



American Heart Association®
Cardiovascular-Kidney-Metabolic
Health Initiative™










From Evidence to Practice: Bringing a Cardiovascular- Kidney-Metabolic Model of Care to Life

February 2, 2026

1PM – 2PM CT



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Learning Objectives

Gain foundational knowledge of cardiovascular-kidney-metabolic (CKM) syndrome, staging system, risk-enhancing factors, screening protocols, and evidence-based management strategies.

Increase confidence in applying key steps of the CKM care model via case-study exercises.

Learn about American Heart Association's resources for implementing and/or enhancing interdisciplinary CKM care.



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Disclosures:

Consulting : Boehringer Ingelheim, Bayer, Retension Pharmaceuticals
Advisory board: Procyron Inc.





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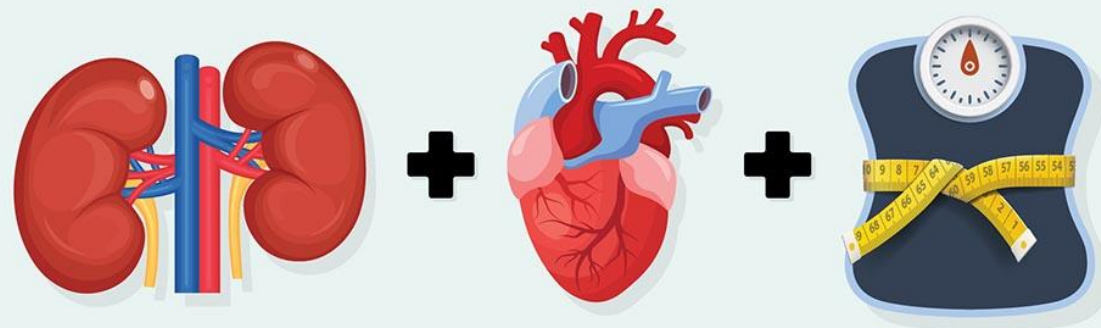
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An Introduction to CKM Syndrome Assessment and Care

CKM Syndrome

Definition and Rationale

CARDIOVASCULAR-KIDNEY-METABOLIC (CKM) SYNDROME



Definition:

Cardiovascular-Kidney-Metabolic (CKM) Syndrome is a health disorder due to the connections among heart disease, kidney disease, diabetes, and obesity leading to poor health outcomes.

Rationale:

- Conditions with closely intertwined pathophysiology
- Due to growing rates of obesity and diabetes, becoming the predominant phenotype of cardiovascular risk
- Major clinical consequence is premature (cardiovascular) mortality
- Growing scientific understanding, with multiple new therapeutic options that substantially improve outcomes in CKM syndrome

Steps to Applying the CKM Care Model

- 1) Systematic testing for CKM risk factors
- 2) CKM Staging for Qualitative Assessment of CVD Risk and promotion of prevention across the life course
- 3) Quantitative Assessment of CVD Risk (PREVENT)
- 4) Personalizing the Clinician-Patient Risk Discussion
- 5) Holistically Addressing CKM Risk Factors

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1) Routine Assessments for CKM Risk Factors

Rationale:

- *Many risk factors go long unrecognized/unaddressed (CKD diagnosis not known in 90% of those who have it)*
- *Timely initiation of therapy for risk factors = improved clinical outcomes*
- *Intensified/more frequent screening in higher stages (more disease and risk)*
- *In patients with CVD, identifying CKM risk factors helps to optimize therapeutic management*

Approach to Testing in Adults

CKM Stage	Testing and Frequency
All Stages	Annual anthropometrics and BP
Stage 0	Every 3-5 years: lipids, glycemia, eGFR
Stage 1	Every 2-3 years: lipids, glycemia, eGFR
Stage 2-4	Every year: lipids, glycemia, eGFR and urine albumin to creatinine ratio (UACR)

Centers for Disease Control and Prevention. Chronic Kidney Disease in the United States, 2023. <https://www.cdc.gov/kidney-disease/php/data-research/index.html>.

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). Kidney Disease Statistics for the United States. NIDDK website. <https://www.niddk.nih.gov/health-information/health-statistics/kidney-disease>.

Ndumele, C.E. et al., Cardiovascular-Kidney-Metabolic Health: A Presidential Advisory From the American Heart Association. 2023. *Circulation*.

Rationale for UACR Testing: KDIGO Heat Map

CKD is classified based on:

- Cause (C)
- GFR (G)
- Albuminuria (A)

				Albuminuria categories		
				Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30–299 mg/g 3–29 mg/mmol	≥300 mg/g ≥30 mg/mmol
				GFR categories (mL/min/1.73 m ²) Description and range	G1	Normal or high
G2	Mildly decreased	60–89	Screen 1		Treat 1	Treat and refer 3
G3a	Mildly to moderately decreased	45–59	Treat 1		Treat 2	Treat and refer 3
G3b	Moderately to severely decreased	30–44	Treat 2		Treat and refer 3	Treat and refer 3
G4	Severely decreased	15–29	Treat and refer* 3		Treat and refer* 3	Treat and refer 4+
G5	Kidney failure	<15	Treat and refer 4+		Treat and refer 4+	Treat and refer 4+

■ Low risk (if no other markers of kidney disease, no CKD)
 ■ High risk
■ Moderately increased risk
 ■ Very high risk

- Both eGFR and UACR are part of diagnostic criteria for CKD
- Risk categories based on eGFR and UACR linked to absolute risk for kidney failure, CVD events, all-cause mortality and other adverse outcomes
- Higher albuminuria prevalence in DM, HTN and CKD justifies regular testing

Ndumele, C.E. et al., Cardiovascular-Kidney-Metabolic Health: A Presidential Advisory From the American Heart Association. 2023. *Circulation*.

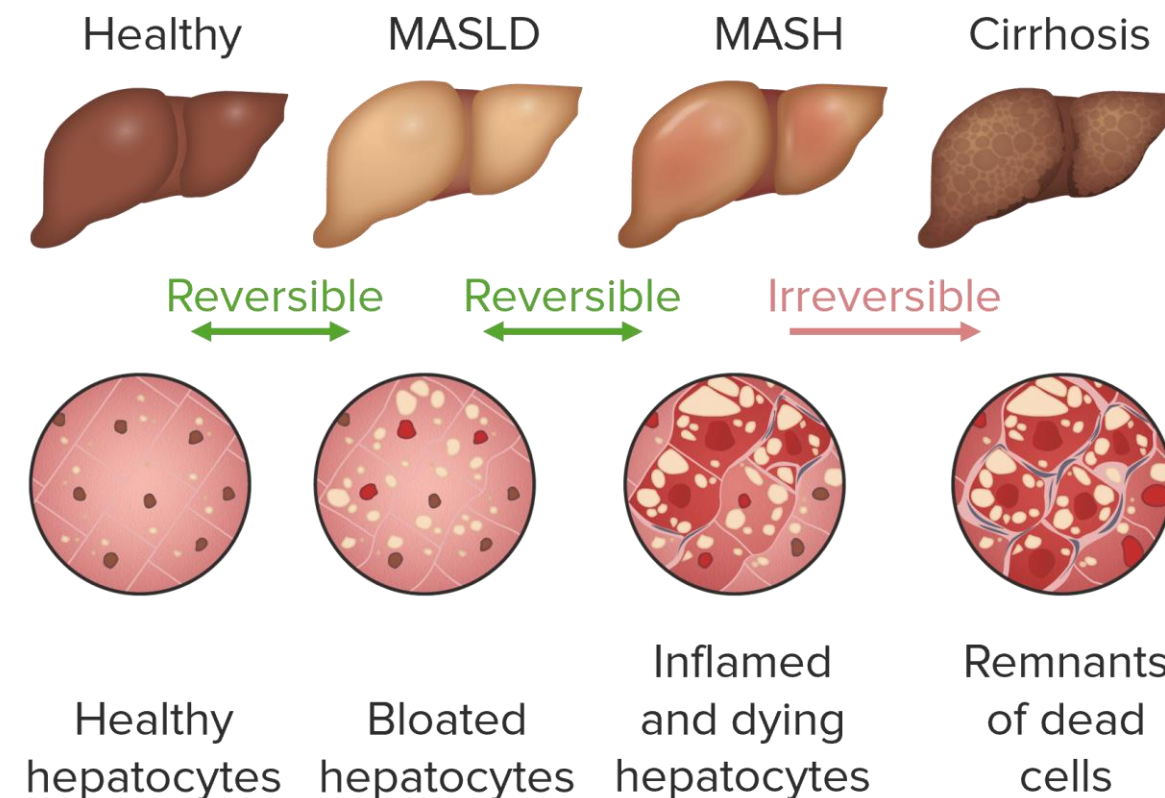
Kidney Disease: Improving Global Outcomes (KDIGO). KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. *Kidney Int.* 2024;105(4S):S1-S295. Published April 2024. <https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf>

Additional Testing in CKM Syndrome: MASLD and Liver Fibrosis

Screen for fibrosis with FIB-4 index:
 $\text{age} \times \text{AST} / \text{platelet count} \times \sqrt{\text{ALT}}$

More testing if >1.3 in 35–64 yrs
or if > 2 in 65+ yrs

- Metabolic Associated Steatotic Liver Disease (MASLD) is a leading cause of cryptogenic cirrhosis and need for transplantation
- Closely associated with CKMH:
 - Overweight/obesity: 3-fold \uparrow risk
 - Diabetes: 70% with MASH
- Lifestyle change and weight loss reduce fatty liver; GLP-1 RA reduces liver fibrosis
- Screening with FIB-4 every 1-2 years in DM or ≥ 2 CKM risk factors



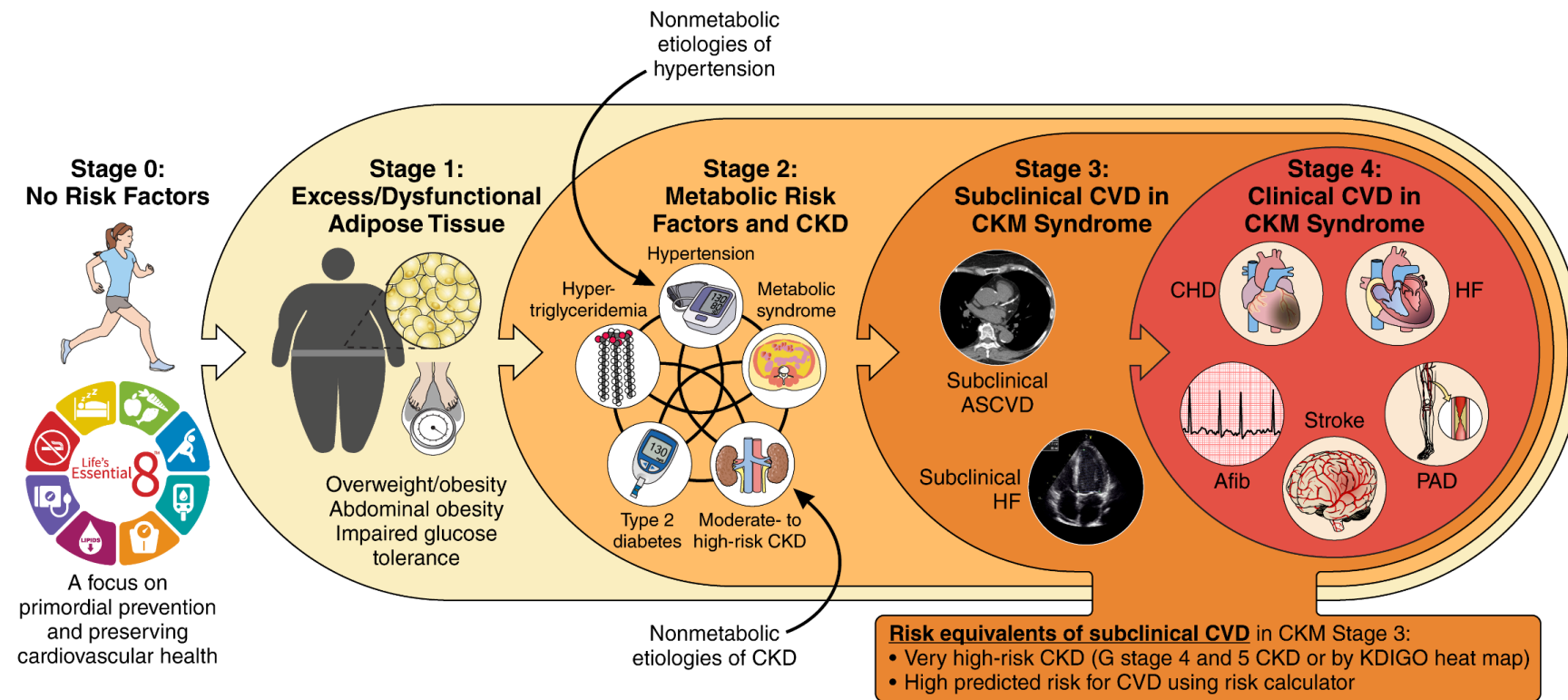
Cusi K, Abdelmalek MF, Apovian CM, et al. Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD) in People With Diabetes: The Need for Screening and Early Intervention. A Consensus Report of the American Diabetes Association. *Diabetes Care*. 2025;48(7):1057-1082. doi:10.2337/dci24-0094.

Rinella ME, Neuschwander-Tetri BA, Siddiqui MS, et al. AASLD Practice Guidance on the Clinical Assessment and Management of Nonalcoholic Fatty Liver Disease. *Hepatology*. 2023;77:1797-1835. doi:10.1097/HEP.000000000000323.

Targher G, Day CP, Bonora E. Risk of cardiovascular disease in patients with nonalcoholic fatty liver disease. *N Engl J Med*. 2010;363(14):1341-1350.

Younossi ZM, Stepanova M, Al Shabeeb R, et al. The changing epidemiology of adult liver transplantation in the United States in 2013–2022: The dominance of metabolic dysfunction-associated steatotic liver disease and alcohol-associated liver disease. *Hepatol Commun*. 2023;8(1):e0352. doi:10.1097/hc9.0000000000000352.

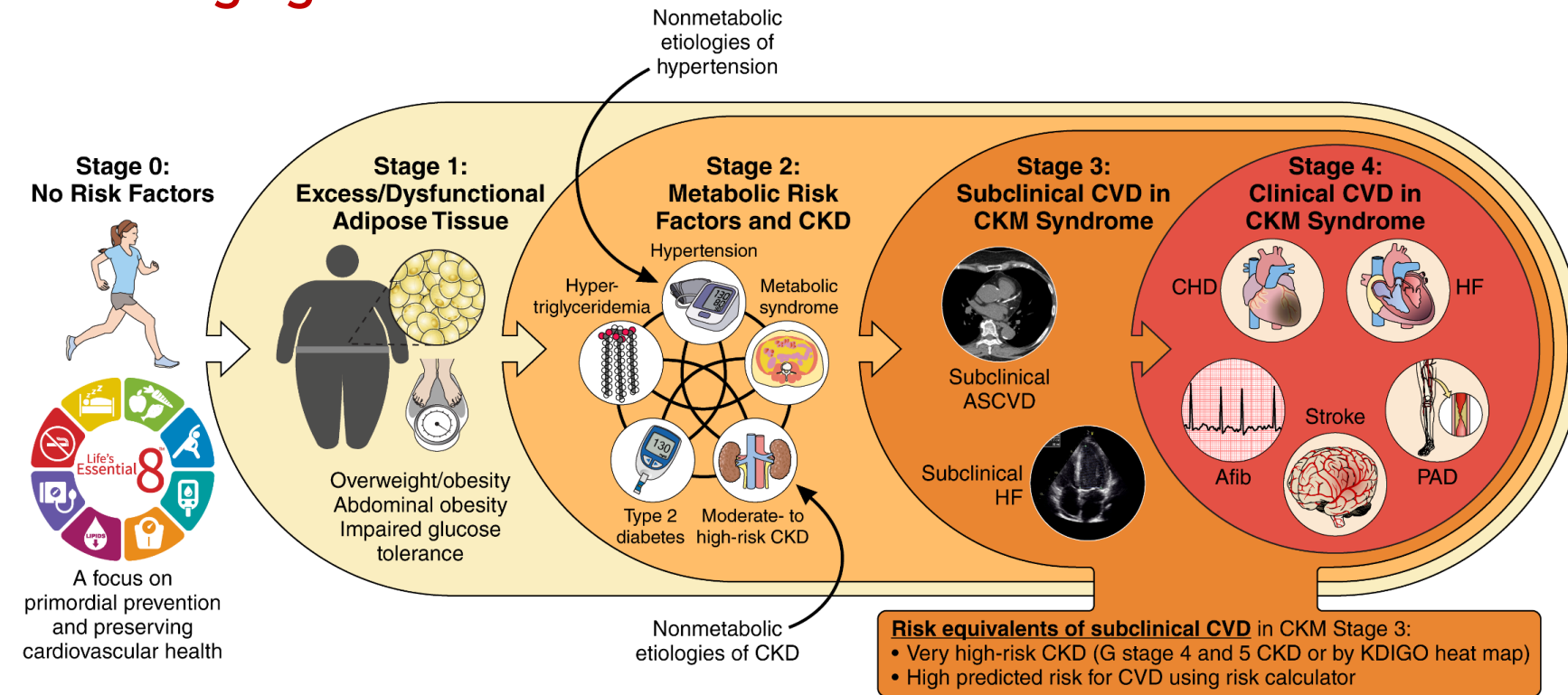
2) Staging of CKM Syndrome



- *Detect risk earlier*
- *Prevent CKM progression*
- *Intensify therapy in higher risk*
- *Promote CKM regression*

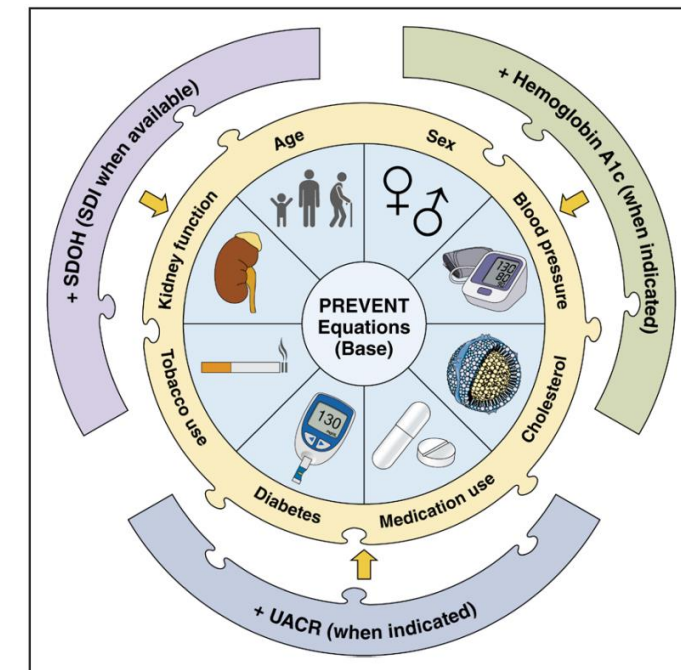
3) Complementary Approaches to Assessing Risk

Qualitative Approach CKM Staging



What risk factors are present?
How far along CKM syndrome spectrum?
Is cardiovascular disease present?

Quantitative Approach Risk Calculation



What is the integrated CVD risk over 10 years?
If 10-year risk low, what is risk over 30 years?

Ndumele, C.E. et al., Cardiovascular-Kidney-Metabolic Health: A Presidential Advisory From the American Heart Association. 2023. Circulation.

Khan SS, Coresh J, Pencina MJ, et al. Novel Prediction Equations for Absolute Risk Assessment of Total Cardiovascular Disease Incorporating Cardiovascular-Kidney-Metabolic Health: A Scientific Statement From the American Heart Association. Circulation. 2023;148(24):1982-2004. doi:10.1161/CIR.0000000000001191.

4) Personalizing Risk Discussion: CKM Risk Enhancers



- *Chronic inflammatory conditions*
- *High burden of adverse SDOH*
- *High risk demographic (South Asian ancestry)*
- *Mental health disorders*
- *Sleep disorders*
- *Sex-specific risk enhancing factors*
 - *History of premature menopause*
 - *History of adverse pregnancy outcomes*
 - *Polycystic ovarian syndrome*
 - *Erectile dysfunction*
- *Elevated high-sensitivity C-reactive protein*
- *Family history of kidney failure, diabetes*

Ndumele, C.E. et al., Cardiovascular-Kidney-Metabolic Health: A Presidential Advisory From the American Heart Association. 2023. *Circulation*.

5) Emphasis on Multi-system and Holistic Care

It is no longer sufficient to focus on individual risk factors alone for preventing heart and kidney disease

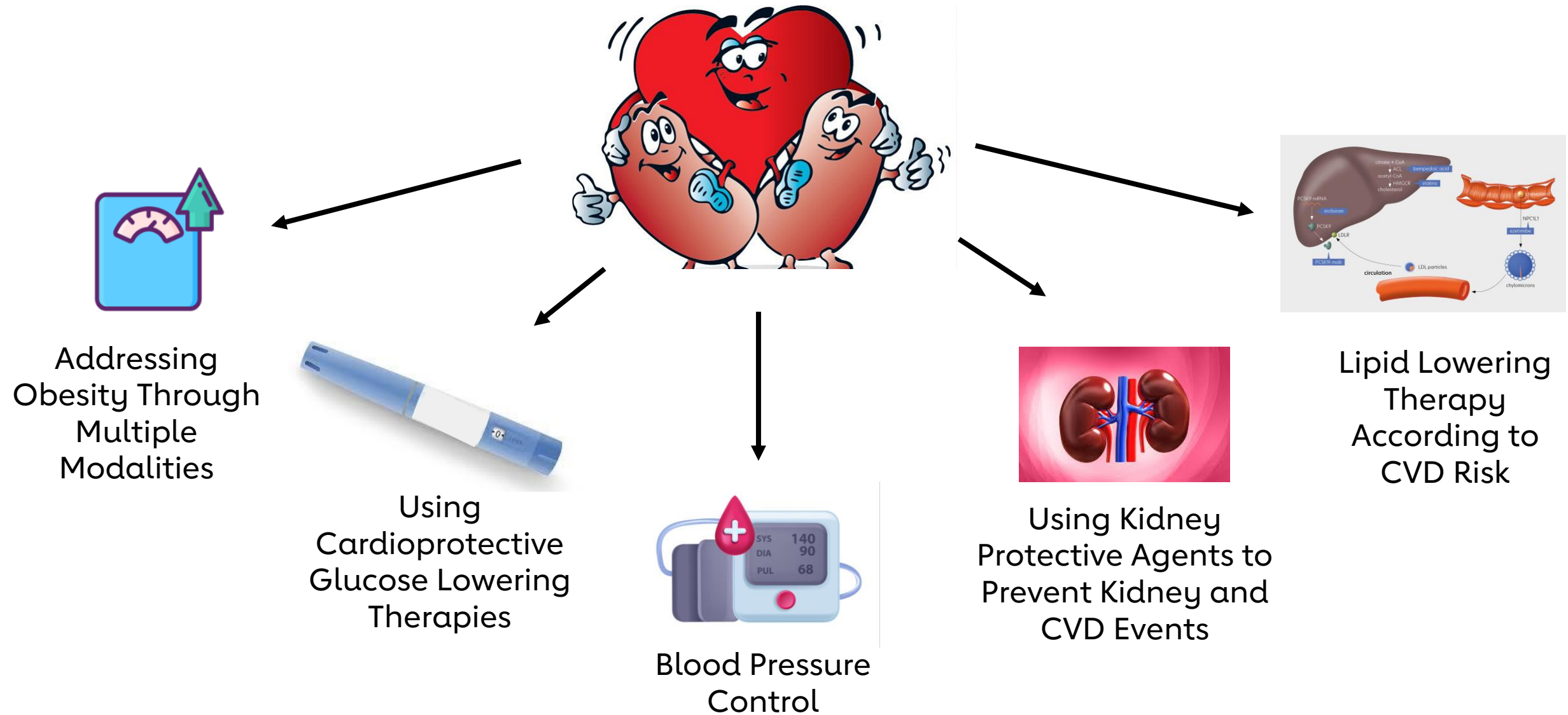
There is need to focus on achieving control of multiple inter-related risk factors in CKM syndrome

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Top Therapeutic Priorities in CKM Syndrome

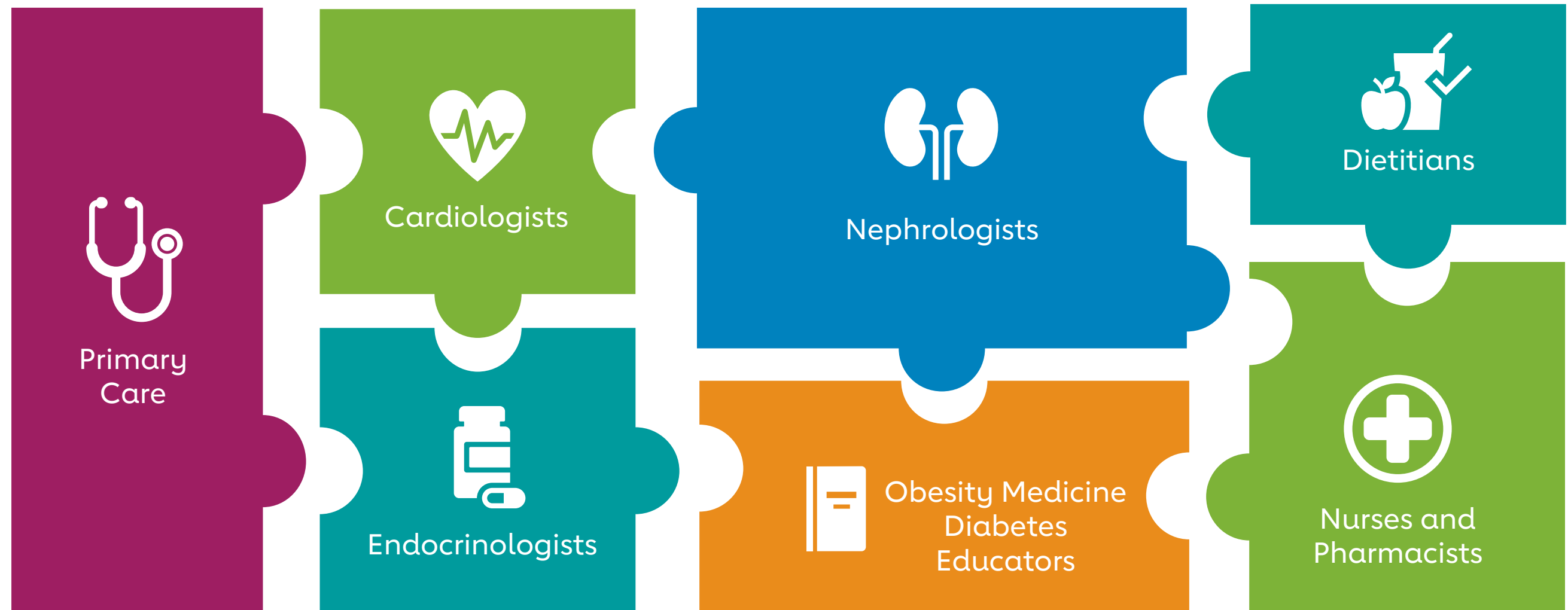


Ndumele, C.E. et al., Cardiovascular-Kidney-Metabolic Health: A Presidential Advisory From the American Heart Association. 2023. Circulation.

Ndumele CE, Neeland IJ, Tuttle KR, et al. 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. Circulation.

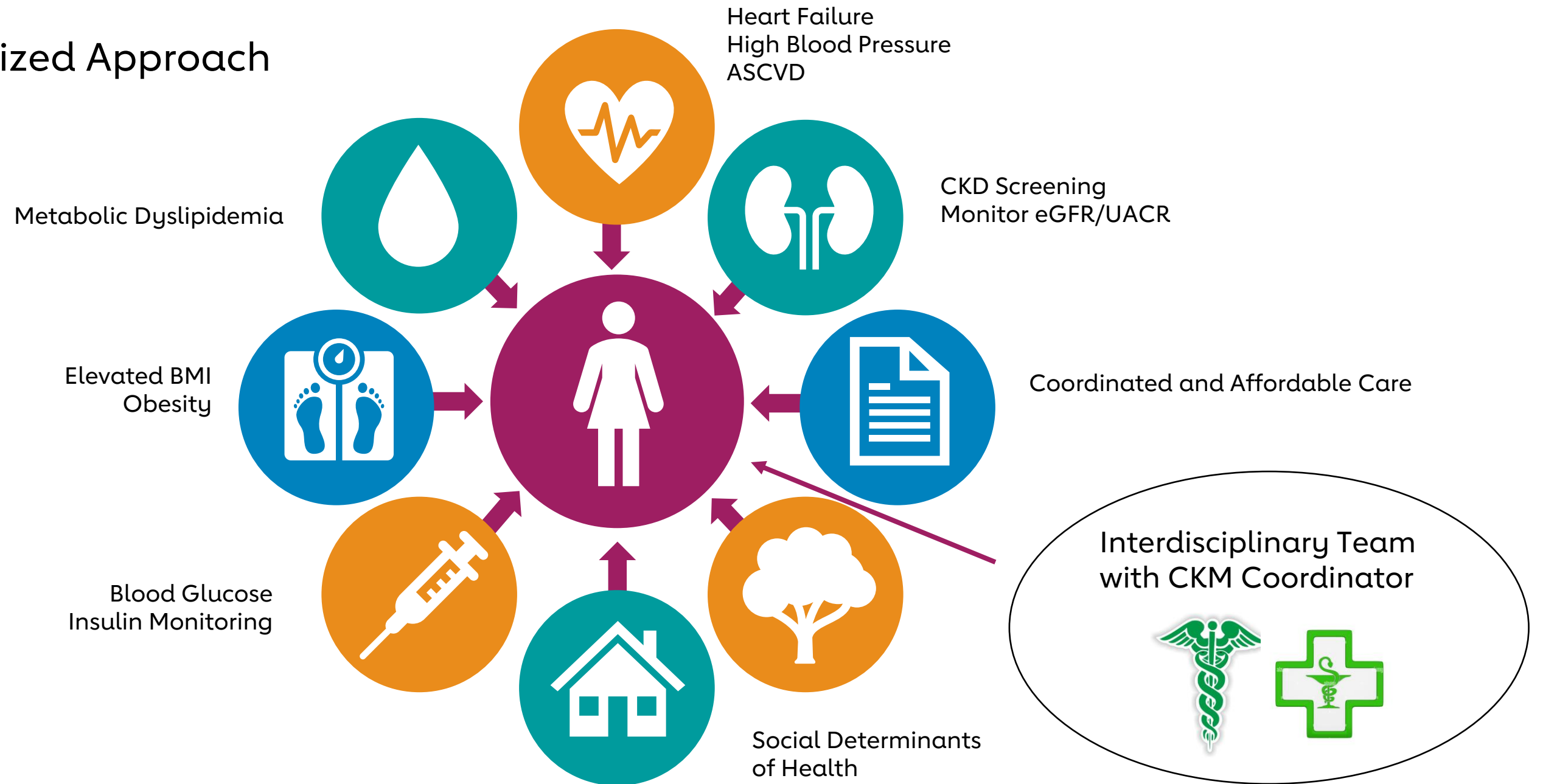
Key Goal: Reducing Fragmented Care

Multiple health care professionals + lack of comprehensive/cohesive treatment plans

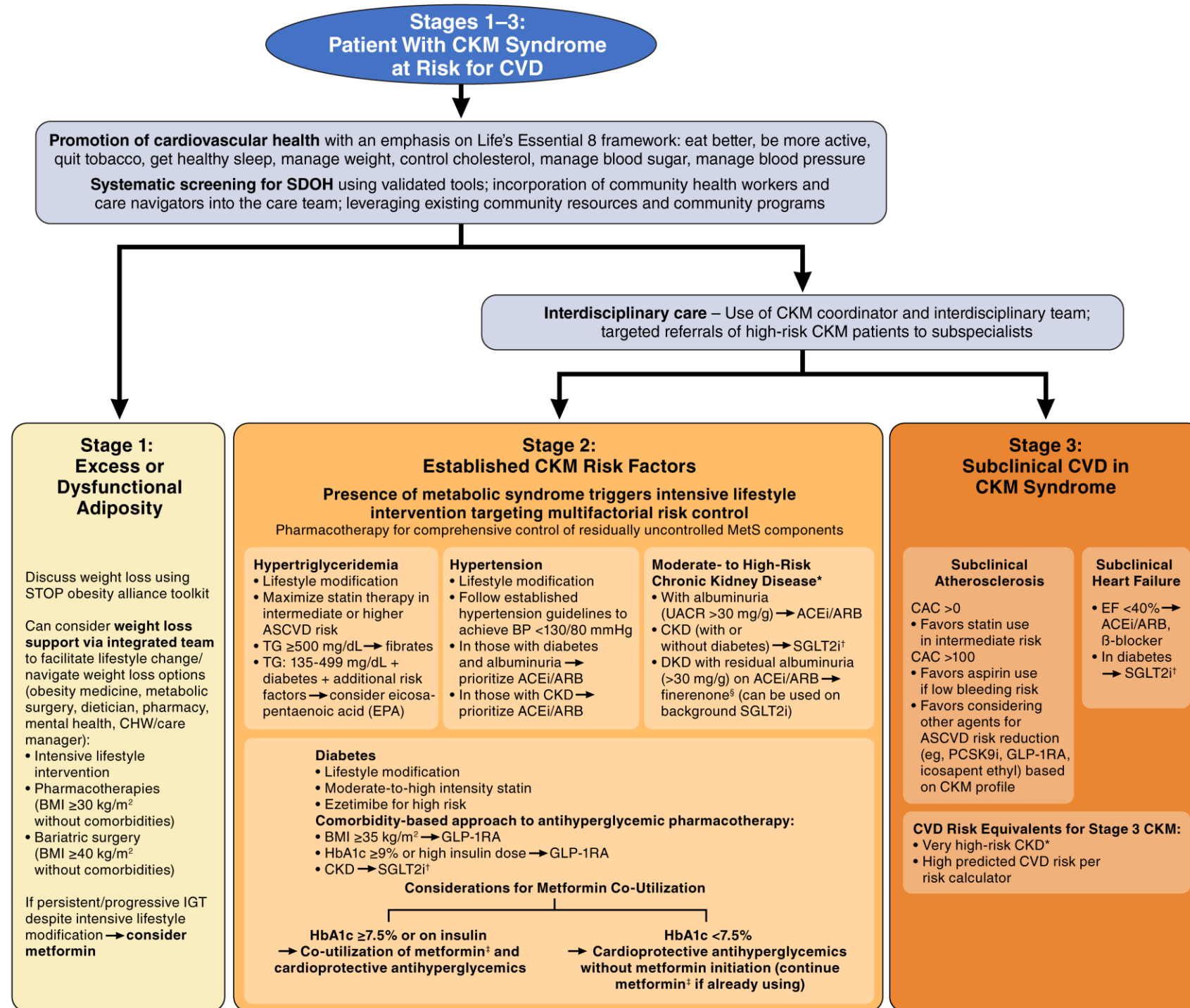


Patient-Centered

Harmonized Approach



Algorithm for CKM Syndrome Management Stages 1-3



Key Highlights

- Interdisciplinary care for confluent risk (DM/CKD/CVD); address SDOH
- Address/control CKM risk factors
- Address obesity through multiple modalities
- Comorbidity-based approach to selecting cardioprotective anti-hyperglycemic agents
- Prevent CKD progression with RAASi/SGLT2i and/or finerenone/GLP-1RA (in diabetes)
- More intensive and combination therapy in higher risk

*per KDIGO heat map
[†]SGLT2i can be safely initiated for patients with eGFR ≥20 mL/min/1.73 m²
[‡]Metformin can be co-utilized for patients with eGFR ≥30 mL/min/1.73 m²
[§]Finerenone can likely be initiated on background SGLT2i for those with eGFR >25 mL/min/1.73 m² and potassium <5 mEq/L

**Stage 4:
Patient With CKM Syndrome
With Existing CVD**

Promotion of cardiovascular health with an emphasis on Life's Essential 8 framework: eat better, be more active, quit tobacco, get healthy sleep, manage weight, control cholesterol, manage blood sugar, manage blood pressure

Systematic screening for SDOH using validated tools, incorporation of community health workers and care navigators into the care team, leveraging existing community resources and community programs

Interdisciplinary care – Use of CKM coordinator and interdisciplinary team; targeted referrals of high-risk patients with CKM to subspecialists

HF: GDMT for all patients
ASCVD: Aspirin and high-intensity statin for all patients, consider addition of ezetimibe and PCSK9i based on LDL level/goals or presence of high-risk ASCVD

Management of Excess or Dysfunctional Adiposity

Discuss weight loss using STOP obesity alliance toolkit

Weight loss support via integrated team to facilitate lifestyle change/navigate weight loss options (obesity medicine, metabolic surgery, dietician, pharmacy, mental health, CHW/care manager):

- Intensive lifestyle intervention
- Pharmacotherapies[§] (BMI ≥27 kg/m²)
- Bariatric surgery (BMI ≥35 kg/m²)

If persistent/progressive IGT despite intensive lifestyle modification → **consider metformin**

Management of Other CKM Risk Factors

Presence of metabolic syndrome triggers intensive lifestyle intervention targeting multifactorial risk control
Pharmacotherapy for comprehensive control of residually uncontrolled MetS components

Hypertriglyceridemia

- Maximize lifestyle modification and statin therapy
- Fibrates for ≥500 mg/dL
- Consider eicosapentaenoic acid (EPA) for TG: 135-499 mg/dL for patients with diabetes and additional risk factors

Hypertension

- Lifestyle modification
- Follow established hypertension guidelines to achieve BP <130/80 mmHg
- In diabetes or CKD → prioritize ACEi/ARB; consider steroidal MRA for resistant hypertension
- Avoid CCB in HFrEF
- African American patients with HFrEF → prioritize hydralazine + isosorbide dinitrate after 4 pillars of GDMT

Chronic Kidney Disease

- With albuminuria (UACR >30 mg/g) → ACEi/ARB
- ARNi preferred in HFrEF
- In CKD (in those with/without diabetes) → SGLT2i*
- DKD with residual albuminuria (UACR >30 mg/g) on ACEi/ARB → finerenone† (can be used on background SGLT2i)

Diabetes

- Lifestyle modification
- Co-utilization of metformin† with cardioprotective antihyperglycemics if HbA1c ≥7.5%

In ASCVD
To reduce MACE → Either SGLT2i* or GLP1-RA
To reduce HF hospitalizations → SGLT2i*
GLP1-RA/SGLT2i based on:

- BMI ≥35 kg/m² → GLP-1RA
- HbA1c ≥9% or high insulin dose → GLP-1RA
- CKD → SGLT2i*
- Concomitant HF → SGLT2i*

In HF
To reduce HF hospitalizations and CV mortality → SGLT2i*
Avoid → thiazolidinediones, DPP4i
SGLT2i for all patients with HF +

- BMI ≥35 kg/m² → add GLP-1RA
- HbA1c ≥9% or high insulin dose → add GLP-1RA
- Diabetes with multiple comorbidities → add GLP-1RA
- Albuminuria → consider adding finerenone†

Multiple comorbidities in the setting of Diabetes and CVD → Consider co-utilization of SGLT2i* and GLP-1RA

CKM Syndrome Management Stage 4

Key Highlights

- Support interdisciplinary care and address SDOH
- Address obesity and CVD with integrated teams; consider obesity pharmacotherapy
- Address/control CKM risk factors
- Cardioprotective anti-hyperglycemic agent in all with CVD plus diabetes; combination therapy for very high risk/multiple comorbidities
- Prevent CKD progression with RAASi/SGLT2i and/or finerenone/GLP-1RA (in diabetes)

*SGLT2i can be safely initiated for patients with eGFR ≥20 mL/min/1.73 m²
†Metformin can be co-utilized for patients with eGFR ≥30 mL/min/1.73 m² and without unstable or decompensated HF
‡Finerenone can likely be initiated on background SGLT2i for those with eGFR >25 mL/min/1.73 m² and potassium <5 mEq/L
§Pending the full results of the SELECT trial, high dose GLP-1RA may become frontline therapy in patients with obesity and established CVD

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Summary



- CKM health reflects interplay among metabolic risk factors, chronic kidney disease and the cardiovascular system
- Holistic care approaches are needed to mitigate the multi-system morbidity and greater risk for mortality inherent to CKM syndrome
- Optimal CKM syndrome care includes:
 - Systematic testing for detection of CKM risk factors in a timely fashion
 - Qualitative risk assessments with CKM staging
 - Quantitative risk assessments (PREVENT)
 - Personalizing risk discussions (CKM risk enhancers)
 - Holistically addressing inter-related risk factors

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Case Studies

Case 1 Presentation

David is a 45-year-old man with a history of overweight and stage 1 hypertension (SBP 130s), who comes to the Cardiology clinic for the evaluation of palpitations. He describes an occasional sensation of brief palpitations, lasting seconds. He denies chest pain, shortness of breath or other cardiovascular symptoms. He has no prior cardiovascular history.

He is married with one child. He works as a contractor. He describes some challenges “making ends meet” and does not eat many fresh foods, including fruits and vegetables, in part due to cost considerations. He smokes 3-4 cigarettes a day.

He is not currently taking any medications.



Case 1 Evaluation

On examination, David's BMI is 29 kg/m² with a waist circumference of 106 cm. His BP is 138/86 and HR is 77. His JVP is 7 cm, lungs clear to auscultation, CV exam with a RRR nl S1S2, his abdomen is protuberant and soft, his extremities are warm without edema, and his distal pulses are 2+.



His labs are notable for an eGFR of 55 ml/min/1.73m², potassium of 4.2, fasting glucose of 118, total cholesterol of 184 mg/dL, HDL-C of 38 mg/dL, triglycerides of 123 mg/dL an LDL-C of 121 mg/dl. A hemoglobin A1c is 6.1% and a UACR is 212 mg/g. An ECG shows sinus rhythm, some PACs and non-specific T wave changes.

His 10-year PREVENT-CVD score is calculated at 9.1%.

Case 1 Questions

- What is David's stage of CKM Syndrome?
- What factors influence your approach to his blood pressure management?
- How should we characterize and address his kidney disease?
- What aspects of his social context should be addressed?

Case 1 Take Home Points

- Pharmacologic management of stage 1 HTN indicated for PREVENT $\geq 7.5\%$ and CKD; RASi for HTN + albuminuria.
- Provide clear, actionable lifestyle guidance (nutrition - specifically the DASH diet, physical activity, smoking cessation resources) to improve treatment success, especially for patients who may be asymptomatic.
- Emphasize patient education on key CKM risk factors—including hypertension, prediabetes, weight, and smoking—to prevent future complications and support long-term risk reduction.
- Even during routine cardiology visit, importance of incorporating UACR into assessments of kidney and cardiovascular risk.
- Use of SGL2i in addition to RASi for the management of CKD with albuminuria, even in the absence of T2D.

Case 2 Presentation



Michelle is a 56-year-old woman presenting for the evaluation of progressive fatigue and shortness of breath over 6 months. She now notes dyspnea with climbing 1 flight of stairs or carrying laundry. She has also developed some lower extremity edema and 2 pillow orthopnea.

She has a history of obesity, hypertension and pre-diabetes. She is a single mother of 3 children and takes a bus to her job in retail. Her symptoms have recently made her commute and standing at work challenging. She does not smoke or drink alcohol.

Medications: valsartan 80 mg, amlodipine 5 mg

Case 2 Evaluation

On examination, Michelle's BMI is 42 kg/m² with a waist circumference of 118 cm. Her BP is 142/88 mmHg and HR is 82 bpm. Her JVP is 12 cm, lungs with basilar rales, CV exam with an occasionally irregular rhythm, nl S1S2, her abdomen is mild hepatomegaly and epigastric discomfort with palpation and her extremities are warm with 2+ edema.

Her labs are notable for an eGFR of 52 ml/min/1.73m², potassium of 4.5 mEq/L, fasting glucose of 122 mg/dL, total cholesterol of 176 mg/dL, HDL-C of 52 mg/dL, triglycerides of 112 mg/dL and LDL-C of 102 mg/dL. A hemoglobin A1c is 6.7% and a UACR is 52 mg/g. A proBNP is 320 pg/mL. Her FIB-4 index is 2.32.

An ECG shows sinus rhythm, occasional PVCs and left atrial enlargement. An echo shows mild concentric LVH, increased LA volume, EF 60%, grade II diastolic dysfunction and an E/e' of 20.

Case 2 Questions

- What is Michelle's Stage of CKM Syndrome?
- What are the primary therapeutic considerations for her HFpEF?
- What are the implications and next steps related to her FIB-4 score?
- What are key considerations for care coordination?

Case 2 Take Home Points

- Obesity, CKD, DM and HTN as key therapeutic targets in HFpEF management
- Assessments for liver fibrosis in MASLD
- Several CKM therapies with overlapping benefits
- Care coordination in HF; education and social support



Case 3 Presentation

Maxine is a 58-year-old woman presenting for an outpatient cardiologic visit. She was referred by the ED after severe incidental CAC was found on a chest CT for pneumonia.

She has a history of obesity, diabetes and hypertension. She has a family history of kidney failure and heart disease. She is married with 2 kids, has a long-time job as a busy administrator and doesn't "have much time" for her health. She does not smoke or drink alcohol.

Medications: Atenolol 50 mg, Metformin 1000 mg, Atorvastatin 20 mg



Case 3 Evaluation

On examination, Maxine's BMI is 38 kg/m², with a waist circumference of 104 cm. Her BP is 142/88 and HR is 72. Her JVP is 8 cm, lungs clear to auscultation, CV exam with a RRR s1s2 and an s4, her abdomen is protuberant and soft, her extremities are warm with trace edema and distal pulses are 2+.

Her labs are notable for an eGFR of 38 ml/min/1.73m², potassium of 4.6, fasting glucose of 214, total cholesterol of 188 mg/dL, HDL-C of 41 mg/dL, triglycerides of 163 mg/dL and LDL-C of 114 mg/dL. Lp(a) is 156 nmol/L. A hemoglobin A1c is 9.6% and a UACR is 324 mg/g. Her FIB-4 index is 1.1. An ECG shows NSR without ischemic changes.

Her 10-year PREVENT-CVD score is calculated at 41.4%.

Case 3 Questions

- What is Maxine's Stage of CKM Syndrome?
- How should we address her risk related to T2D?
- How should we address her risk related to CKD?
- How might her presentation influence her lipid management?
- How would care coordination impact her clinical management?

Case 3 Take Home Points

- For DM with high CKM risk – consideration for use of combination GLP-1/SGLT2i, especially with multiple uncontrolled CKM risk factors
- Diabetic CKD with albuminuria associated with high kidney and CVD risk (CVD first); 4 therapeutic options to reduce risk
- For patients with elevated A1c levels, provide anticipatory guidance regarding the increased risk of genital mycotic infections when initiating SGLT2i as higher baseline A1c levels are associated with greater susceptibility, making proactive education essential.
- Severe CKM syndrome is associated with greater ASCVD risk; consider aggressive lipid lowering with multiple agents as needed
- For high-risk patients seeing multiple clinicians (cardiology, endocrinology, nephrology) – CKM coordinator can support patient navigation and coordination across multiple specialists



Use the Q&A* box to submit a question

**How to submit a question to the Q&A box*

1. Click the **Q&A** button on the Zoom toolbar at the bottom of your screen. You may need to click the “More” icon.
2. Type your question in the text box at the bottom of the Q&A panel and click 'Send' to submit your question. (You have the option to submit questions anonymously.)
3. **Your questions will be monitored by our team and answered live as time allows.**



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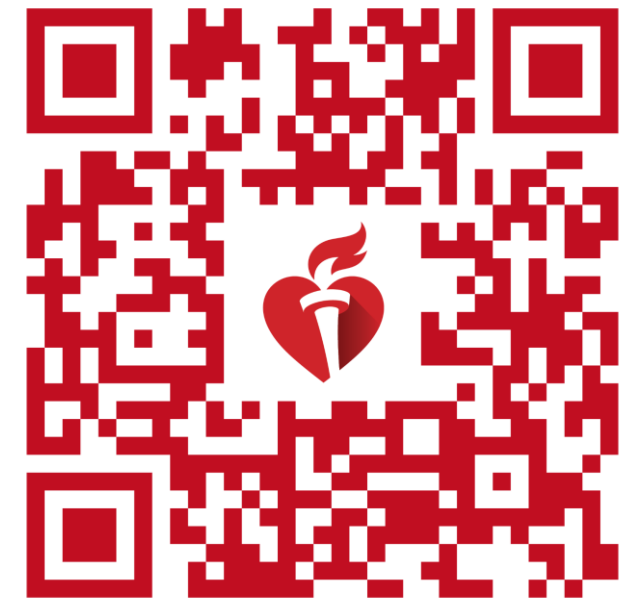
Cardiovascular- Kidney-Metabolic Health Initiative™

The CKM Health Initiative™ was built to foster collaboration across disciplines—because improving care requires everyone at the table. Whether you work in a clinic, community or health system, there's a way to get involved and help shape the future of CKM care. [Heart.org/CKMHealth](https://www.heart.org/CKMHealth)



Call to Action for all Health Care Professionals

- Become familiar with the CKM science compendium, including PREVENT calculator
- Be a champion for CKM care at your health care organization
- Comment on draft standards of care for CKM Center Certification
- Download the CKM Implementation Guide to access tools and resources to adopt interdisciplinary care practices



Sign up to receive more information on this fast-breaking new initiative.



Help define the national and global standards for Cardiovascular-Kidney-Metabolic Center Certification



The American Heart Association is developing a gold standard of care for site-based **Cardiovascular-Kidney-Metabolic Center Certification** to recognize healthcare organizations delivering integrated, person-centered care for people with cardiovascular, kidney, and metabolic conditions.

Your voice matters – scan the QR code now to get started.





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***Together, we can transform CKM care
and improve the lives of millions.***

