Initiatives in Health Care

Shaping the Future of "Cardio-Kidney-Metabolic" Health: Insights From The Texas Heart Institute's 2024 Cardiometabolic Syndrome Conference

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Abstract

At the Texas Heart Institute's 2024 Cardiometabolic Syndrome Conference, held on August 23, 2024, experts from diverse academic fields spoke about novel initiatives for addressing the worsening projections for cardiometabolic syndrome. Four major areas in which innovation is ongoing were highlighted: technology, policy, population health, and lifestyle and behavioral modification. This article presents a brief contextualization, summary, and analysis of the novel initiatives being implemented in each of these 4 areas to address cardiometabolic syndrome. Despite alarming projections, cardiometabolic syndrome presents a unique opportunity for innovators to drive change through collaborative, multidisciplinary efforts.

Keywords: Metabolic syndrome; cardiometabolic risk factors; cardiovascular diseases; social determinants of health

Introduction

Cardio-kidney-metabolic (CKM) syndrome is the complex interaction of metabolic risk factors such as obesity, diabetes, and chronic kidney disease with the cardiovascular system. Cardio-kidney-metabolic syndrome negatively affects most major organ systems and contributes disproportionately to all cardiovascular disease (CVD) phenotypes and overall mortality. Given its worldwide prevalence and worsening projections, CKM syndrome is a global crisis, which underscores the urgent need for more intelligent preventive measures. Despite substantial advancements in CKM pathophysiology and treatments over the past decade, critical gaps remain in research, patient education, access to medical treatment, and advocacy in communities adversely affected by social determinants of health.

On August 23, 2024, The Texas Heart Institute held the 2024 Cardiometabolic Syndrome Conference: A Population Health Crisis. During this event, speakers from diverse fields, including medicine, politics, population health research, and mental health services, discussed the latest advancements and challenges in managing CKM syndrome. They explored innovative developments in risk-prediction tools, the effects of policy on access to care for underrepresented populations, the prospect of aiming prevention strategies at younger individuals, and the effects of lifestyle and behavior on managing CKM risk factors. This article is an overview of some of the novel initiatives discussed during this conference across 4 major areas—technology, policy, population health, and lifestyle and behavior—highlighting their potential to address the current gaps in the prevention of CKM syndrome.

Technology

New Approaches to Predicting Risk of CVD: The PREVENT Models

Based on the consensus that the intensity of a preventive intervention should be commensurate with the absolute risk of the patient developing CVD, risk prediction has been a hallmark of preventive cardiology for the past 2 decades.[1,2] In 2013, the American Heart Association (AHA) and the American College of Cardiology developed pooled cohort equations that provide a basis for estimating the 10-year absolute risk of CVD in White and Black individuals. Pooled cohort equations, however, are limited by their failure to account for all CVD subtypes, such as heart failure, and the lack of representation for many minority populations.[1]

As a result, in 2023, the AHA created and validated the Predicting Risk of CVD EVENTs (PREVENT) equations,[1] which address the primary concerns with the pooled cohort equations by taking a non–race-based approach to predicting patients' 10-year and 30-year absolute risk of CVD. In addition, placing a greater emphasis on the "kidney" component of CKM, PREVENT uses estimated glomerular filtration rate as a primary predictor and can incorporate optional predictors, including glycated hemoglobin and urine albumin to creatinine ratio. The inclusion of social determinants of health metrics such as the Social Deprivation Index, which is derived from the patient's zip code, represents a further crucial step toward factoring broader environmental and socioeconomic factors into the overall CVD risk assessment.

The PREVENT models have shown better discrimination of patients with CVD from patients without CVD, for both men and women, than the pooled cohort equations. In addition, PREVENT is substantially less prone to overestimating CVD risk.[1] As the focus now shifts to implementing the PREVENT equations in electronic health record systems, clinicians have the opportunity to assess CVD risk even more accurately than before and create more tailored interventions for patients from underrepresented backgrounds.

Key Points

- The Texas Heart Institute hosted the 2024 Cardiometabolic Syndrome Conference: A Population Health Crisis, which united speakers across diverse fields to share their current efforts in preventing CKM syndrome.
- Technology, policy, population health, and lifestyle and behavior were identified as critical areas for further research and development.
- Addressing CKM syndrome presents a unique opportunity for collaboration among experts specializing in these 4 areas.

Abbreviations

ACA, Patient Protection and Affordable Care Act
AHA, American Heart Association
CKM, cardio-kidney-metabolic
CVD, cardiovascular disease
PREVENT, Predicting Risk of CVD EVENTs

Policy

Impact of Federal Policy: Expansion of the Patient Protection and Affordable Care Act

At the federal level, the expansion of Medicaid coverage by the Patient Protection and Affordable Care Act (ACA) in most US states has broadly expanded access to CKM screenings and made CKM syndrome–targeted medications more affordable. This expansion has been associated with greater utilization of preventive medical services among low-income populations.[3] One of the main reforms that the ACA made was prohibiting health plans from denying coverage to or increasing premiums for individuals with preexisting health conditions. Given that CKM syndrome is a collection of risk factors that tend to cluster in the same individuals, especially individuals from racial and ethnic minority groups and individuals with lower socioeconomic status, this reform has made access to CKM-specific medical care more equitable. As a result of Medicaid expansion, diagnostic screenings for CKM risk factors such as hypertension, diabetes, and hypercholesterolemia have greatly increased. Moreover, studies conducted after the ACA was passed show that CKM risk factors are now more frequently diagnosed and that the number of drug prescriptions for CKM conditions such as diabetes have consequently increased.[4]

The Inflation Reduction Act of 2022, which enables Medicare to negotiate drug prices and establishes a $2,000 out-of-pocket cap on prescription drug prices, is projected to make CKM medications substantially more affordable.[3,5] Of the first 10 drugs eligible for price negotiations under Medicare Part D, 7 target CKM syndrome. In addition, by 2025, the Inflation Reduction Act is expected to substantially lower out-of-pocket costs for CKM-related conditions, such as severe hypercholesterolemia and heart failure with reduced ejection fraction.[5] These changes mark a critical step in ensuring that patients with low socioeconomic status can afford essential CKM medications.

Population Studies

Whereas most studies on CKM syndrome prevention target adult populations, a potential paradigm shift would be to explore the effectiveness of educational interventions in school-aged children. In a recent study published in the *Journal of the American College of Cardiology*,[6] investigators conducted one of the largest randomized controlled trials to analyze the effect of exposure to a school-based health education program on adiposity biomarkers in children aged 6 to 12 years in Spain. In the 6-year follow-up period, students in grades 1 through 3 who participated in the health education program had notably smaller increases in waist circumference and waist to height ratio than their peers who were not included in the program.

Early-life screenings are not currently recommended by the US Preventive Services Task Force and are controversial because of their high cost of implementation and negative impact on young children's self-concept. The AHA, however, recognizes that detecting obesity in the pediatric population is crucial in preventing the development of comorbid CKM risk factors and risk for CVD mortality.[2] Perhaps introducing pilot educational studies similar to the one described by Santos-Beneit and colleagues[6] in US schools located in low-income neighborhoods could provide valuable evidence of the effectiveness of focusing preventive efforts on the pediatric population.

Lifestyle and Behavioral Interventions

Key variables related to lifestyle and behavioral choices, such as diet, physical activity, and psychosocial stressors, are not explicitly included in PREVENT as predictors of overall CVD risk for a variety of reasons. For one, the effects of these variables tend to be indirectly represented by clinical measurements such as systolic blood pressure and body mass index. In addition, collecting standardized data on lifestyle and behavioral variables is costly and challenging.

In 2023, however, the AHA published one of the first cross-sectional studies to examine the prevalence of lifestyle-related risk factors such as current smoking, excessive drinking, poor diet, inadequate physical activity, and inappropriate sleep duration among young adults (aged 18-44 years).[7] Using the National Health and Nutrition Examination Survey dataset, the study showed that lifestyle risk factors and cardiometabolic disease were correlated, further corroborating a need for early CKM intervention strategies in young adults.

Some behavioral intervention strategies for CKM syndrome use an individual-focused approach to educate patients about the impact of lifestyle on CVD risk; for instance, studies have shown that patient-centered cognitive behavior therapy can effectively lead to substantial clinical improvements in individuals with CKM syndrome.[8] Other strategies integrate formal education with peer support and community engagement. Microclinic Social Network programs, for example, use this type of collaborative approach.[9] By combining formal health curriculum–based methods with informal peer support groups to implement behavioral interventions, these programs have resulted in notably lower levels of CKM risk metrics in participants. Implementing such behavioral programs in resource-limited communities can be a valuable first step in preventing CKM syndrome.

Conclusion

Addressing CKM syndrome presents unique opportunities for collaboration among experts across multiple

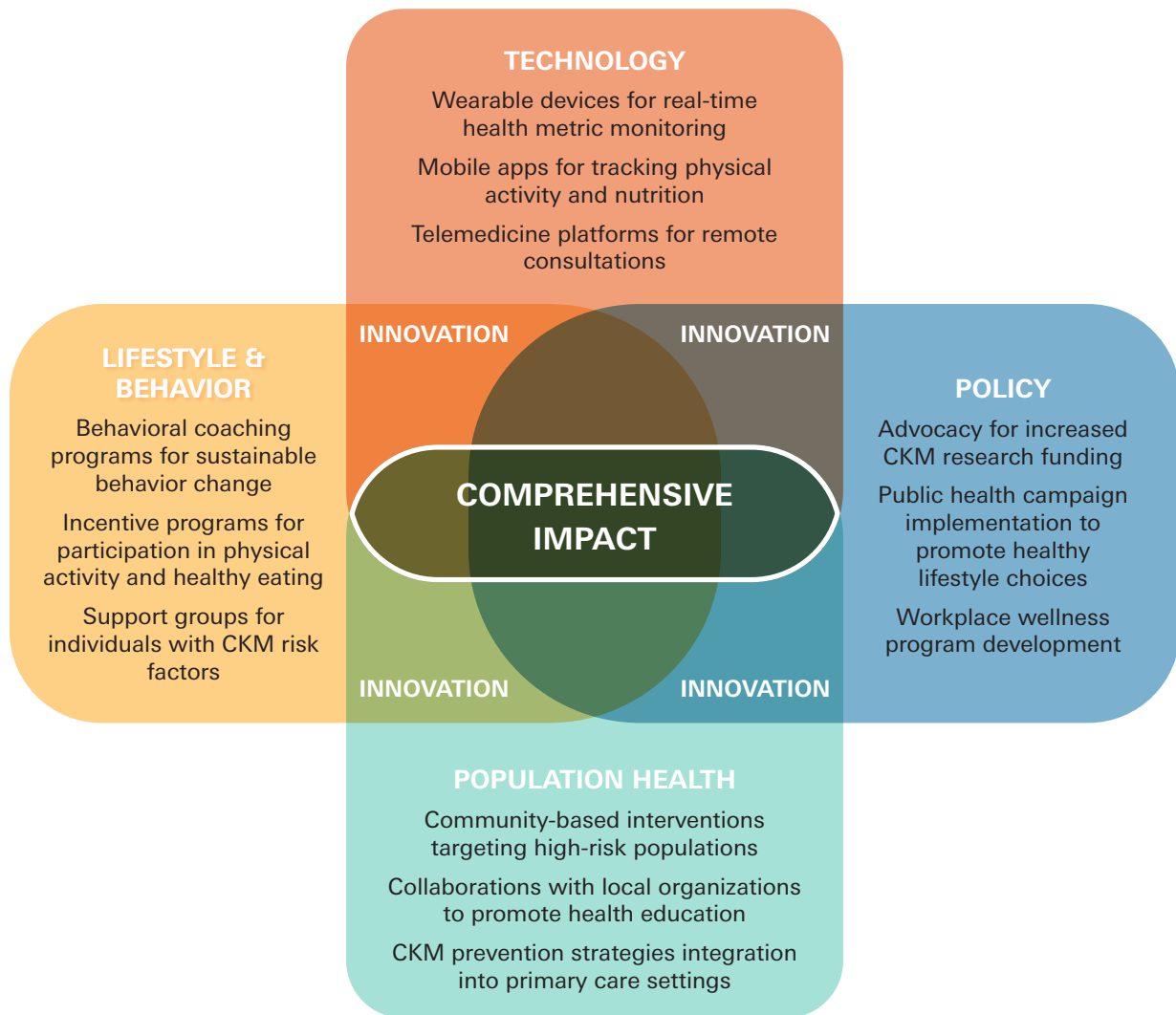# Novel Initiatives for Prevention of CKM Syndrome

Fig. 1 Novel initiatives for the prevention of CKM syndrome. Preventing CKM syndrome requires a comprehensive approach based on technology, lifestyle interventions, policy, and population health strategies. Initiatives may complement and enhance one another. Innovative solutions may emerge when elements and initiatives from multiple domains overlap. The central intersection represents the area where all 4 approaches overlap to produce a synergistic effect, potentially leading to CKM prevention strategies with the most comprehensive impact.

Abbreviation: CKM, cardio-kidney-metabolic.

disciplines (Fig. 1). Advancements in risk-prediction tools, insurance policies, population studies, and lifestyle and behavioral interventions can drive targeted solutions for CKM syndrome and substantially improve the health of underserved communities. The Texas Heart Institute's commitment to shaping the future of cardiovascular health is reflected in its twin focuses on fostering interdisciplinary partnerships across thought leaders and organizations in these 4 areas and on developing effective preventive strategies for populations at risk for CKM syndrome.

References

1. Khan SS, Matsushita K, Sang Y, et al; Chronic Kidney Disease Prognosis Consortium and the American Heart Association Cardiovascular-Kidney-Metabolic Science Advisory Group. Development and validation of the American Heart Association's PREVENT equations. *Circulation*. 2024;149(6):430-449. doi:10.1161/CIRCULATIONAHA.123.067626

2. Ndumele CE, Rangaswami J, Chow SL, et al; American Heart Association. Cardiovascular-kidney-metabolic health: a presidential advisory from the American Heart Association. *Circulation*. 2023;148(20):1606-1635. doi:10.1161/CIR.0000000000001184

3. Wadhera RK, Joynt Maddox KE. Policy strategies to advance cardiovascular health in the United States—building on a century of progress. *Circ Cardiovasc Qual Outcomes*. 2024;17(4):e010149. doi:10.1161/CIRCOUTCOMES.123.010149

4. Sommers BD, Gawande AA, Baicker K. Health insurance coverage and health. *N Engl J Med*. 2017;377(20):2000-2001. doi:10.1056/NEJMc1711805

5. Kazi DS, DeJong C, Chen R, Wadhera RK, Tseng CW. The Inflation Reduction Act and out-of-pocket drug costs for Medicare beneficiaries with cardiovascular disease. *J Am Coll Cardiol*. 2023;81(21):2103-2111. doi:10.1016/j.jacc.2023.03.414

6. Santos-Beneit G, Bodega P, de Cos-Gandoy A, et al. Effect of time-varying exposure to school-based health promotion on adiposity in childhood. *J Am Coll Cardiol*. 2024;84(6):499-508. doi:10.1016/j.jacc.2024.04.065

7. Shi S, Huang H, Huang Y, Zhong VW, Feng N. Lifestyle behaviors and cardiometabolic diseases by race and ethnicity and social risk factors among US young adults, 2011 to 2018. *J Am Heart Assoc*. 2023;12(17):e028926. doi:10.1161/JAHA.122.028926

8. Zhang Y, Mei S, Yang R, Chen L, Gao H, Li L. Effects of lifestyle intervention using patient-centered cognitive behavioral therapy among patients with cardio-metabolic syndrome: a randomized, controlled trial. *BMC Cardiovasc Disord*. 2016;16(1):227. doi:10.1186/s12872-016-0398-9

9. Ding EL, Watson KT, Makarechi L, et al. Social induction via a social behavioral intervention on changes in metabolic risk factors: a randomized controlled trial in rural Appalachia, United States. *Mayo Clin Proc*. 2024;99(7):1058-1077. doi:10.1016/j.mayocp.2023.11.023