D Supplements on Falls in Older Adults : A Response-Adaptive, Randomized Clinical Trial. *Ann Int Med.* 2020. Dec 1.

COVID-19 and CVD

Lowenstein CJ, Solomon SD.

Severe COVID-19 is a microvascular disease. *Circulation.* 2020 Oct 27; 142(17):1609-1611.

Conclusion: Endothelial exocytosis plays a central role in the pathogenesis of severe COVID-19.



Charles Lowenstein, MD

Metkus TS...**Lowenstein CJ, Michos ED, Nolley EP, Post WS...Hasan RK.** Myocardial Injury in Severe COVID-19 Compared to Non-COVID ARDS. *Circulation.* 2020 Nov 13.

Conclusion: Myocardial injury in severe COVID-19 is a function of baseline risk & comorbidities and multisystem organ dysfunction.

Reza N, DeFilippis EM, **Michos ED.** The Cascading Effects of COVID-19 on Women in Cardiology. *Circulation.* 2020 Oct 5.

Khera A, Baum SJ, **Gluckman TJ, Gulati M, Martin SS, Michos ED...Toth PP.** Shapiro MD. Continuity of care & outpatient management for patients with & at high risk for CVD during the COVID-19 pandemic: scientific statement from American Society for Preventive Cardiology. *Am J Prev Cardiol.* 2020 Mar;1:100009.

Conclusion: This statement provides a series of recommendations to mitigate disruptions of care & enhance the health of individuals at high-risk for CVD.

Usman MS...Michos ED. Is there a smoker's paradox in COVID-19? *BMJ Evid Based Med.* 2020 Aug 11;bmjebm-2020-111492.

Conclusion: The data supporting smoker's paradox claims are limited & questionable.

Heffernan KS, **Michos ED, Gump BB.** Coronavirus Disease 2019 (COVID-19) & Cardiac Injury. *JAMA Cardiol.* 2020 Jul 8.

Duffy EY, Cainzos-Achirica M, Michos ED. Primary & secondary prevention of CVD in the era of the coronavirus pandemic. *Circulation.* 2020 Jun 16;141(24):1943-1945

Conclusion: Telemedicine/health technology enhance CVD prevention in the COVID-19 era.

Oren O, Yang EH, Gluckman TJ, Michos ED, Blumenthal RS, Gersh BJ. Use of chloroquine & hydroxychloroquine in COVID-19 & CV implications: understanding safety discrepancies to improve interpretation & design of clinical trials. *Circ Arrhythm Electrophysiol.* 2020 Jun;13(6):e008688.

Conclusion: In light of the potential for serious cardiovascular effects with & hydroxychloroquine, its use in COVID-19 should be limited to randomized trials.

Minhas AS, Scheel P... Jones SR, Michos ED, Hays AG.

Takotsubo syndrome in setting of COVID-19. *JACC Case Rep.* 2020 Jul 15;2(9): 1321-1325.

Conclusion: COVID-19 has been associated with a variety of complications, including acute cardiac dysfunction. This was the first case of takotsubo (stress) cardiomyopathy reported in association with COVID-19 in the US.



Anum Minhas, MD

Oren O, Gersh BJ, Blumenthal RS. Anticipating & curtailing the cardiometabolic toxicity of social isolation & emotional stress in the time of COVID-19. *Am Heart J.* 2020 Aug;226:1-3.

Gao C...**McEvoy JW...Li F.** Association of hypertension & antihypertensive treatment with COVID-19 mortality: retrospective observational study. *Eur Heart J.* 2020 Jun 7;41(22):2058-2066.

Conclusion: Patients with RAAS inhibitors did not have a higher risk of mortality.

Sinha SS, **Sharma G, Cullen MW.** The crucible of crisis: responses of fellows-in-training & early career Cardiologists to the COVID-19 Pandemic. *J Am Coll Cardiol.* 2020 May 26;75(20):2627-2629

Goerlich E...**Cingolani OH, Hays AG.** Prevalence & clinical correlates of echo-estimated right & left heart filling pressures in hospitalized patients with coronavirus disease 2019. *Crit Care Explor.* 2020 Sep 30;2(10):e0227.

Conclusion: Pulmonary hypertension is common in hospitalized patients with COVID-19 & is associated with elevated left heart filling pressure..

RESEARCH PUBLICATIONS

Kass DA, Duggal P, **Cingolani O**.

Obesity could shift severe COVID-19 disease to younger ages. *Lancet*. 2020 May 16;

395(10236):

1544-1545.

Conclusion: In populations with a high prevalence of obesity, COVID-19 will affect younger populations more strongly.



Oscar Cingolani, MD

Al-Ghatrif M, **Cingolani O**, Lakatta EG. The Dilemma of Coronavirus Disease 2019, Aging, & CVD: Insights From Cardiovascular Aging Science. *JAMA Cardiol*. 2020 Jul 1;5(7):747-748.

Conclusion: Older persons with CVD who have reduced ACE2 levels will be predisposed to exaggerated inflammation with further reduction in ACE2 expression.

Khan MS, Shahid I, Anker SD, Solomon SD, Vardeny O, **Michos ED**, Fonarow GC, Butler J. Cardiovascular implications of COVID-19 versus influenza infection: a review. *BMC Med*. 2020 Dec 18;18(1):403. doi: 10.1186/s12916-020-01816-2.

Anca PS, **Toth PP**, Kempler P, Rizzo M. Gender differences in the battle against COVID-19: impact of genetics, comorbidities, inflammation & lifestyle on differences in outcomes. *Int J Clin Pract*. 2020 Aug 8:e13666.

Conclusion: There are gender differences in the severity of COVID-19; severe infection, organ failure, & death occur with greater frequency in men.

Rodriguez F...**Gluckman TJ**...Wang TY. Racial & ethnic differences in presentation & outcomes for patients hospitalized with COVID-19: findings from the AHA's COVID-19 CVD registry. *Circulation*. 2020 Nov 17.

Conclusion: Black & Hispanic patients bore a greater burden of mortality & morbidity due to their disproportionate representation among COVID-19 hospitalizations.

Gluckman TJ...Spinelli KJ. Case Rates, Treatment approaches and outcomes in acute MI during the coronavirus disease 2019 Pandemic. *JAMA Cardiol*. 2020 Aug 7;5(12)1-6.

Conclusion: Changes in MI hospitalization rates & worse outcomes occurred during the early & later COVID-19 periods.

Lakkireddy DR...**Gluckman TJ**...Russo AM. Guidance for cardiac electrophysiology during the COVID-19 pandemic from the HRS COVID-19 task force. *Circulation*. 2020 May 26;141(21):e823-e831.

Galiatsatos P...**Golden SH**, Teague P, Hale WD. Community calls: lessons & insights gained from a medical-religious community engagement during the COVID-19 pandemic. *J Relig Health*. 2020 Oct;59(5):2256-2262.

Conclusion: Medical-religious partnerships have proven feasible & valuable during the pandemic to disseminate information, & allow community leaders to discuss struggles & successes, ways to solve challenges, with novel strategies.

Usman MS...**Michos ED**...Alkhouli M. Meta-analysis of the relationship between renin-aldosterone system inhibitors & COVID-19. *Am J Cardiol*. 2020;130:159-161.

Conclusion: There was no significant association between RAAS inhibitor use & mortality in COVID-19 patients.

Duffy E, Ayers A, Cainzos-Achirica, Blumenthal RS. Clinical review of COVID-19 & CVD: What the cardiovascular practitioner needs to know. *Cardiology Today*. April 2020;23(4)1,20-21.

Oren O, Kopecky SL, Gluckman TJ, Gersh BJ, Blumenthal RS. Coronavirus Disease 2019 (COVID-19): epidemiology, clinical spectrum & Implications for the cardiovascular clinician. *ACC.org*. April 6, 2020.

Krasne M, Gluckman TJ, Marine JE, Blumenthal RS, Sharma G. Outcomes of acute myocardial infarction hospitalizations during the COVID-19 pandemic. *ACC.org* Aug 24, 2020.

Conclusion: Hospitalization rates for acute MI decreased, and fatality rates for patients hospitalized with acute MI increased during the pandemic.

Wagle A, Isakadze N, Eatz T, Blumenthal RS, Martin SS. Continuing preventive care during the COVID-19 pandemic: discussion of recent ASCP recommendations. *ACC.org* July 13, 2020.

Conclusion: This article summarizes recent ASCP recommendations on how clinicians can continue outpatient care & enhance CV health.





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