Facing Off Against Cardiovascular Disease

Annual Update 2020
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 Cainzos-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
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
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.

Dr. Thorsten Leucker is also collaborating with Dr. Arvaniatis to study the genetics of vascular disease. 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.

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.

Dr. Chiadi Ndumele, Florido, 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, Florido, 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
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
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
Assessment of CVD risk


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.


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. Coronary artery calcium is associated with a low risk of ischemic chest pain.


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


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.


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


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) & <25th percentile define very low risk older adults.


Conclusion: ED was associated with incident atrial fibrillation.
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.

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

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.

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

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

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

Conclusion: The volunteer selection for mortality in long-standing epidemiologic cohort studies diminishes over time.

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.

Dr. Omar Dzaye obtained his MD and PhD in Berlin, Germany. He is presently completing a cardiovascular and radiology research fellowship at the Ciccarrone 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.

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


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


Conclusion: The recent reduction in mortality in aortic stenosis patients was not consistent among demographic subsets.


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


Conclusion: Frailty, phenotype & developments of geriatric syndromes in older adults with CHD.

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.


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


Conclusion: Inflammation strongly contributes to atherosclerosis progression.


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.


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


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


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.

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.


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


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


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


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


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


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


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


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


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

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 lipiddowering 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.


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


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.


Conclusion: High aortic valve calcium was independently associated with all-cause & CVD deaths.

**Antiplatelet/Anticoagulant Treatment**


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


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


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


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


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.


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.


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


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


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


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


Conclusion: Patients with diabetes are justified in using clopidogrel.


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


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


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


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

Blood Pressure


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


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

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

**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.

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

**Song L, Post WS, Guillar 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.

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

**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.

**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.


**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.

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

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


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

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


**Biomarkers**

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

**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 JA.** 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.

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

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


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


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


Conclusion: Plasma adipokines have utility in predicting & preventing glycemic progression.


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


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


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


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

Cholesterol/Dyslipidemia


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.


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


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


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


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


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


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.


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


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


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


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


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


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.


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


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.


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


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.


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.


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


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

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


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


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.


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


Conclusion: Subclinical thyroid disorders are associated with atherosclerosis.


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


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


Conclusion: Intensive lipid-lowering to achieve LDL-C < 15 mg/dL in high-risk individuals: a randomized controlled trial.
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.

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 … 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.


Jacobson 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.


Das T, Vakil RM, Blumenthal RS, Martin SS. Kosapent EthylMay Act on Plaque. Cardiology Today/Health.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.


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 noncigarette 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.

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


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


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


Conclusion: There was stable e-cigarette use prevalence in 2016 with a marked increase from 2017-8.
CV Imaging with CT/PET/MR


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


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.


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.


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


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


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


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. Comorbidity & CV events in patients with HIV infection or treatment status or with coronary plaque type or stenosis.


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


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


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.


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.


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


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


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


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.


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


Conclusion: Cortisol has a detrimental role in worsening glycemia among persons with diabetes.


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.


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.


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


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.


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**


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


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


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


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

**Dict/Weight/Nutrition**


**Conclusion:** Serum magnesium was inversely associated with CAD risk.


**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.


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


**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.


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


**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.


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


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


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


**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.


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


**Conclusion:** Comprehensive risk factor modification requires lifestyle optimization.


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

Al Rifai M, Blaha MJ...Al-Mallah MH.
Conclusion: Cardiorespiratory fitness is inversely associated with risk for stroke.

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...Cuiqui 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.

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

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.

Florrido R, Zhao DI, Ndumele CE...Michos ED.
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.

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


Digital/Mobile Health Technology


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


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


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


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


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. JIMIR 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.


Gender/Sex Differences


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, Tibaukuu 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.


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


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


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


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

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

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.


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.


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


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


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.


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


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


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


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


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


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


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


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


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


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


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

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 Cedar (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.

**Revenue Publications**


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


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


**Conclusion:** Urinary incontinence prevalence differs by race/ethnicity.


**Cardio-Obstetrics**


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


**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.


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


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


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

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


### HIV


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


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


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


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


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

### Genetics


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


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.


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


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


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


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


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


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

### Vascular Disease/ Aortic Disease/ Heart Failure


**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.


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


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


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


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


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


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


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


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


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


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


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


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


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


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

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.
Cardiosmart.org
Feldman DI
body composition influences post-TAVR recovery.
TAVR patients; further study is needed into how life in older adults after TAVR.

Jun;224:171-181.

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Damluji AA
Low ABI was associated with higher risk for incident HFpER in persons free of known CVD.

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Feldman DI

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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 markers 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.
COVID-19 and CVD


Minhas AS, Scheel P, Jones SR, Michelos ED, Hays AG. Takotsubo syndrome in setting of COVID-19. JACC Case Rep. 2020 Jul 15;2(2):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.


**Conclusion**: In populations with a high prevalence of obesity, COVID-19 will affect younger populations more strongly.


**Conclusion**: Older persons with CVD who have reduced ACE2 levels will be predisposed to exaggerated inflammation with further reduction in ACE2 expression.


**Conclusion**: There are gender differences in the severity of COVID-19; severe infection, organ failure, & death occur with greater frequency in men.


**Conclusion**: Black & Hispanic patients bore a greater burden of mortality & morbidity due to their disproportionate representation among COVID-19 hospitalizations.


**Conclusion**: Changes in MI hospitalization rates & worse outcomes occurred during the early & later COVID-19 periods.


**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.


**Conclusion**: There was no significant association between RAAS inhibitor use & mortality in COVID-19 patients.


**Conclusion**: Hospitalization rates for acute MI decreased, and fatality rates for patients hospitalized with acute MI increased during the pandemic.


**Conclusion**: This article summarizes recent ASPC recommendations on how clinicians can continue outpatient care & enhance CV health.
The Johns Hopkins Ciccarone Center for the Prevention of Cardiovascular Disease