

Cost-effectiveness of CKD screening

Pierre Delanaye, MD, PhD
University of Liège
CHU, Sart Tilman
BELGIUM
Associate Editor CKJ

CKD screening: still debated!

Screening and prevention

Despite the increasing recognition of the true burden of CKD, there remains controversy and lack of consensus as to the utility of population screening for CKD²⁶ or targeted screening programs,¹⁸ due to the complexity of the underlying sociopolitical and resource environment.





IN CONTEXT

Testing the waters on home-based albuminuria screening to enhance the detection and management of CKD

Lauren Floyd ^{1,2} and Pierre Delanaye ^{3,4}

Clinical Kidney Journal, 2024, vol. 17, no. 2, sfae031

<https://doi.org/10.1093/ckj/sfae031>

Advance Access Publication Date: 9 February 2024

In Context

**63rd ERA
CONGRESS**
GLASGOW & VIRTUAL
JUNE 3-6, 2026
Challenge Your Thinking



Table 1: Pros and cons of screening for chronic kidney disease in the general population and in individuals deemed at risk. At-risk individuals include those with diabetes, hypertension, familial history and specific ethnic groups [5].

	Screening the general population	Screening those at risk
PROs	• Quick, non-invasive and acceptable to most individuals • Allows for the management of risk factors and early intervention with effective treatment • Opportunity for patient education • Promotes self-management and shared decision making	• Tailored screening to account for genetic, demographic, and environmental factors • Shown to be more cost-effective • Allows for more targeted and patient-centred treatment • May reduce the progression and therefore burden on KRT services • Encourages an MDT approach to management • Increased observation and follow-up in high-risk individuals
CONS	• False positives and false negatives • Not hugely cost-effective • Potential for over diagnosis and over treatment • No long-term data to provide it makes a difference to overall outcomes • Increased health anxiety • Needs to be equitable and allow for equal access • Burden on healthcare resources and primary care services	• Still may not improve overall outcomes • No evidence to suggest an improvement in health-related quality of life outcomes • Screening with eGFR may identify a greater number of at-risk people than screening with urinalysis

CKD: chronic kidney disease; eGFR: estimated glomerular filtration rate ; KRT: kidney replacement therapy; MDT: multidisciplinary team

~ 10%



Clinical Kidney Journal, 2025, vol. 18, no. 11, sfaf328

<https://doi.org/10.1093/ckj/sfaf328>

Advance Access Publication Date: 24 October 2025

Pro/Con Debate



PRO/CON DEBATE

Age-adapted versus age-independent eGFR thresholds to diagnose CKD: integrating the debate and charting a balanced path forward

Pierre Delanaye ^{1,2,3}, Priya Vart ⁴, Jürgen Floege⁵ and Carmine Zoccali^{6,7,8}

Tools (and prices)



- Creatinine : Jaffe (~0,04 €) or enzymatic (~0,05-0,20 €)
- Cystatin C: from ~4 € (to 20 €)
- UACR: ~0,5-1€
- UPCR: ~0,5-1€
- Urine strips (basic): ~ 0,5-0,10 €

So, safe and relatively low costs ...and easy to perform (urine) and creatinine measurement is standardized

Goals of screening

- Prevention of CKD progression
- Avoid ESRD
- Avoid MACE

We are more and more effective...

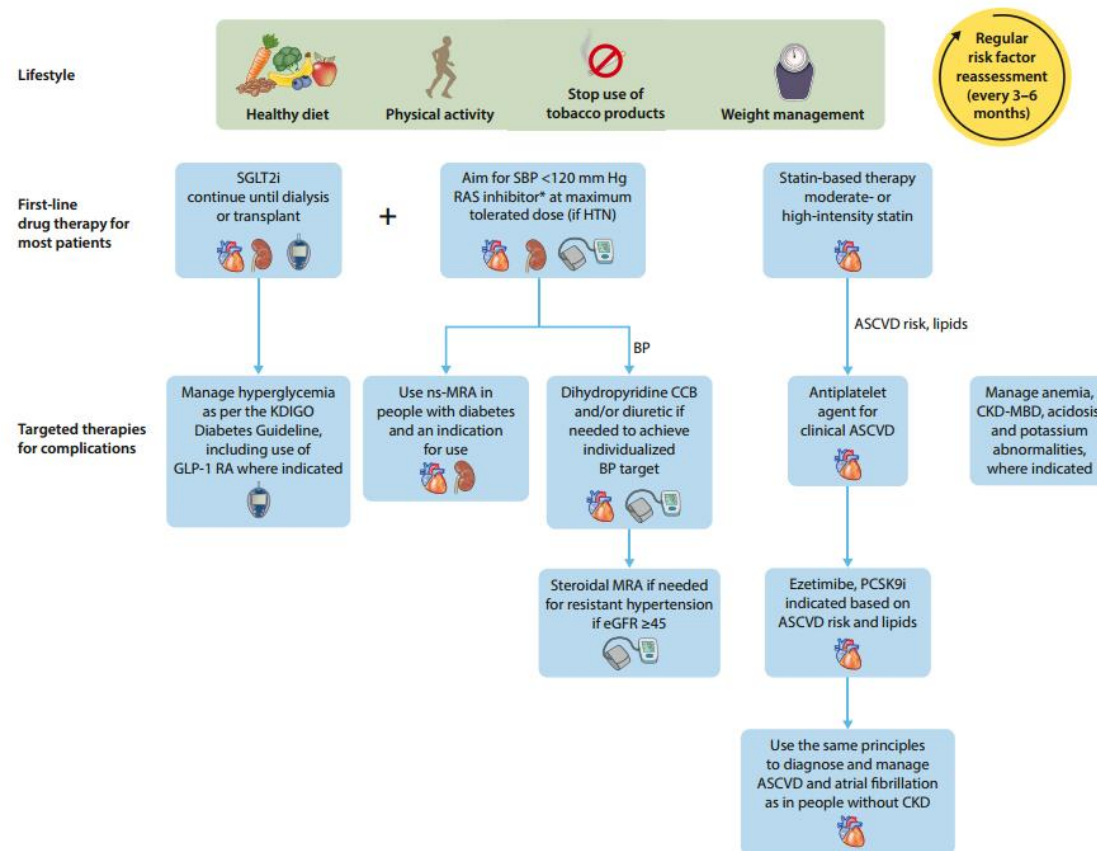


Figure 18 | Holistic approach to chronic kidney disease (CKD) treatment and risk modification.





ORIGINAL ARTICLE

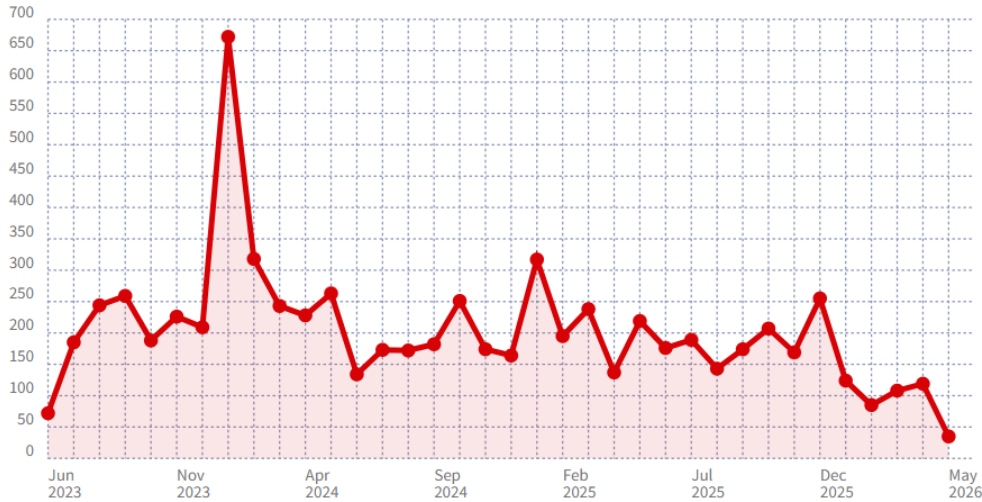
Cost-effectiveness of screening for chronic kidney disease in the general adult population: a systematic review

See Cheng Yeo¹, Hankun Wang¹, Yee Gary Ang², Chee Kong Lim³
and Xi Yan Ooi¹

Metrics

Total Views 7,247	5,244 Pageviews
	2,003 PDF Downloads

Since 6/1/2023



Citations



- 80 Total citations
- 79 Recent citations
- 43 Field Citation Ratio
- 4.67 Relative Citation Ratio

Powered by Dimensions

Altmetrics



- Posted by 13 X users
- Referenced by 2 Bluesky users
- 85 readers on Mendeley

Systematic Review and meta-analysis

- Inclusion criteria (2022):

Adult individuals

Full or partial health economic evaluation (including cost-effectiveness, cost-utility, cost-benefit, cost-minimization, cost-description, cost-consequence or cost-outcome)

Using societal or healthcare payer perspective

CKD screening strategies available

Comparison with no screening or usual care

Systematic Review and meta-analysis

- Outcomes

Incremental cost-effectiveness ratio (ICER) of CKD screening versus no screening

$$ICER = \frac{\text{Cost of Screening} - \text{Cost of no screening}}{\text{Efficacy of screening} - \text{Efficacy of no screening}}$$

Efficacy is expressed in quality-adjusted life years (so, one QALY represents one year of life in perfect health)
or cost per life-year gain (so, LYG is purely quantitative)

ICER = € / LYG: "How much does it cost to save one life for one year?"

ICER = € / QALY: "How much does it cost to save one life for one year *in good health*?"

“The cost-effectiveness of CKD screening was determined based on ICER threshold of USD \$50.000 per QALY, as this threshold is most frequently quoted in primary literature, is widely accepted, and also the most studied and reviewed”

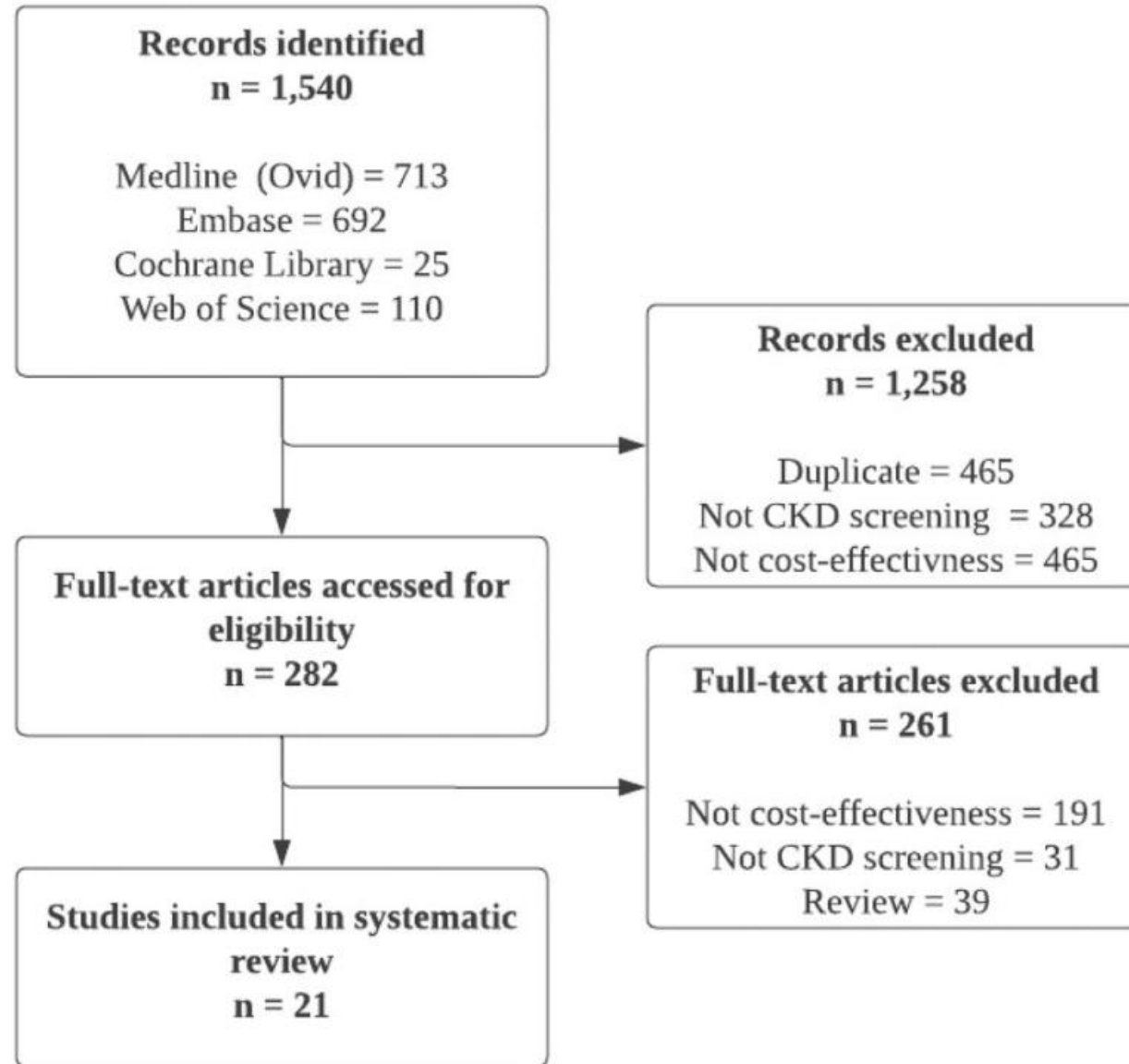


Figure 1: PRISMA flow diagram.

Results

- 13 in targeted populations and 8 in general population
- 9 in USA, 5 each in Europe and Asia and 2 in Australia
- 15 in the primary care setting and 6 in the community setting
- 2 studies with a two-step strategy: home based followed by confirmatory test in primary care
- UACR or UPCR only n=13, eGFR only n=3, both n=3
- ICER per QALY (n=17) and/or per LYG (n=5)
- Only RAS inhibitors are considered

- ICERs per QALY: from \$113 to \$430,595, with a median of \$26,662
- ICERs per LYG: from \$6,516 to \$38,372, with a median of \$29,112
- Range varies widely across studies

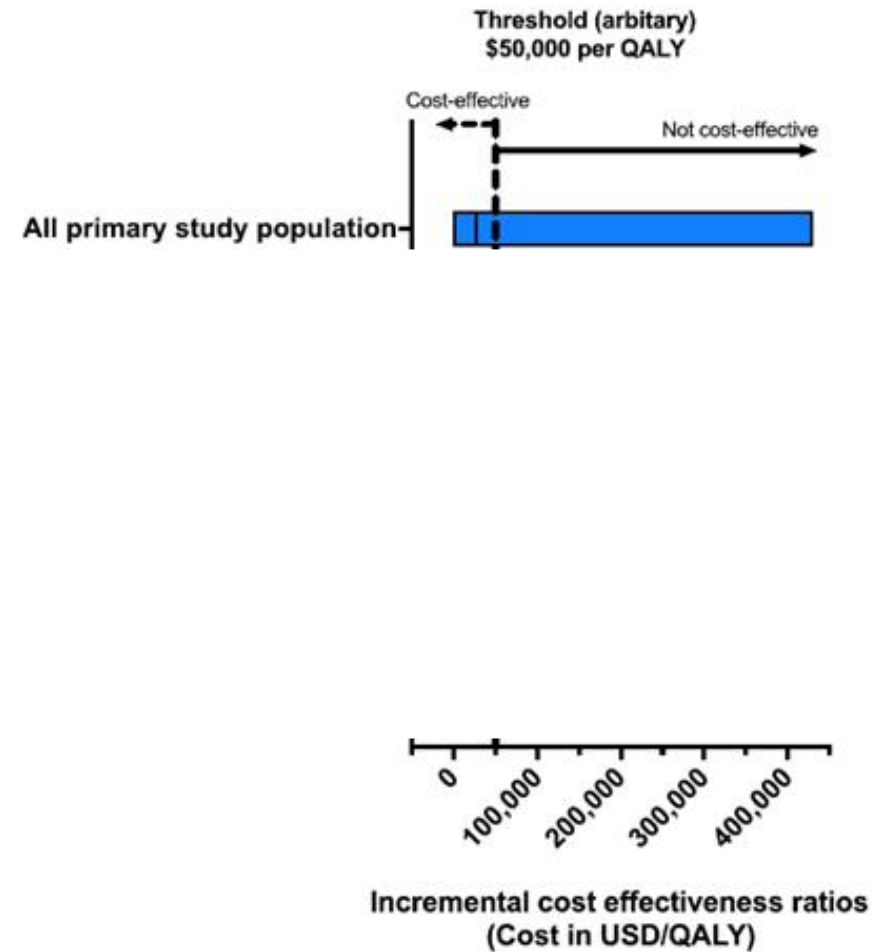


Figure 2: Plot comparing reported incremental cost-effectiveness ratios in selected sub-populations. Each bar represents the range of ICERs reported with the line showing the median value. The \$50000 ICER threshold was pre-defined to demonstrate cost-effectiveness (left of vertical line) or not cost-effective (right of vertical line). MICs, middle-income countries.

Studies screening urine for UPCR/UACR have lower ICERs than screening for eGFR:

median \$25,282 *versus* \$48,948 per QALY

studies screening for both:

median \$74,916 per QALY

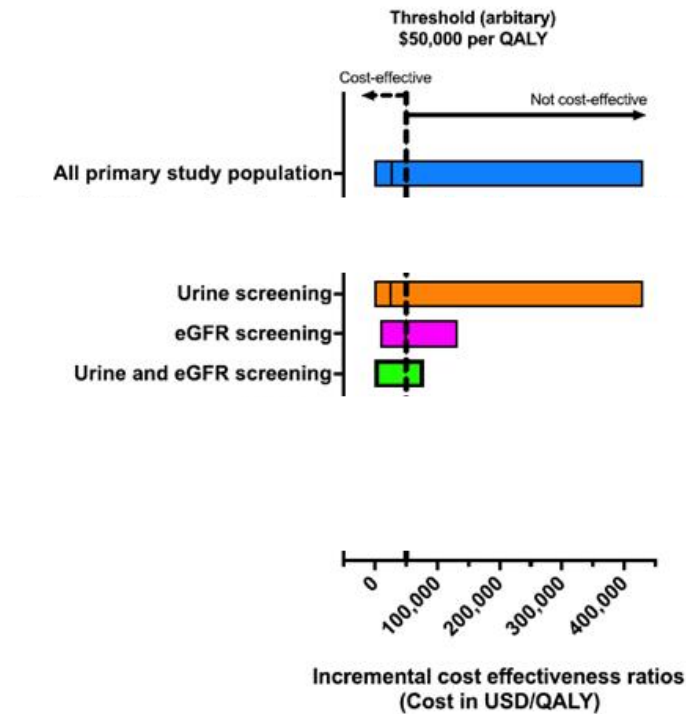


Figure 2: Plot comparing reported incremental cost-effectiveness ratios in selected sub-populations. Each bar represents the range of ICERs reported with the line showing the median value. The \$50,000 ICER threshold was pre-defined to demonstrate cost-effectiveness (left of vertical line) or not cost-effective (right of vertical line). MICs, middle-income countries.

Studies screening diabetic populations:

median \$27,471 per QALY

Studies screening hypertensive populations:

median \$53,531 per QALY

Studies screening without hypertension, nor diabetes:

median \$202,761 per QALY

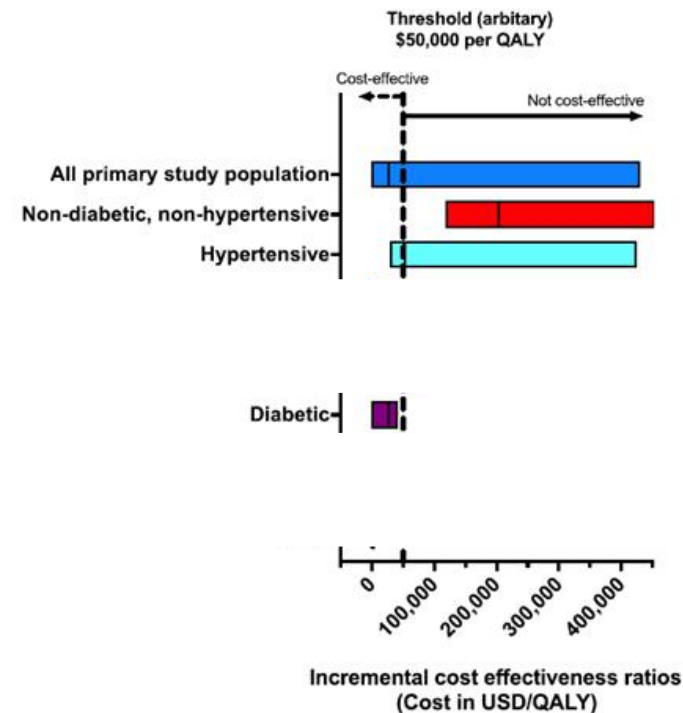


Figure 2: Plot comparing reported incremental cost-effectiveness ratios in selected sub-populations. Each bar represents the range of ICERs reported with the line showing the median value. The \$50,000 ICER threshold was pre-defined to demonstrate cost-effectiveness (left of vertical line) or not cost-effective (right of vertical line). MICs, middle-income countries.

Discussion

- Methodology and populations vary widely
- Cost-effectiveness varies widely...
- Targeted screening is cost-effective
- Urine screening is more cost-effective than eGFR screening

EDITORIAL COMMENT

Cost-effectiveness of screening for chronic kidney disease: existing evidence and knowledge gaps

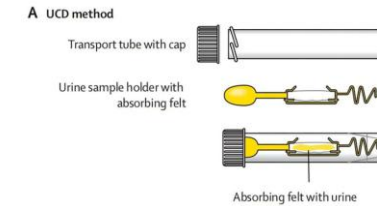
Dominique van Mil ^{1,2}, Xavier G.L.V. Pouwels³, Hiddo J.L. Heerspink ²
and Ron T. Gansevoort ¹

Table 1: World Health Organization (WHO) Wilson & Jungner's principles of screening for disease.

-
1. The condition sought should be an important health problem.
 2. There should be an accepted treatment for patients with recognized disease.
 3. Facilities for diagnosis and treatment should be available.
 4. There should be a recognizable latent or early symptomatic phase.
 5. There should be a suitable test or examination.
 6. The test should be acceptable to the population.
 7. The natural history of the condition, including development from latent to declared disease, should be adequately understood.
 8. There should be an agreed policy on whom to treat as patients.
 9. The cost of case-finding (including a diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.
 10. Case-finding should be a continuous process and not a 'once and for all' project.
-

Defenders of ACR for screening

- Easy (possible at home)
 - UACR increases before GFR decreases
 - Strongly associated with risk of progressive CKD and CVD
 - ACE/ARA2, SGLT2i, finerenone are particularly efficient in patients with increased UACR
 - UACR can improve with treatment...and it reflects the risk reduction of CKD progression
-
- Confirmation test (chronicity and intra-individual CV)
 - Not standardized



Defenders of screening in the general population

- Screening in high-risk population is unsatisfactory
- HTA and diabetes can be unknown
- UACR (and eGFR) can be included in scores to predict CV risk (SCORE2)...in the general population

Since then...

ORIGINAL RESEARCH

Annals of Internal Medicine

Population-Wide Screening for Chronic Kidney Disease

A Cost-Effectiveness Analysis

Marika M. Cusick, MS; Rebecca L. Tisdale, MD, MPA; Glenn M. Chertow, MD, MPH; Douglas K. Owens, MD, MS; and Jeremy D. Goldhaber-Fiebert, PhD

Ann Intern Med. 2023;176:788-797.

NHANES/DAPA-CKD
ACR
RASi, SGLT2i

With SGLT2i, screening is cost-effective in every age group
(<100-150,000\$ per QALY)

Since then...

Articles

Cost-effectiveness of home-based screening of the general population for albuminuria to prevent progression of cardiovascular and kidney disease



Xavier G. L. V. Pouwels,^{a,l} Dominique van Mil,^{b,c,l} Lyanne M. Kieneker,^b Cornelis Boersma,^{d,e} Ronald W. van Etten,^f Birgitte Evers-Roeten,^g Hiddo J. L. Heerspink,^{c,h} Marc H. Hemmelder,ⁱ Marloes L. P. Langelaan,^j Marc H. M. Thelen,^k Ron T. Gansevoort,^{b,*,m} and Hendrik Koffijberg^{a,m}



eClinicalMedicine

Volume 68, February 2024, 102414

THOMAS/PREVENT/SCORE2

ACR (home based)

RASi, SGLT2i (and statin, diuretics, beta blockers)

CVEs considered!

With this “global approach” , screening is cost-effective
(9,225 \$ per QALY, i.e. <20,000 \$ per QALY, ICERs lower in 45-65 than 65-80 y)

We must do better...



www.kidney-international.org

clinical investigation

Population-based estimated Glomerular Filtration Rate distributions and associated health outcomes provide opportunities for early identification of and primary prevention of chronic kidney disease



see commentary on page 436

OPEN

Yuanhang Yang¹, Antoine Creon¹, Andrew S. Levey², Anne-Laure Faucon¹, Aurora Caldinelli¹, Marie Evans³, Arvid Sjölander¹, Alberto Ortiz⁴, Edouard L. Fu^{1,5} and Juan Jesus Carrero^{1,6}

Kidney International (2026) **109**, 559–568;

Percentiles of estimating glomerular filtration rate: a new personalized tool for detection of chronic kidney disease

Pierre Delanaye^{1,2,3} and Christophe Mariat⁴



Sweden is a high-income country with an excellent health system, also recognized for the quality of its registers and epidemiological data (as it is for the SCREAM project). Despite this favorable environment, only 39% of individuals with CKD (defined according to the Kidney Disease Improving Global Outcomes [KDIGO] guidelines by an eGFR below 60 ml/min per 1.73 m²) have been tested for ACR within 1 year before or after GFR estimation in SCREAM.

Conclusions

- Screening strategy is still debated
- New studies are necessary for cost-effectiveness
- This is not easy...
- Screening targeted populations is cost-effective (but is it done?)
- Screening in the general population could be cost-effective if this is integrated in a strategy, not only focused on the kidney, but on CVD prevention (post-screening is the challenge)
- Whatever the strategy, we can (must) do better
- In low-income countries, prevention strategies are vital...

