

A Synopsis of the Evidence for the Science and Clinical Management of Cardiovascular-Kidney-Metabolic (CKM) Syndrome: A Scientific Statement From the American Heart Association

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A growing appreciation of the pathophysiological interrelatedness of metabolic risk factors such as obesity and diabetes, chronic kidney disease, and cardiovascular disease has led to the conceptualization of cardiovascular-kidney-metabolic syndrome. The confluence of metabolic risk factors and chronic kidney disease within cardiovascular-kidney-metabolic syndrome is strongly linked to risk for adverse cardiovascular and kidney outcomes. In addition, there are unique management considerations for individuals with established cardiovascular disease and coexisting metabolic risk factors, chronic kidney disease, or both. An extensive body of literature supports our scientific understanding of, and approach to, prevention and management for individuals with cardiovascular-kidney-metabolic syndrome. However, there are critical gaps in knowledge related to cardiovascular-kidney-metabolic syndrome in terms of mechanisms of disease development, heterogeneity within clinical phenotypes, interplay between social determinants of health and biological risk factors, and accurate assessments of disease incidence in the context of competing risks. There are also key limitations in the data supporting the clinical care for cardiovascular-kidney-metabolic syndrome, particularly in terms of early-life prevention, screening for risk factors, interdisciplinary care models, optimal strategies for supporting lifestyle modification and weight loss, targeting of emerging cardioprotective and kidney-protective therapies, management of patients with both cardiovascular disease and chronic kidney disease, and the impact of systematically assessing and addressing social determinants of health. This scientific statement uses a crosswalk of major guidelines, in addition to a review of the scientific literature, to summarize the evidence and fundamental gaps related to the science, screening, prevention, and management of cardiovascular-kidney-metabolic syndrome.

Poor cardiovascular-kidney-metabolic (CKM) health is a major determinant of premature morbidity and mortality. Consequently, developing comprehensive strategies to augment CKM health across the life course is a key clinical and public health priority. There is a growing understanding of the science underlying the complex interplay among metabolic risk factors, chronic kidney disease (CKD), and the cardiovascular system. Accordingly, there has been an expansion of therapeutic approaches to prevent or mitigate metabolic risk factors, to delay kidney disease progression, and to reduce associated cardiovascular risk. The increasing number of agents with beneficial metabolic effects, kidney effects, or both that additionally improve cardiovascular disease (CVD) outcomes offers promise for the future of CKM care.

However, several fundamental gaps remain in our scientific insight into the mechanistic underpinnings of CKM health. There are also major gaps, as well as some conflicts, in current clinical guidelines with respect to the approach to screening, prevention, and management of the patient with CKM syndrome. Using a review of the literature and crosswalk of major guidelines, this scientific statement describes the current evidence and gaps in our knowledge in terms of the science, screening, and clinical care of CKM syndrome. The scientific statement concludes with charting a path forward for science and clinical care in relation to CKM health.