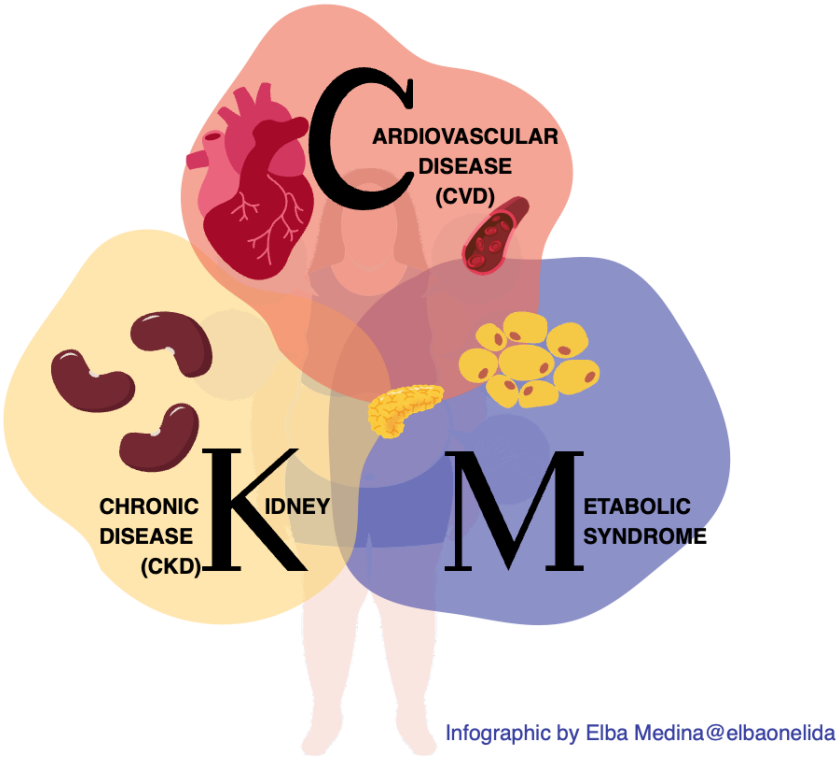
1/🚨📢Hey, **#Nephtwitter**, **#Medtwitter**, today we will discuss CKM syndrome based on the **@KIreports** blog. Have you heard about **#cardio-#kidney-#metabolic** (CKM) connection? Let´s start with a poll
What percentage of American adults have at least one CKM risk factor?

a)30%
b)50%
c)70%
d)90%

2/ We´ll be talking about Combination of Cardiovascular, Kidney, and Metabolic Diseases in a Syndrome Named Cardiovascular-Kidney-Metabolic, With New Risk Prediction Equations. https://www.kireports.org/article/S2468-0249(24)01757-1/fulltext. @MassyZiad
The American Heart Association proposed this concept @American_Heart @AHAScience

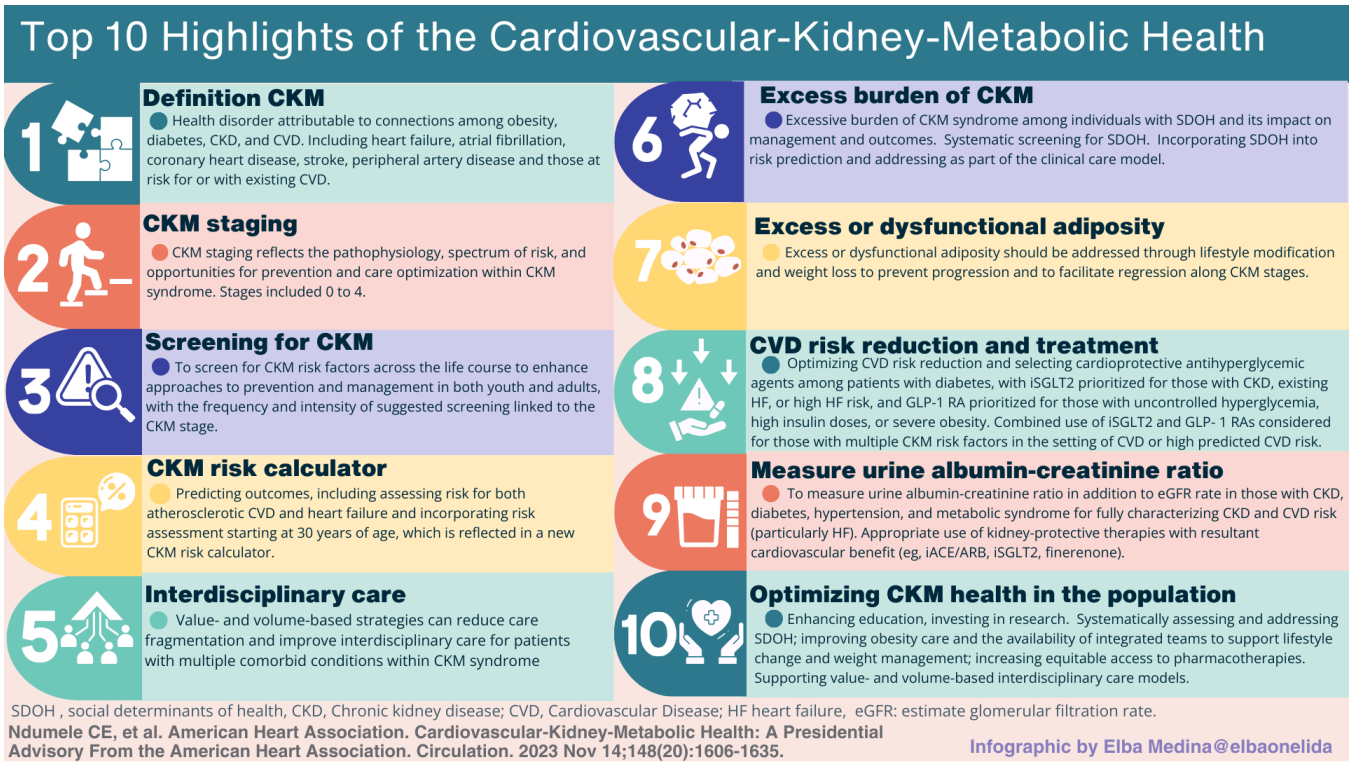


3/ Let´s start by talking about CKM syndrome.
➡️~30-60% with HF have moderate or severe kidney damage
➡️~40% with DM have CKD
➡️~10% have isolated T2DM with no associated cardiovascular or kidney disorder
➡️#Cardio, #kidney and #metabolic disease are the pandemic of 21st century

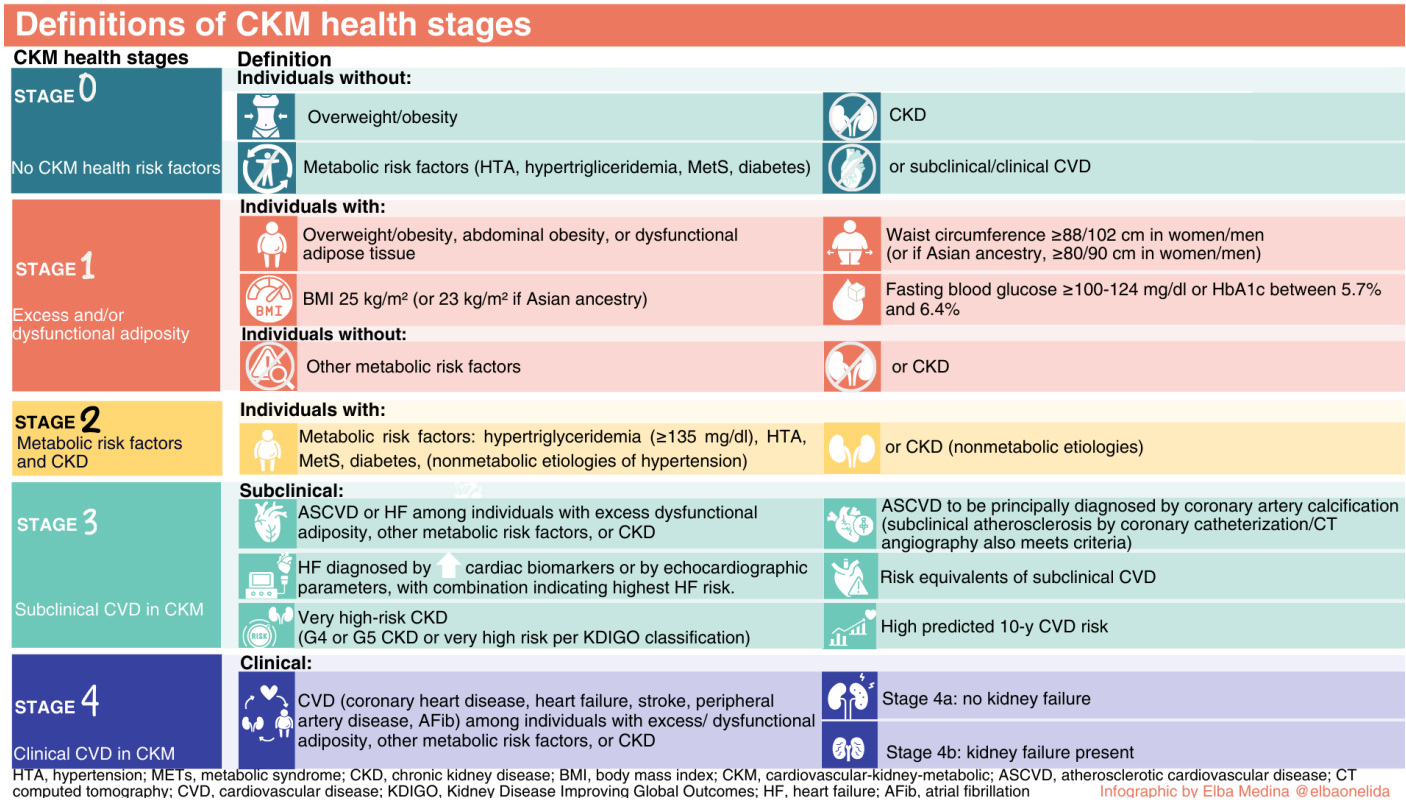
4/ So why is important ⁉️

≥25% of patients are affected by CKM syndrome which is associated with premature mortality🔥! Look at the Presidential Advisory from the American_Heart @AHAScience @ChiadiNdumele

https://www.ahajournals.org/doi/10.1161/CIR.0000000000001184



5/ What is the objective 🎯?
The integration 🧩of #CKM syndrome was to create an integrated staging system that is useful for clinical management, prevention, and research purposes for optimizing @CKMH (#Cardiovascular-#Kidney-#Metabolic- Health) 🦾 🔥

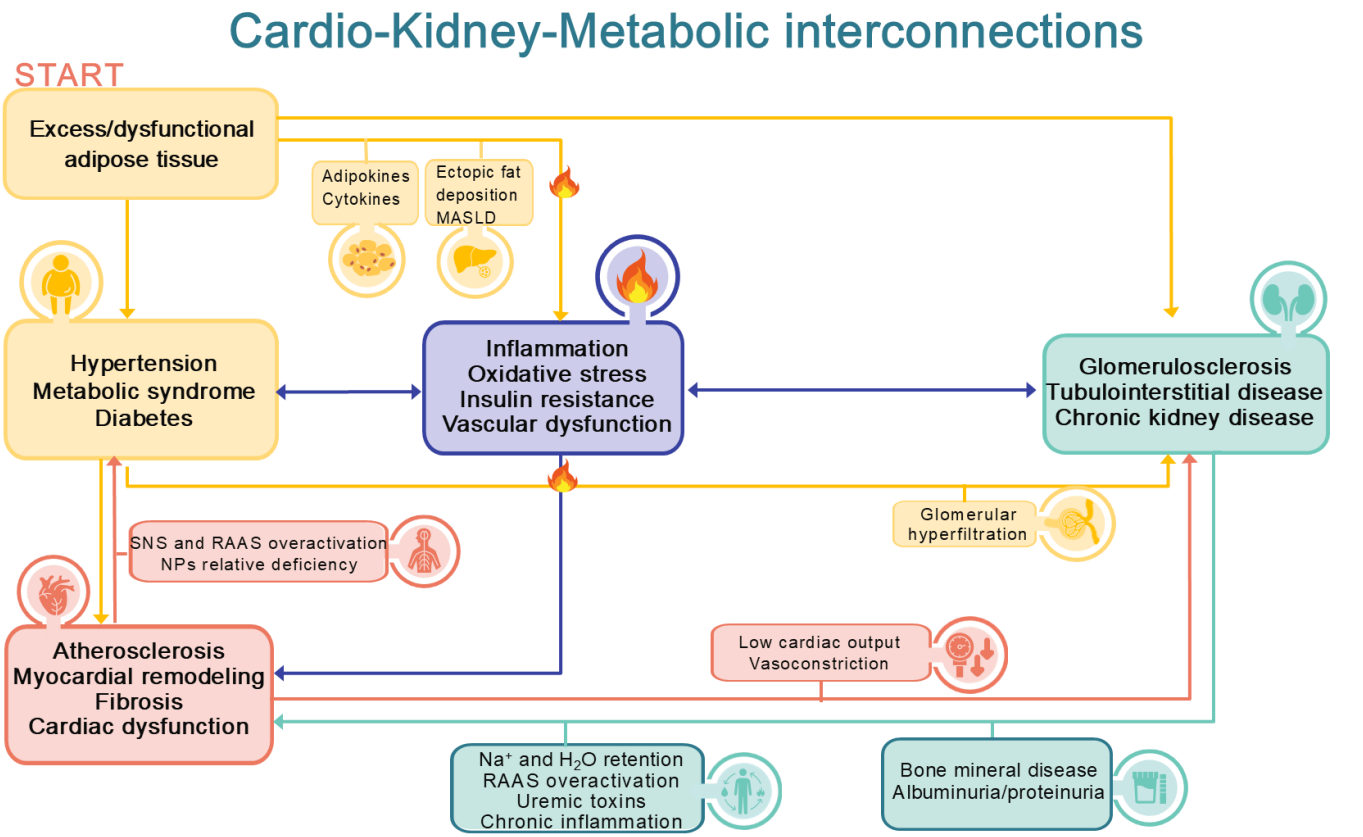


6/ In the pathophysiology of CKM syndrome a variety of interconnected factors are involved:

- Insulin resistance, hyperglycemia
- RAAS
- AGEs
- Oxidative stress
- Dyslipidemia and lipotoxicity
- Mitochondrial dysfunction
- Chronic (micro) inflammation
- Potentially uremic toxins

7/ #CKM syndrome most commonly originates from excess adipose tissue, dysfunctional adipose tissue, or both🔥with consequences not just limited to the known systems but also affect other organs interconnectedness.

Check out this infographic created by @elbaonelida



8/ Numerous risk factors cover a diversity of predisposing conditions for CKM syndrome influence its severity as well as related adverse outcomes.

09/ There are social determinants at multiple levels of influence, affect the likelihood of #cardiovascular-#kidney, #metabolic (CKM) syndrome and of consequent adverse outcomes.

@CircAHA @ChiadiNdumele

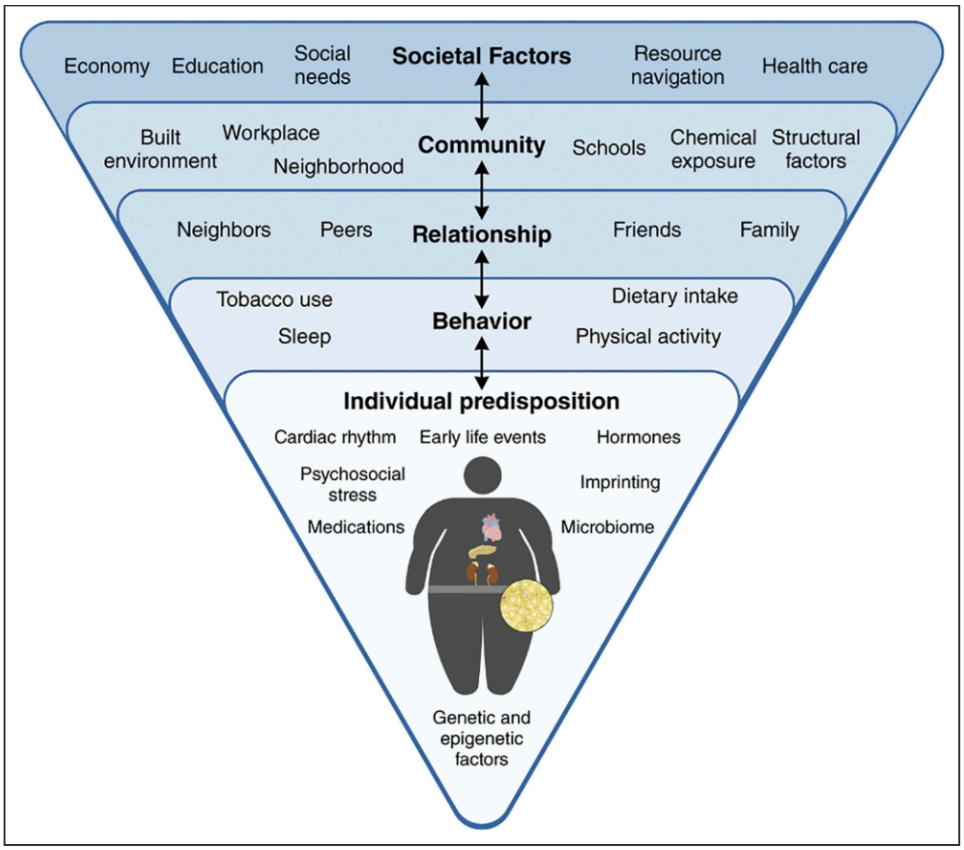


Figure 2. **Socioecological framework for CKM syndrome.** Social determinants at multiple levels of influence, including at societal, community, interpersonal and individual behavioral levels, affect the likelihood of cardiovascular-kidney-metabolic (CKM) syndrome and of consequent adverse outcomes. Individual biological predisposition, nested within these multiple levels of social influence, further affects CKM syndrome development and related outcomes.

10/ CKM syndrome includes the 2 major parameters of CKD progression risk: glomerular filtration rate and albuminuria. A more severe urinary albumin-to-creatinine ratio (uACR) was asociated with increased rates of all 10 adverse outcomes @goKDIGO

Associations of CKD staging by eGFRcr-cys and ACR categories and risks for 10 common complications by age in multivariable-adjusted analyses

Age <65	ACR, mg/g			
eGFRcr-cys	<10	10–29	30–299	300+
	All-cause mortality			
105+	0.99	1.2	1.5	2.4
90–104	ref	1.3	1.5	2.5
60–89	1.2	1.6	2.0	2.9
45–59	2.1	2.7	2.9	4.5
30–44	2.7	3.8	4.2	5.6
<30	5.2	4.0	7.1	8.6
	Cardiovascular mortality			
105+	0.95	1.4	1.7	4
90–104	ref	1.6	1.8	3.5
60–89	1.3	1.7	2.3	3.9
45–59	2.5	4.0	4.6	6.0
30–44	3.1	6.6	5.3	7.1
<30	6.0	5.5	9.4	12
	Kidney failure replacement therapy			
105+	0.57	0.77	2.3	12
90–104	ref	1.4	3.9	11
60–89	1.9	3.7	8.3	33
45–59	7.0	16	28	100
30–44	22	34	109	210
<30	335	267	419	625

Age 65+	ACR, mg/g			
eGFRcr-cys	<10	10–29	30–299	300+
	All-cause mortality			
105+	1.2	1.4	1.9	3.5
90–104	ref	1.2	1.4	2.0
60–89	1.2	1.5	1.8	2.3
45–59	1.6	2.0	2.4	2.9
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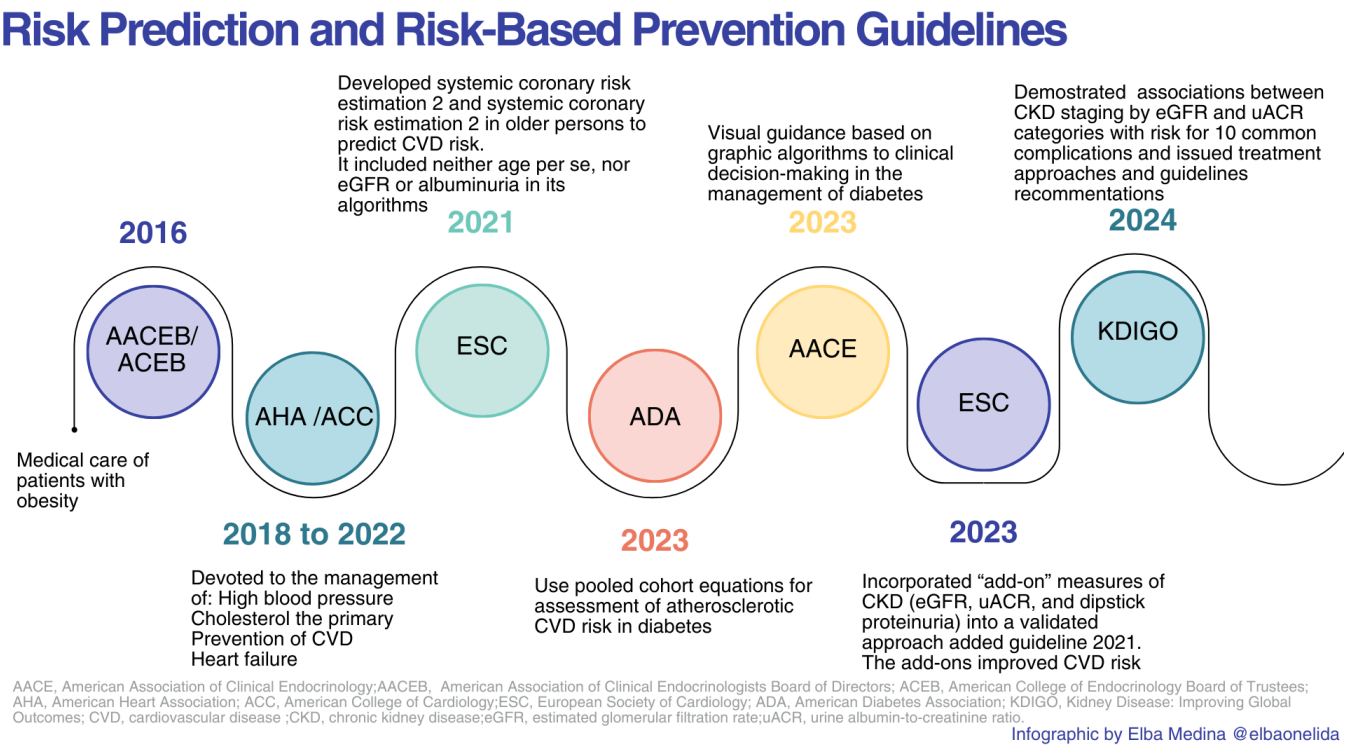
<30	5.7	5.2	5.1	7.8
	Kidney failure replacement therapy			
105+	2.0	1.0	2.1	
90–104	ref	1.9	4.7	10
60–89	1.4	2.6	6.2	19
45–59	3.7	7.9	16	42
30–44	14	14	46	137
<30	87	364	241	406

ADJUSTED VARIABLES INCLUDED
age
sex
systolic blood pressure
smoking status (current, former, or never)
total cholesterol
cancer
systolic blood pressure
high-density lipoprotein cholesterol
body mass index
use of antihypertensive medications
medical history of diabetes
stroke
coronary heart disease
atrial fibrillation
peripheral artery disease
heart failure
chronic obstructive pulmonary disease

Numbers reflect the adjusted hazard ratio compared with the reference cell. The colors were determined for each outcome separately using the following rule: the percentile shaded the darkest green color corresponds to the proportion of cells in the grid without CKD (e.g., 6 of 24 cells), and the percentile shaded the darkest red color corresponds to proportion expected to be at highest risk (e.g., 5 of 24 cells). In this manner, the numbers of green and red cells are consistent across outcomes, but the patterns are allowed to differ. ref, reference cell. CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; Cr, creatinine; cys, cystatin C; ACR, albumin-to-creatinine ratio.

Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int. 2024 Apr;105(4S):S117-S314.

11/ Over the years, risk prediction and risk-based prevention guidelines have been created, to improve the prediction and care of obesity, diabetes, and hypertension ❗ @American_Heart @AHAScience, @goKDIGO, @ACCinTouch, @AmDiabetesAssn, @escardio



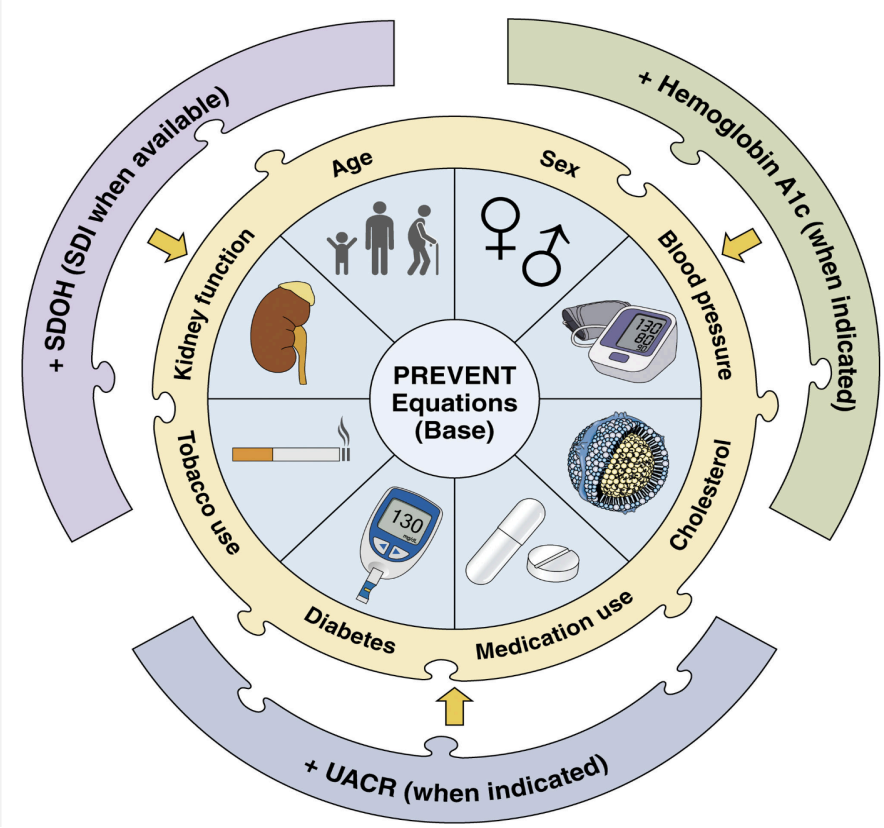
12/ There are calculators for calculated 10y and lifetime risk of atherosclerotic cardiovascular disease (ASCVD)ASCVD Risk Estimator + (acc.org)
👇

https://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/therapy/

13/PREVENT equation Absolute Risk Assessment of Total Cardiovascular Disease Incorporating Cardiovascular-Kidney-Metabolic Health This should be used for primary prevention patients only
https://professional.heart.org/en/guidelines-and-statements/prevent-calculator

https://gph.is/g/aX836BO

14/ PREVENT Equation originated with a derivation and validation cohort from a sample of >6 million people that provided CVD risk of total CVD (and CVD subtypes) estimates over periods of 10 and 30 years.



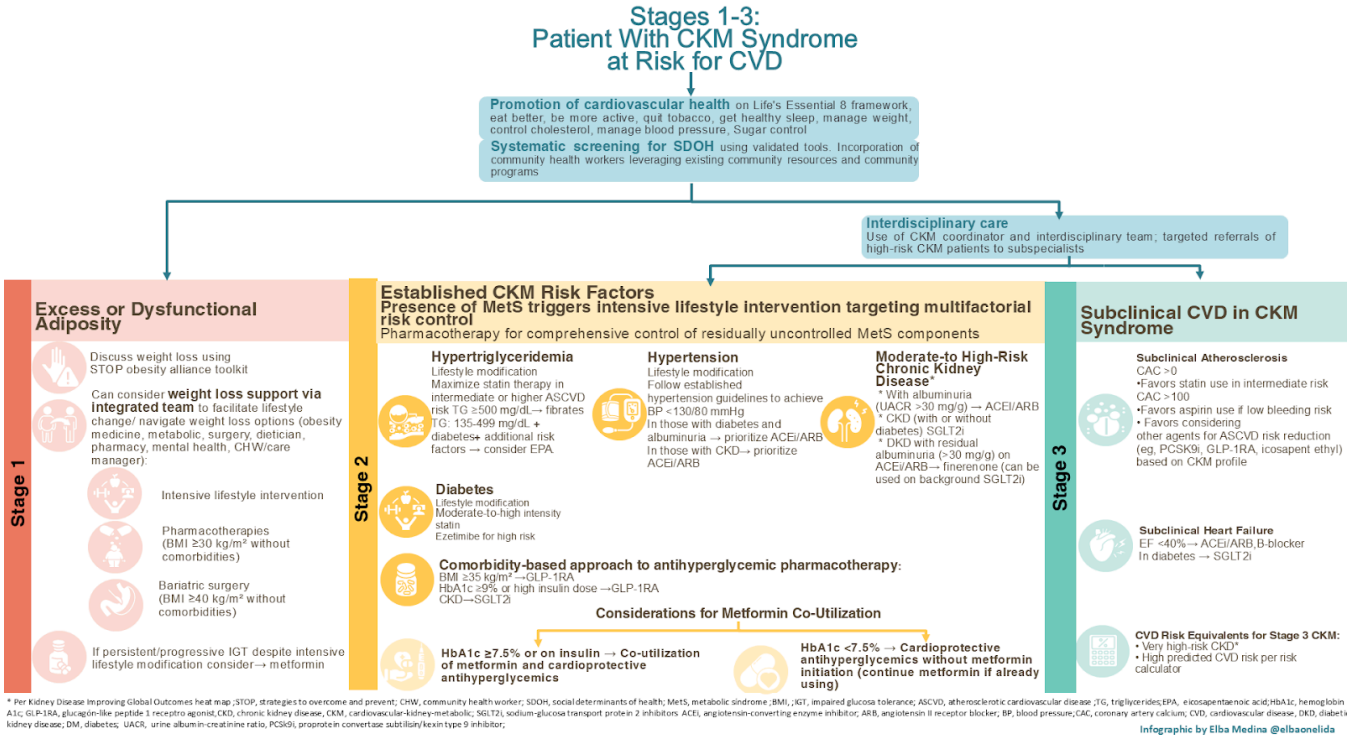
https://www.ahajournals.org/doi/epub/10.1161/CIR.0000000000001191

15/ Notwithstanding the benefits PREVENT equations, were observed several limitations:

Limitations of PREVENT equation
The authors used electronic medical records/based data sets
Excluded people with extreme clinical values of systolic blood pressure, serum total, and HDL cholesterol, or BMI.
The long baseline time period of the included data sets, spanning more than 3 decades, might have led to differences in risk factor prevalence and treatment modalities.
The authors used age as the time scale for model development as the time scale.
Individual-level social determinants of health were not routinely available in all data sets
The PREVENT model development did not include a variety of well-known biomarkers of target organ damage.
Separate modeling was used for total CVD and its components in the development of PREVENT equations.
Valid only for individuals aged 35 to 79 years in the US.

16/ knowing the result of the PREVENT equation of risk may assist and guide clinicians and patients in shared decision-making for interventions targeting lifestyle behaviors and consideration of pharmacotherapies
=Earlier and more appropriate treatment
=Prevention of CKM factors

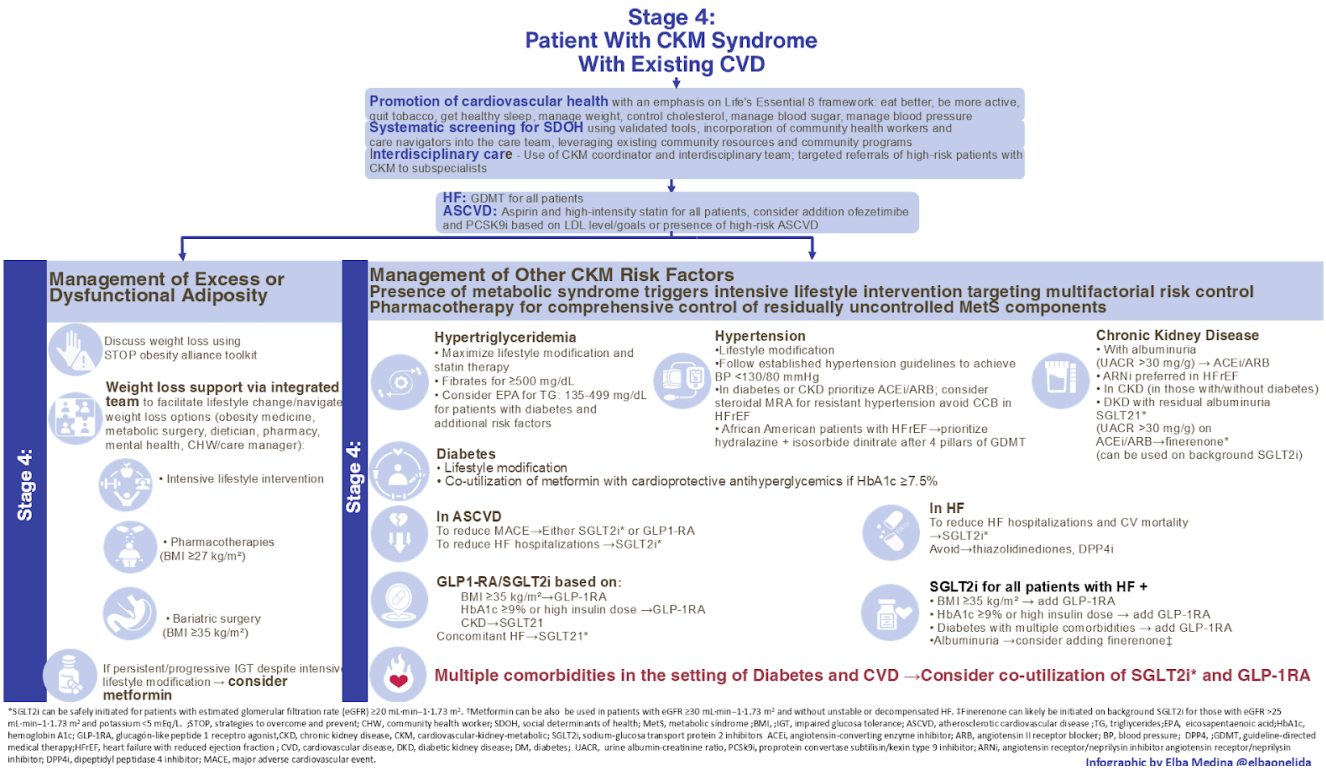
17/ #CKM (#cardio-#kidney-#metabolic syndrome) treatment algorithm Stages 1-3 Patient with CKM syndrome at Risk of CVD.



18/ What do you think is the treatment of patient in Stage 4 with multiples comorbidities in the setting of Diabetes and CVD ?

A) Co-utilizacion of SGLT2i and GLP-1 RA
B) SGLT2i
C) GLP-1 RA
D) Lifestyle modification

19/ Here is #CKM (#cardio-#kidney-#metabolic syndrome) treatment algorithm Stage 4 Patient with CKM syndrome with Existing CVD.



20/ This has been a Xtorial by @elbaonelida POD3 Glomke3pers @NSMCInternship NephEdC 2024 Interns. Thank your for reading our KI Reports Community blog

[CKM Syndrome: Finally recognizing the connection between the heart, kidney & metabolic syndrome]