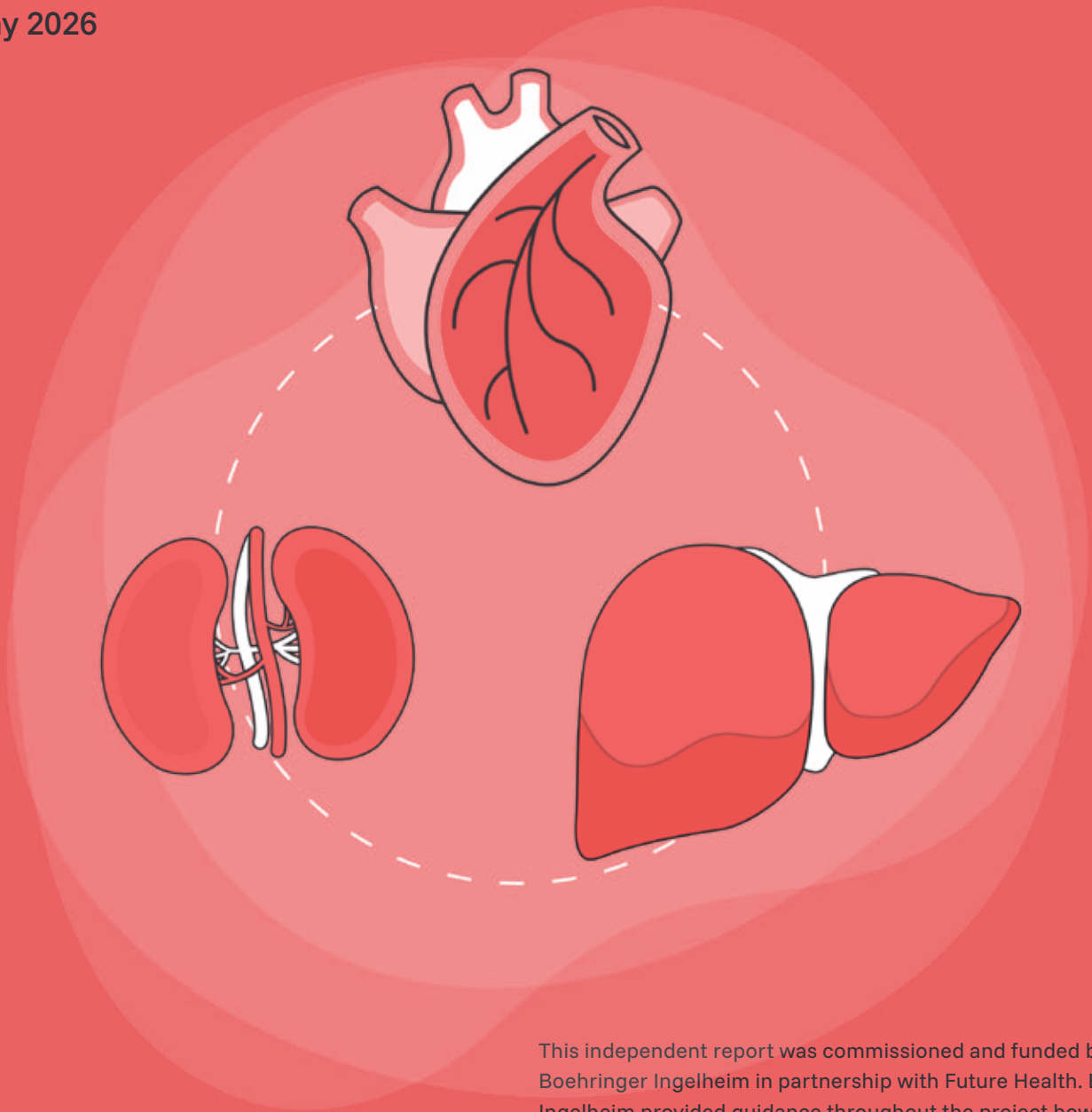
Future Health Research

Delivering interconnected cardiovascular-renal-metabolic care

A draft policy roadmap for improving the screening and earlier diagnosis of patients with Chronic Kidney Disease and liver disease

May 2026



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About Future Health Research

Future Health Research is a specialist healthcare public policy research centre that aims to deliver policies that support healthier and wealthier people, communities and nations.

Future Health's global health policy research programme includes work on cardiovascular disease and lung health. More information is available at: www.futurehealth-research.com/

About the author

Richard Sloggett is the Founder and Programme Director of Future Health – a health specialist policy research centre – and has over fifteen years of experience in healthcare policy. At the 75th World Health Assembly (WHA) Richard published *The power of connection*, a research paper exploring how countries can develop more interconnected approaches to cardiovascular, renal and metabolic diseases to meet the needs of patients.[1]

From 2018-19 he was Special Advisor to the UK Secretary of State for Health and Social Care.

During his time in the UK Government, Richard worked on major health policy decisions including a ten year health service reform plan. Richard's work with the Secretary of State also included work on the 2019 G7 primary care declaration.

Alongside his work at Future Health Richard is undertaking his doctoral thesis in preventative healthcare systems at the University of Liverpool.

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Introduction

Cardiovascular disease (CVD) is the world's biggest killer today – with nearly twenty million people dying from CVD in 2022 – and is set to remain so in 2050.[2] As set out in Future Health's The *power of connection* report, one of the drivers behind this burden, is the rising numbers affected by interconnected Cardiovascular-Renal-Metabolic (CRM) conditions which include diabetes, Chronic Kidney Disease (CKD), obesity and liver disease.[3]

The WHO has set a target of reducing premature mortality from NCDs including CVD by a third by 2030 – but most countries remain off track to deliver on these ambitions.[4]

CRM conditions – CVD, CKD, type 2 diabetes, obesity and liver disease – are biologically and clinically interconnected. They share common underlying causes – particularly excess fat around the organs, the body's reduced response to insulin – and persistent low-level inflammation, and they tend to cluster in the same patients in ways that amplify risk. Patients with CKD and liver disease are more likely to die from cardiovascular events than kidney or liver failure.[5] [6]

Greater effort is needed to diagnose CRM conditions earlier, so patients can get the care and treatment they need. Two CRM conditions in particular, have very low rates of diagnosis and rising patient, health system and economic costs.

- CKD affects 850 million people globally but fewer than 10% with the condition are aware of it[7]
- Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD) affects an estimated 38% of adults globally today and this is expected to rise to 55% by 2040. 20-30% of those with MASLD are expected to progress to Metabolic Dysfunction-Associated Steatohepatitis (MASH).[8] Studies have shown that a significant majority of those with MASH are undiagnosed[9]

Diagnosis for both conditions often takes place when irreversible damage has already been done – resulting in higher rates of mortality, impaired quality of life for patients and carers, and healthcare costs many times greater than those associated with earlier-stage disease.[10] [11] [12] [13] [14]

Screening and earlier intervention can empower patients to make lifestyle changes as well as open up opportunities to explore pharmacological treatments which can help slow, halt or even reverse damage to these vital organs.[15] [16]

The positive news is that the earlier diagnosis of both conditions is achievable – the tools exist and are improving, the evidence base supports their use and a growing number of countries have demonstrated that systematic screening in high-risk populations can be delivered at scale.

New international commitments from 2025 including the WHO resolution on 'Reducing the burden of noncommunicable diseases through promotion of kidney health and strengthening prevention and control of kidney disease'[17] and the UN General Assembly political declaration on NCDs and mental health – which for the first time explicitly commits signatories to strengthening screening and management for both CKD and MASLD – create opportunities for action.[18]

This draft roadmap translates available evidence into a practical framework that policymakers can draw on to design, prioritise and implement earlier diagnosis approaches for CKD and MASH that can deliver more interconnected strategies to tackling CRM conditions helping to reduce mortality rates, system costs and wider economic impacts.

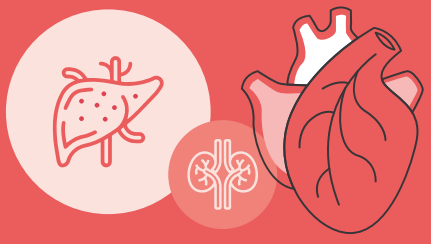
Future Health is now seeking feedback on this draft roadmap, specifically:

- Identifying further evidence and examples of health systems making changes to increase access to CKD and MASH screening
- Any gaps or areas that need strengthening in the draft roadmap
- How the recommended actions should be prioritised and rolled out

Future Health looks forward to engaging with policymakers and other stakeholders in this consultative phase with a final document published later in 2026.

Please do get in touch at richard@futurehealth-research.com

The case for action



Cardiovascular disease is the world's biggest killer[1]

20 million

deaths globally per year[1]

CKD - Prevalence and the undiagnosed - liver disease

CKD

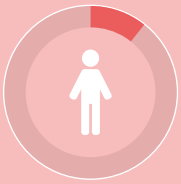
Claims 19 million lives per year and is set to become the 5th leading cause of death by 2040 globally.[2 3] CKD is a key driver of CVD deaths[4]

MASH

Obesity is a key driver of MASH with prevalence of both conditions on the rise.[5] CVD is the most common cause of death in MASH patients[6]

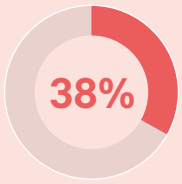
1 in 10

people worldwide live with CKD[7 8]



<10%

of people with CKD are diagnosed[9]

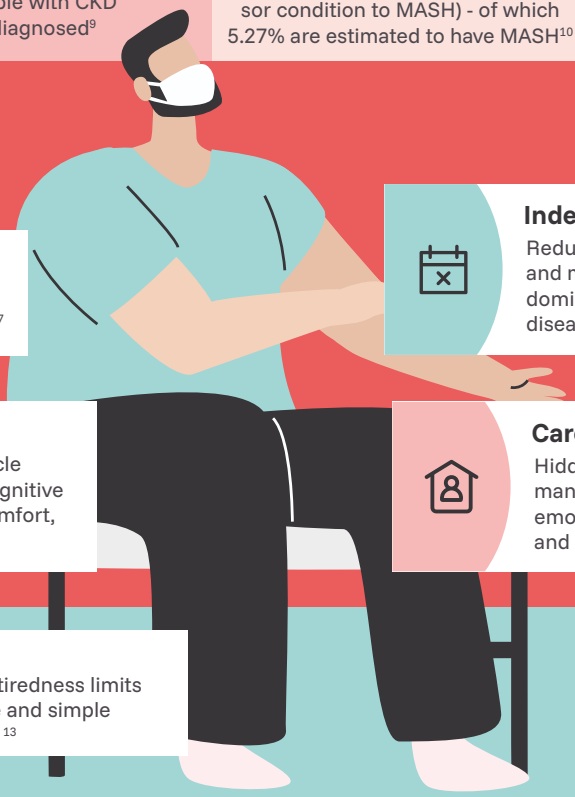


38% of adults globally have MASLD (Metabolic dysfunction-associated steatotic liver disease - the precursor condition to MASH) - of which 5.27% are estimated to have MASH[10]

<5%

of people living with at-risk MASH are diagnosed[11]

The Human Cost



Mental Health

Depression, anxiety, loss of identity and fear of future health decline[16 17]

Independence

Reduced ability to work, parent, travel and maintain friendships. Dialysis dominates schedules. World shrinks as disease advances[18 19]

Physical Symptoms

Pain, breathlessness, nausea, muscle cramps, itch, sleep disturbance, cognitive difficulties (CKD). Abdominal discomfort, fatigue, brain fog (MASH)[14 15]

Carer Impact

Hidden burden on carers: medication management, transport to appointments, emotional support. Family exhaustion and isolation[20]

Daily Life

Overwhelming tiredness limits work, family life and simple daily activities[12 13]

The case for earlier diagnosis and disease management through screening

Both CKD and MASH are progressive conditions, that if left un-detected carry an increased risk of mortality. Earlier diagnosis creates the opportunity for lifestyle intervention and pharmacological treatment — both of which can slow progression, and in the case of MASH, halt or even reverse fibrosis.[19] [20] Earlier diagnosis can also help reduce the substantial and growing costs that late-stage disease places on health systems.

Due to the often asymptomatic nature of both CKD and liver disease, without formal screening tests they can be difficult to identify. [21] [22]

For both conditions there are simple inexpensive screening tests that can be used outside of a specialist care setting, and evidence shows that targeted screening for CKD and MASH is cost effective.[23] [24] [25] Targeted screening for both CKD and MASH is increasingly supported by health-economic evidence. A 2023 review of the cost-effectiveness of CKD screening concluded that screening higher-risk populations (e.g. those with diabetes or hypertension) is cost-effective across most health system contexts, while the case for general-population screening remains less clear.[26] For MASH, pharmaco-economic modelling of primary care-based case-finding in high-risk groups similarly demonstrates cost-effectiveness, and real-world implementation of automated pathways such as Scotland's iLFT (intelligent Liver Function Testing) shows that systematic detection of liver disease can be delivered cost-effectively at scale within existing primary care infrastructure.[27]

The biomarker data needed to screen patients for both conditions is largely already collected in routine care — FIB-4 scoring for MASH is calculated from standard full blood count components, and CKD screening requires only eGFR, a routinely measured blood biomarker, alongside an inexpensive urine test (uACR). There is also international clinical consensus on which high-risk populations should be screened for both CKD and MASH (see table 1 below).

Despite international guidelines from the EASL-EASD-EASO and KDIGO setting out clear case-finding pathways for CKD and MASH respectively, real-world implementation remains poor: large primary care cohort studies show that the majority of high-risk patients are not appropriately risk-stratified or referred onward, with FIB-4 testing performed in only a minority of eligible patients with MASLD risk factors and CKD frequently undiagnosed even where eGFR and uACR data are available in the medical record.[28] [29] [30]

CKD – The cost of late diagnosis – MASH

$406.7bn

projected global direct healthcare costs of CKD by 2027

$246bn

annual MASH productivity loss by 2040 across nine countries

Table 1:

Internationally recommended screening approaches for CKD and MALSD/MASH

Based on KDIGO 2024 and EASL–EASD–EASO 2024 guidelines

	CKD[31]	MASLD/MASH[32]
Risk factors	▪ Type 2 diabetes ▪ Hypertension ▪ Cardiovascular disease ▪ Family history or known genetic risk factors ▪ Acute kidney disease/injury ▪ Occupational/environmental exposures (e.g. heavy metals, nephrotoxins) ▪ Multisystem diseases/chronic inflammatory conditions (e.g. HIV)	▪ Type 2 diabetes or abdominal obesity (BMI ≥30 kg/m^2) with one other cardiometabolic risk factor or abnormal liver function test
First-line screening tests	▪ eGFR (estimated glomerular filtration rate) — blood test ▪ uACR (urine albumin-to-creatinine ratio) — urine sample *Diagnosis requires both markers confirmed on two occasions at least 3 months apart.*	▪ FIB-4 score (calculated from age, AST, ALT and platelet count)
Suggested frequency	▪ Annual eGFR and uACR in all individuals with Type 2 diabetes and every five years for those with Type 1 diabetes	▪ In all individuals with type 2 diabetes or obesity every 1-3 years (if FIB-4 score is deemed low risk) ▪ At first point of contact for anyone with Type 2 diabetes or abdominal obesity (BMI ≥30 kg/m^2) with one other cardiometabolic risk factor or abnormal liver function test
Recommended delivery setting	▪ Primary care and relevant secondary care specialisms (e.g. endocrinology, cardiology, rheumatology)	▪ Primary care and within relevant secondary care specialisms (e.g. endocrinology, weight management, cardiology)

The draft roadmap

The draft roadmap

The draft roadmap below sets out five pillars that countries can use to design, prioritise and implement policies support the earlier diagnosis of CKD and MASH — translating global commitments on reducing mortality from NCDs into a practical framework for action. These include:

- Pillar 1: Improving public and clinical awareness of both conditions with a particular focus on the importance of early diagnosis
- Pillar 2: Utilising data, artificial intelligence and risk prediction tools to more effectively identify those at risk
- Pillar 3: Screen at-risk populations and improve rates of earlier diagnosis
- Pillar 4: Integrate care
- Pillar 5: Evaluation, research and improvement

Draft roadmap for delivering earlier diagnosis of CKD and MASH

1. Awareness

Public awareness

- Develop educational materials in partnership with patient organisations
- Utilise CKD and MASH awareness campaigns and maximise health service touch-points

Clinical awareness

- Embed CKD and MASH in medical education and continuous professional development
- Provide simplified, accessible guidance for primary care
- Adopt a city/region wide effort to tackle these under-prioritised conditions

2. Risk stratification

- Analyse existing data to identify those at risk
- Deploy artificial intelligence and risk prediction tools to identify those at risk at scale in a cost effective and efficient way

3. Screen at-risk populations

- Systematically screen high-risk groups
- Standardise the use of non-invasive tests with clear referral criteria
- Integrate kidney and liver screening into existing health check programmes
- Improve uptake of screening amongst at-risk populations
- Recognise the value of screening programmes within reimbursement frameworks
- Accelerate access to emerging diagnostic tools

4. Integrate care

- Publish integrated care strategies / policies
- Build multidisciplinary teams around patients with Cardiovascular-renal-metabolic conditions
- Create stronger partnerships between specialists and primary care clinicians
- Prioritise shared health data and adapt payment models to support interconnected care

5. Evaluate, research and improve

- Embed research and evaluation frameworks into all pilot and early-adopter CKD and MASH screening programmes
- Build health equity impact assessments into new diagnostic and pathway implementation programmes
- Fund clinical and health service research programmes that support more interconnected working
- Establish a cross-condition learning network

Pillar 1

Improving public and clinical awareness of both conditions with a particular focus on the importance of early diagnosis

The often asymptomatic nature of CKD and MASLD/MASH — particularly in the early stages — coupled with non-specific or non-attributable symptoms when they do appear, can delay diagnosis and worsen outcomes for patients. There is currently poor awareness of these conditions and their risk factors amongst the public, primary care professionals and specialists in other related disease areas such as CVD, diabetes and obesity. [33] [34]

Earlier diagnosis empowers patients to address modifiable lifestyle factors such as diet and exercise, and enables clinicians to initiate appropriate pharmacological treatments — both of which can slow, halt or even reverse disease progression.

The following sets out steps and case studies to support countries in raising public and clinical awareness of both conditions.

PUBLIC AWARENESS

Develop educational materials in partnership with patient organisations

Awareness materials such as leaflets, posters and digital tools should explain CKD and MASH, their common symptoms, and who is at greatest risk — particularly those with CRM conditions and certain socioeconomic groups. These materials should be (i) developed in genuine partnership with patients and patient organisations, (ii) reflect the lived experience of those affected and (iii) be designed for accessibility across different health literacy levels.

Case Study[35]
Kidney Research UK — Patient awareness raising materials

Kidney Research UK has developed a practical suite of freely available resources including a waiting room poster on diabetes and kidney disease to raise awareness among patients attending general practice, and a patient leaflet — Take a Wee Look — encouraging early detection of CKD through urine testing (see below). The resources are designed for use in primary care settings where most patients at-risk are often first encountered.

Utilise CKD and MASH awareness campaigns and maximising health service touch-points

Public awareness raising campaigns can be either (a) standalone and targeted at high-risk populations or (b) look to embed CKD and MASH within existing national awareness campaigns for other conditions such as those for CVD and diabetes given the substantial overlap in at-risk populations.

Case Study[36]
American Liver Foundation — Think Liver Think Life

Think Liver Think Life is a national public health campaign run by the American Liver Foundation, focused on ensuring every American understands their risk for liver disease, receives appropriate screening and care coordination, and feels well-informed throughout their liver health journey. The campaign targets populations at highest risk, including those with diabetes and obesity. It began in ten states with ambitions to reach all 50 states.

The campaign uses a combination of community education and awareness events, local screening opportunities, patient stories and a bilingual online risk quiz (available in English and Spanish) to reach diverse populations. Its state-by-state structure allows for local tailoring, recognising that awareness needs and at-risk populations vary by geography and community.

Beyond public awareness raising campaigns there are opportunities to maximise patient touch-points with health services to increase awareness of both conditions.

One channel is via health insurance providers and community pharmacies which represent high-frequency touchpoints for at-risk populations. Both settings should provide clear, consistent awareness messaging on CKD and MASH risk, symptoms, and how to seek further assessment.

Emerging digital health channels also represent an opportunity to engage groups at higher risk.

Embedding simple validated risk calculators in patient-facing websites and apps — similar to those already in use for cardiovascular risk assessment— could help raise awareness of CKD and MASH amongst the public. [37] [38] It will be important that these tools are developed with appropriate clinical oversight and co-designed with patient groups to ensure they are intuitive and actionable. They should also offer advice on what a patient should do if a tool identifies them as being at higher-risk – including opportunities for referral for screening.

CLINICAL AWARENESS

Embed CKD and MASH in medical education and continuous professional development

CKD and MASH should feature in primary care medical education and be integrated into training for specialists working in related areas — obesity, diabetes and cardiovascular disease in particular. Education should focus on risk assessment and screening through NiTs. Updated medical education programmes for trained staff should include modules on the latest international and national guidelines as the evidence base evolves.

Case Study[39]
Diabetes UK and Kidney Research UK — Joint CPD Module on Early CKD Detection

A joint CPD module on kidney health and early CKD detection, developed jointly by Diabetes UK and Kidney Research UK, demonstrates that cross-condition professional development is both feasible and valued by practitioners. The resource page brings together tools from both organisations — including patient information prescriptions, guidance on uACR testing and signposting to peer support.

Provide simplified, accessible guidance for primary care

Primary care professionals need clear, distilled guidance on CKD and MASH that does not require mastery of full clinical guidelines across multiple conditions. Guidance should focus on the key decision points: who to screen, when, with what tools and key referral criteria.

This guidance should be integrated into practice management software and provide automatic diagnostic prompts. For example, a suggestion to calculate a FIB-4 score or to undertake a uACR test when a patient with relevant risk factors presents — can support earlier testing and diagnosis.

Case Study[40]
IntERKit — A Structured CKD Implementation Toolkit for Primary Care

IntERKit was developed in Spain to improve the early detection, diagnosis and initial management of CKD by providing healthcare organisations with structured tools that can be implemented across primary and hospital care settings. It was co-created through a multidisciplinary scientific committee spanning family medicine, nephrology, cardiology, endocrinology, clinical analysis, nursing, primary care pharmacy, digital health, health management and patient representatives.

The toolkit includes; implementation tools (including a user guide and structured diagnostic improvement plans), evaluation tools to track measurable impact, and support tools for developing local action plans. It is designed to be scalable and adaptable across different health organisations, and aims to generate sustainable improvements in screening rates and early management.

Adopt a city/region wide effort to tackle these under-prioritised conditions

In geographic areas with higher prevalence rates of both conditions and where health system architecture allows it (for example in countries with more regional healthcare systems), there is an opportunity to build an integrated system wide approach to raising awareness of these conditions and to co-ordinate the health service response. One example of this is MASH cities (see case study below).

Case Study[41] [42]
MASH Cities — Driving Clinical and Public Awareness of MASH

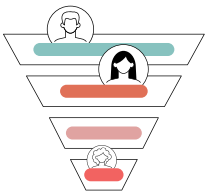
MASH Cities is an initiative co-founded by Professor Jeffrey V. Lazarus (City University of New York / ISGlobal) and Dr Meena Bansal (Icahn School of Medicine at Mount Sinai) that brings together city officials, community and industry leaders, and healthcare providers to address the growing but still under-recognised challenge of MASLD and MASH. The initiative builds on the success of city-level disease campaigns in HIV (Fast-Track Cities) and Hepitatis C (HepCityFree), which have shown that localised, multi-stakeholder approaches can shift the dial faster than national initiatives alone.

MASH Cities began as an awareness campaign and has developed into a data-generating research and advocacy platform, with published survey evidence now being used to build city-specific action plans across New York, Los Angeles, Chicago and Houston, and with international expansion underway.

The programme's first major research output, highlighted the scale of the awareness problem finding low levels of awareness of MASLD across the public and primary healthcare professionals: 18.7% of the general public; 37.8% of adults with diabetes and only 54.7% of primary care professionals (PCPs). However the older umbrella term "fatty liver disease" was familiar to 78.1% of the general public, 85.4% of adults with diabetes and 86.6% of PCPs – highlighting a need to improve awareness of the new nomenclature.

Only 48.5% were aware of the FIB-4 Index to screen for liver disease and there was substantial variation in referral rates to specialists.

These findings are designed not merely to document an awareness gap but to drive city-level commitments to action — including the integration of MASLD and MASH into municipal public health plans, targeted awareness campaigns for high-risk populations, and stronger MASLD-related training and screening infrastructure within primary care.



Pillar 2

Utilising data, artificial intelligence and risk prediction tools to more effectively identify those at risk

There are well-established common risk factors for CKD and MASH which create clear opportunities for effective population-level risk stratification (please see table 1 for an overview of high-risk populations for both conditions).

The case for risk stratification is not only clinical but also economic. Evidence consistently shows that targeted screening in high-risk populations is cost-effective, and that the costs of managing CKD and MASH escalate sharply with disease progression.[43]

IMPROVEMENTS IN DATA ANALYSIS

A significant proportion of the data needed to identify those at elevated CKD and MASH risk already exists within primary care systems. This includes specific risk markers from routine blood tests (i.e. eGFR, AST, ALT, platelet count) as well as co-morbidity risk factors (obesity, CVD, hypertension, diabetes) alongside sociodemographic data.[44] [45]

Healthcare systems should ensure that all existing data has been analysed to identify those at high-risk of CKD or MASH. To incentivise health organisations to do so payors should audit current rates of clinical diagnosis of CKD and MASH and set improvement targets.

Case Study[46]
The Data-to-Diagnosis Gap: Evidence from German Primary Care

A 2025 study using data from 758 German general practices illustrates that the problem of CKD underdiagnosis is not primarily a problem of missing data — it is a problem of data failing to generate formal diagnoses. The study identified 113,996 patients who already had at least two qualifying pathological eGFR and/or uACR values on record, documented at least 60 days apart and meeting KDIGO 2024 criteria for CKD. Despite this, a coded CKD diagnosis had been recorded for only 46.9% of them. More than half of patients with the laboratory evidence of CKD in their records had not received a formal diagnosis.

Deploy validated risk prediction tools driven by artificial intelligence

AI powered risk prediction tools can help scale risk stratification with efficiency enabling wider population cohorts to be risk assessed within electronic health records. Realising this potential will require investment in data infrastructure, interoperability between systems, and governance frameworks that enable appropriate data access while protecting patient privacy.

There are many risk prediction tools for CKD and MASH which utilise commonly available health data and that can be built into electronic health data systems to flag risk.

Those currently recommended in recent international guidelines for CKD include:[47]

- **Klinrisk** – a machine learning model applicable from CKD stage G1 upwards, including adults with diabetes or hypertension not yet formally diagnosed with CKD, that uses routine laboratory data and is designed for direct embedding into electronic health records and laboratory information systems. The tool has received European regulatory approval[48] [49]
- **KidneyIntelX** – an FDA-authorised multi-biomarker test for patients with CKD stages G1–G3 and type 2 diabetes is used alongside routine clinical variables to predict progressive kidney function decline[50] [51]

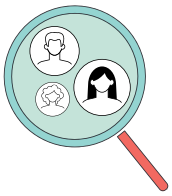
There is a strong international consensus on the use of FIB-4 as a risk prediction tool for liver fibrosis. [52] [53] [54] A FIB-4 score utilises common blood test markers (AST, ALT and platelet count) alongside age.[55]

There are also other risk-prediction tools that have been developed to assess the future potential risk of disease which do not require specific blood biomarkers and instead utilise routinely collected health and socioeconomic information. This can serve as a useful tool to improve the diagnostic yield of testing and reducing strain on laboratory capacity (see case study below).

Case Study[56] [57]
QKidney — Predicting CKD Risk from Routinely Available Primary Care Variables

QKidney is a validated risk prediction algorithm developed using data from over two million patients in the UK. It uses variables that are already routinely recorded in GP systems — including age, sex, BMI, systolic blood pressure, smoking status, diabetes status, deprivation score and a range of comorbidities — to calculate an individual's five-year risk of developing moderate-to-severe chronic kidney disease. Unlike tools that require laboratory inputs, QKidney can be run using existing clinical record data, making it applicable to patients who have not yet had kidney function tests and enabling proactive identification of those who should be prioritised for screening.

In settings where laboratory capacity or access is constrained, this kind of pre-screening risk tool can substantially improve the yield of diagnostic testing by concentrating it on those at highest predicted risk.



Pillar 3

Screen at-risk populations and improve rates of earlier diagnosis

Early diagnosis in CKD and MASH is particularly poor, often due to the asymptomatic nature of each disease until they become more advanced. Over 90% of individuals living with CKD are unaware of their condition.[58] An estimated 83-89% of patients living with moderate to advanced liver disease are undiagnosed based on a study of three European countries and the US. [59]

Early detection and diagnosis through screening is therefore an important area for prioritisation and focus within this draft roadmap and the following sets out steps countries can take to deliver on this.

Embed CKD and MASH screening into high-risk comorbidity pathways

Given that type 2 diabetes, obesity, and CVD significantly increases the risk of developing CKD and MASH it is imperative that these populations are regularly screened as recommended by international clinical guidelines.[60] [61] [62]

Health systems should also ensure that clear guidelines on screening and referral criteria for CKD and liver disease are embedded within standard care pathways for obesity, diabetes and CVD.

Case Study[63]
American Diabetes Association — Embedding CKD and MASH Screening Within the Diabetes Care Pathway

The American Diabetes Association (ADA) Standards of Care published in 2025 have embedded recommendations on both CKD and MASH screening.

The Standards recommend assessing kidney function with random uARC and eGFR at least annually in all people with type 1 diabetes.

For MASH, the most recent Standards update introduced a formal recommendation requiring that adults with type 2 diabetes or prediabetes — particularly those with obesity or established cardiovascular disease — are screened for their risk of advanced liver disease using the FIB-4 index, even in the absence of abnormal liver enzymes. It also includes a secondary screening step where FIB-4 is ≥1.3 – through the use of vibration-controlled transient elastography or the ELF test.

These Standards are an exemplar of how to integrate CKD and MASH screening into another disease pathway.

Standardise the use of non-invasive diagnostic tests with clear referral criteria

Diagnostic tests for both CKD and MASH are simple, inexpensive tests, which can often be coordinated by administrative or non-clinical staff. They are also more acceptable to patients.[64] Many countries already capture the necessary biomarkers in standard blood tests (AST, ALT, platelet count for MASH and eGFR for CKD). Additional steps for screening would usually involve an inexpensive urine sample to measure uACR for CKD and for a risk calculation to be undertaken with the available data for both conditions.

Clear diagnostic and referral criteria should be published by health systems for primary care professionals and those working in related specialist conditions (CVD, obesity, diabetes).

Digital decision-support tools integrated into GP workflows — including automated risk calculations with flagged results and embedded referral pathways — can translate guidance into routine clinical behaviour with minimal additional burden on practitioners.

Case Study [65]
IntERKit — A Co-Designed CKD Implementation Toolkit for Spain

IntERKit was developed to address the persistent gap between CKD guidelines and clinical practice. Co-created by a multidisciplinary committee spanning nephrology, primary care, cardiology, laboratory medicine, nursing and patient representatives, and endorsed by the Spanish Society of Nephrology and seven other professional societies, it provides healthcare organisations with structured tools to improve early detection: implementation guides and diagnostic improvement plans; evaluation tools to track measurable impact; and support for developing local action plans.

Specific improvements targeted include the systematic inclusion of renal function tests in routine analytical panels, automated alerts for qualifying laboratory results, translation of abnormal results into coded diagnoses in the electronic medical record, and a strengthened nursing role in early detection and patient education.

Integrate kidney and liver screening into existing health check programmes

A consensus statement, led by the European Society of Cardiology in the context of the European Cardiovascular Health plan and developed with input from kidney, diabetes and obesity communities, explicitly calls for eGFR and uACR testing to take place every five years for those aged 35-65 and every 3-5 years for those over 65 years old.[66]

Embedding CKD and MASH risk screening into existing health check programmes provides an easily scalable and often cost-effective way to find those undiagnosed. Many countries have established CVD or regular general health check programmes that provide ready-made infrastructure for integrating CKD and MASH screening.

Case Study[67] [68]
Japan — Health Checks Programme: A Ready-Made Infrastructure for CKD and MASH Screening

Japan's health checks programme (Tokutei-Kenshin), launched in 2008, requires all adults aged 40–74 to undergo annual health screening by law, fully funded by insurers. The programme already includes blood tests for lipids, blood glucose, liver function (AST and ALT), and in most cases renal function markers. Waist circumference and blood pressure are also measured as standard.

This means that the data infrastructure required to screen tens of millions of people annually for both CKD and MASH already exists within a functioning national programme, requiring policy intent and system design rather than new patient contacts.

Improve uptake of screening amongst at-risk populations

Uptake in health check and chronic disease monitoring programmes is often low, particularly amongst those in certain socioeconomic groups, living in rural areas and those who face stigma (for example those living with obesity).[69] Given that many people from lower socioeconomic groups and those living with obesity are at heightened risk of developing CKD and MASH it is imperative that screening programmes are made as accessible as possible.[70]

Case Study[71]
GRIPonMASH — Cross-Border MASH Screening and Patient Engagement Across Europe

GRIPonMASH is a prospective multicentre observational study operating across ten European countries, in which 10,000 high-risk patients — those with type 2 diabetes, obesity, metabolic syndrome or hypertension — are being screened using at least two non-invasive tests: the FIB-4 index and FibroScan. Blood samples and liver biopsy material are collected and biobanked alongside multiomics analyses, with the study designed to generate the comparative effectiveness evidence needed to support MASH screening policy decisions across different health system contexts.

A defining feature of GRIPonMASH is its integration of patient engagement alongside clinical screening. By operating across ten countries simultaneously and recruiting patients through primary care and community settings rather than specialist hepatology centres, it is designed to identify MASH in people outside of hepatology centres — extending reach into at-risk groups earlier in the disease pathway. The study's multi-country design also enables international comparison of diagnostic yield, referral conversion and screening implementation.

To address barriers to screening, programmes should be co-designed with patient and community organisations to ensure they are tailored appropriately. Remote mobile screening units should also be leveraged in non-clinical community settings where appropriate to make screening more accessible to the population. The feasibility of at-home-testing also presents opportunities to improve patient access to diagnostics.

Workplace screening programmes are another way to improve uptake and remove the burden of time and travel costs for individuals.

Case Study[72]
Actúa por tus Riñones — Community-Based CKD Screening in Spain

Actúa por tus Riñones is a community-based CKD screening campaign organised by ALCER (the Spanish national federation of kidney patient associations). Launched in early 2025, its first phase installed screening points in high-footfall shopping centres in Barcelona, Madrid and Sevilla. Members of the public who showed risk factors during an initial assessment were offered blood and urine tests to screen for CKD, alongside a virtual reality experience designed to convey the impact of living with the condition.

Results from the 439 participants, found that 182 people — approximately 45% of those with complete data — showed indicators of potential CKD against KDIGO 2024 criteria. Following the success of the first phase, a further session was held at the FEDE diabetes congress in Barcelona in October 2025, and additional screening events took place in Málaga in November 2025.

Case Study[73]
Workplace Screening for CKD in Italy: The FISM Occupational Health Model

A pilot project promoted by the Federation of Italian Medical-Scientific Societies (FISM) and coordinated by Professor Luigi Vimercati, Director of Occupational Medicine at the Policlinico di Bari, screened over 12,000 healthcare workers between 2021 and 2024 using a simple, standardised protocol of eGFR and albumin-creatinine ratio testing applied directly in the workplace. Early signs of CKD were identified in 6.7% of those screened. The results demonstrated the effectiveness of integrating kidney screening into routine occupational health surveillance.

Recognise the value of screening programmes within reimbursement frameworks

To encourage the use of screening, its value must be recognised within pay and reimbursement models both within primary and secondary care. Reimbursement frameworks should consider the full value of early detection, including the downstream cost savings from avoided complications. It will also need to account for screening episodes where no disease is found to incentivise widespread screening approaches in appropriate populations.

Case Study[74] [75]
Embedding CKD Screening into GP practice via payment incentives in France

France's July 2024 Assurance Maladie annual report — the 'Charges et Produits' report, which formulates proposals for parliamentary consideration in the following year's social security financing law — dedicated substantial analysis to CKD and its CRM connections, and proposed a structural reform to embed diabetes and CKD screening directly into GP payments. Its acceptance has led to systematic CKD testing being a directly remunerated and measured activity for French GPs for the first time, rather than a guideline recommendation without financial backing.

In addition to this new financial incentive, the Assurance Maladie will utilise its national health data system (SNDS) to generate named patient lists for each GP, identifying exactly which of their patients are eligible for CKD screening but have not received it — removing the identification burden from the clinician and enabling proactive, targeted outreach rather than reactive case-finding.

Case Study[76] [77]
The Mulè-Patriarca Bill: A National CKD Screening Programme for Italy

The Mulè-Patriarca bill is an Italian legislative proposal, sponsored by Giorgio Mulè, Vice President of the Chamber of Deputies, which aims to establish a national multi-year screening programme to identify CKD at an early stage in adults aged 55–75 with diabetes, hypertension, cardiovascular disease, or obesity. The bill proposes an initial budget of €7.5 million over three years, delivery through general practice using standardised eGFR and uACR testing, and the creation of a national observatory on chronic kidney disease.

As of early 2026 the bill remains in committee in the Italian Chamber of Deputies, having missed its original target of passing in the first half of 2025, though it retains strong support from the nephrology community, patient associations, and the governing coalition. It represents the most advanced legislative attempt in Europe to translate clinical screening guidance into a formal national programme with dedicated public funding, a defined delivery infrastructure through primary care, and a structured mechanism for monitoring outcomes. If enacted, it would be a significant proof of concept for other European health systems seeking to operationalise large-scale CKD screening.

Accelerate access to emerging diagnostic tools

There are several promising new NiT tools at an advanced stage of development for MASH and CKD. These include NIS2+™, a blood-based two-biomarker test that outperforms FIB-4 in detecting at-risk MASH, circulating plasma TREM2, a novel blood biomarker shown to rule in or rule out MASH with high diagnostic accuracy, and retinal imaging using optical coherence tomography (OCT), which can detect the microvascular changes associated with CKD non-invasively through the eye.[78] [79] [80]

Realising the clinical value of these tools will require proactive engagement with regulators, payers and guideline developers to support rapid inclusion in health systems. Alongside the introduction of these new tools, there should be scalable pilot projects that generate real-world evidence of impact and cost-effectiveness.

Pillar 4

Integrate care

As set out in The power of connection report, care for patients with overlapping CRM conditions is fragmented between primary and secondary care, and between specialties which means that CKD and MASH diagnoses can be missed until a late stage.[81] Addressing this requires structural changes to how care is organised, how data flows between settings, and how the workforce is deployed.

Publish integrated care strategies / policies

Disease siloed policy can act as a barrier to integrated care – reinforcing the traditional vertical disease pathways within health systems leading to fragmented care for patients living with co-morbidities. Policymakers must therefore ensure national and regional disease strategies and/or policies are themselves integrated and that they include recommendations which improve the integration of care for cardiometabolic conditions – including the screening of CKD and MASH.

Case Study[82] [83]
India — Integrating MASLD into the National Non-Communicable Disease Programme: A Primary Care-Led Model

In February 2021, India became the first country to integrate NAFLD (now MASLD) into a national NCD programme, embedding it within what was then the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), since renamed the National Programme for Prevention and Control of NCDs (NP-NCD).

In September 2024, the Union Ministry of Health and Family Welfare released revised operational guidelines (Version 2.0) and a dedicated training module for medical officers, providing a framework spanning the workforce from community health workers to medical officers.

The model is explicitly primary care-led and structured as a bottom-up pathway. At community level, frontline health workers conduct risk assessments based on waist circumference measurements and diabetes history to identify at-risk individuals. Primary care providers validate these risk assessments, initiate lifestyle interventions or refer accordingly. The FIB-4 score is included in the operational guidelines as an easy-to-use, inexpensive NiT for advanced fibrosis risk stratification at primary care level.

Build multidisciplinary teams around the cardiometabolic patient

Health systems have traditionally been set-up to treat patients in specialist silos which leads to fragmented care, additional treatment burden for the patient and duplicated efforts to manage care that wastes finite healthcare resources.

A multidisciplinary team (MDT) bringing together GPs, specialists (nephrologists, hepatologists, endocrinologists, cardiologists) as well as other holistic care practitioners (dietitians, physios, nurses, care coordinators) can help ensure faster and more appropriate screening of patients at higher risk of CKD and MASH.[84] [85] The use of shared care plans, care co-ordinators and telemedicine can also help improve the efficiency of MDT collaboration and make care more accessible to the patient.

Case Study[86]
Sophia — France's National Nurse-Led Chronic Disease Support Programme

Launched in 2008 by the Assurance Maladie (French national health insurance), Sophia is a free, voluntary patient support programme designed to complement rather than replace existing clinical care. Initially developed for people living with diabetes, the programme has expanded to cover five chronic conditions with significant cardiorenal-metabolic overlap: diabetes, CKD, heart failure, chronic coronary syndrome and COPD. The core model rests on nurse advisors who provide personalised telephone support to enrolled patients, with the frequency and content of contact adapted to each individual's clinical situation and needs. This is supplemented by a quarterly patient journal, a secure digital coaching platform and access to educational resources.

The nurse advisor role bridges the gap between specialist nephrology input and the patient's day-to-day management, reinforcing GP and multidisciplinary team guidance on monitoring, lifestyle adaptation and medication adherence.

Evaluations at one, three and eight years have shown improvements in completion of recommended monitoring examinations among diabetic enrollees while longer-term evaluation of complication rates and healthcare expenditure is ongoing.

Create stronger partnerships between specialists and primary care clinicians

Improved primary care–specialist collaboration can support the increased awareness and screening of CKD and MASH in the primary care setting. It can also address a common challenge many countries face – a lack of secondary care specialists.

Equipping primary care with the knowledge of when to refer high-risk cases and how best to manage these conditions in the community can prevent large increases in specialist workforce caseload.

Case Study[87]
ENDORSE: Scaling GP–nephrologist collaboration across Italy

The ENDORSE (Early chroNic kiDney disease pOint of caRe ScreEning) study built on an existing GP–nephrologist collaboration model pilot (DANTE) to evaluate the clinical and economic impact of a structured training intervention at national scale. Fifty-three GPs across eleven Italian regions received six months of hybrid training from eleven nephrologists, delivered through formal lectures, instant messaging support and joint visits for complex cases. The study population comprised 112,178 patients.

After six months, eGFR testing increased by 44.7%, uACR testing by 95.2%, and the number of patients screened according to KDIGO criteria increased by 128.9%, with a 62% increase in CKD diagnoses. Impact was particularly marked in high-risk groups including patients with type 2 diabetes, hypertension and heart failure. A budget impact analysis projected cumulative five-year savings of €1.7 million for the study cohort, with extrapolation to the entire Italian CKD population suggesting potential savings of €106.6 million — providing a compelling economic as well as clinical rationale for broader national implementation.

Prioritise shared health data and adapt payment models to support interconnected care

Integrated care is challenging without integrated data. In most health systems, secondary care electronic health records do not communicate effectively with primary care systems, meaning that a nephrologist's assessment of a patient's eGFR trajectory may never reach the GP, and a GP's diabetes management notes may not be visible to the hepatologist. Risk stratification of patients with suspected CKD and MASH requires access to longitudinal data across settings — blood test trends, medication histories, comorbidity profiles — that cannot be assembled without interoperable health record infrastructure.

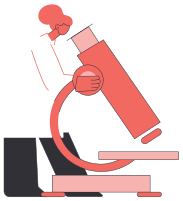
Healthcare payment systems will also need reform to incentivise and support more integrated working. To embed CKD and MASH screening in other care pathways, payment models and incentives will need to move away from single-condition, narrow outcome measures towards metrics that reflect the common nature of co-morbidities and the need for holistic care built around the patient.

Alongside reformed payment structures, policymakers will need to extend outcome measurement timeframes aligning these with multi-year budgeting cycles so that the full benefits of screening and earlier diagnosis can be captured and sustained.

Case Study[88] [89] [90]
Reforming Payment for Chronic Disease Management — Australia's Medicare Benefits Schedule Review

Established in 2015, Australia's Medicare Benefits Schedule (MBS) Review Taskforce undertook the most comprehensive review of Medicare since its inception in 1984 which concluded that near-exclusive reliance on fee-for-service payment had produced incentives misaligned with the needs of patients managing chronic and complex conditions. Among its central recommendations was a structural shift to complement fee-for-service with block and blended payment models, in order to support more clinically appropriate and coordinated modes of care.

Responding to this, the Australian Government committed in the 2023–24 Budget to reforming the funding of chronic disease management in primary care, with changes taking effect from 1 July 2025. The reforms replace the previous GP Management Plan and Team Care Arrangements with a single GP Chronic Condition Management Plan to strengthen continuity of care and support team-based multidisciplinary management. The changes reflect a deliberate effort to shift resources and incentives upstream into primary care, aligning payment structures with coordinated, patient-centred management of long-term conditions rather than discrete clinical interactions.



Pillar 5

Evaluation, research and improvement

It is essential that new screening policies and approaches to improving the diagnosis of CKD and MASH are evaluated to assess their effectiveness and impact. Embedding research and evaluation into the design of all screening programmes, and building the institutional infrastructure to translate that evidence into future policy is essential to support monitoring and improvement.

Embed research and evaluation frameworks into all pilot and early-adopter CKD and MASH screening programmes

Any new screening programme introduced should build in evaluation frameworks looking at uptake rates of diagnosis, referral pathways, patient outcomes, equity dimensions and cost-effectiveness. Results should feed into national registries and, where possible, be harmonised across countries to enable international comparisons that support wider research.

Case Study[91]
Spain — CDSS-Enabled CKD Screening in Primary Care: Embedding Evaluation into a Pilot Programme

A one-year pilot at the San Juan primary care centre in Alicante, Spain deployed a clinical decision support system (CDSS) to enable opportunistic CKD screening alongside routine blood draws.

The pilot screened 1,774 patients using a CDSS that systematically identified those eligible for opportunistic CKD screening based on Spanish national consensus guidelines (age 60–85, or 18–59 with hypertension, diabetes or cardiovascular disease). It identified 104 new CKD cases (5.9%) among patients who had not previously been coded as having the condition, with KDIGO used to risk-stratify confirmed cases.

The study had a rigorous evaluation framework looking at diagnostic yield, KDIGO risk stratification, referral patterns, clinical action rates (including coding), and cost-effectiveness. These evaluation metrics helped assess the effectiveness of the screening programme and are being used to inform future use.

Case Study[92] [93]
LiverScreen — Population-Based Evaluation of Liver Fibrosis Screening in Europe

LiverScreen is a European population-based study evaluating non-invasive liver fibrosis detection across approximately 30,000 individuals in ten countries. The study aims to validate the diagnostic accuracy, cost-effectiveness and feasibility of using transient elastography (TE) to case-find advanced liver fibrosis in the general population.

A key output to date has been the development and validation of the LiverRisk score — a composite blood-based tool, built from age, sex and six routine laboratory variables, offering both diagnostic accuracy for liver stiffness and prognostic value for long-term liver-related outcomes. The score was published in The Lancet in 2023, with subsequent validation work extending its application.

The project's large, demographically diverse sample enables analysis across different socioeconomic and clinical contexts. With final implementation results expected in 2026, LiverScreen is positioned to provide one of the first robust, population-level evidence bases for embedding liver fibrosis screening into routine care, and for evaluating whether such programmes reduce the morbidity and mortality associated with late-stage liver disease.

Build health equity impact assessments into new diagnostic and pathway implementation programmes

A focus on ensuring equitable access to screening programmes is particularly important for CKD and MASH given the disproportionate impact these conditions have on lower socioeconomic and certain ethnic groups.[94] Health equity impact assessments should be embedded in the design of all new screening programme, explicitly modelling the likely distribution of screening benefit across population groups and setting targets for reaching communities with lowest health service contact.

Case Study[95 96 97]
United States — The Kidney Early Evaluation Program (KEEP): Embedding Health Equity into CKD Screening by Design

Launched in 2000 by the National Kidney Foundation, the Kidney Early Evaluation Program (KEEP) was a free, community-based CKD screening initiative targeting adults aged 18 and older with self-reported diabetes or hypertension, or a first-degree relative with diabetes, hypertension or kidney disease. Health equity was built into the programme architecture from the outset. Screening sites were placed in churches, community centres, schools, shopping malls and other public spaces to reach communities with the lowest health service contact. By the end of 2007, KEEP had screened 89,552 participants across 49 states. Its cohort was 34% African American, 12.4% Hispanic, 5.6% Asian/Pacific Islander and 4.5% Native American — representing roughly three times more African Americans and Native Americans which was deemed to be a real success compared with usual engagement statistics.

A dedicated Data Coordinating Center maintained a standardised, de-identified database tracking demographic characteristics, risk factor prevalence and test results, enabling systematic equity analytics across the dataset. KEEP was also structured for longitudinal learning rather than one-off surveillance, with Annual Data Reports published and fed directly into national policy discussions on CKD disparities.

A third phase of the programme (KEEP 3.0) formalised a longitudinal component, randomly assigning participants to different educational interventions — tailored and non-tailored — with long-term clinical outcome follow-up, and concurrently assigning their physicians to educational protocols to improve guideline adherence.

Fund clinical and health service research programmes that support more interconnected working

National research funding into CRM conditions including CKD and MASH should address efforts to better understand the interconnected nature of these conditions. This means moving beyond single-disease based studies and towards research frameworks that capture outcomes across CKD, MASH and the wider cardiometabolic cluster.

Case Study[98 99]
United States — The NIDDK: Government-Funded Research Infrastructure Spanning Diabetes, Kidney Disease and Liver Disease

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) is funded by the US federal government institute and its statutory remit explicitly spans diabetes, liver disease, and kidney disease. This institutional design — unique among major public research funders — makes cross-condition research structurally possible in ways that separate disease-specific funders cannot easily replicate.

Critically all of its research across individual disease areas is deposited into a central data repository — a shared, government-maintained data infrastructure that houses samples, genetic data and phenotypic data from over 100 NIDDK-funded studies across diabetes, liver disease and kidney disease. This means that researchers can access and cross-link datasets from both conditions without new data collection, enabling the kind of cross-condition analyses that single-disease registries structurally preclude.

Establish a cross-condition learning network

Effective cross-condition learning requires a clear infrastructure: networks that connect clinicians, researchers, payors and patients across conditions and geographies with a shared mandate to disseminate emerging evidence and accelerate the spread of effective screening practices.

Networks should operate across CRM specialties— connecting nephrology, hepatology, diabetology, cardiology and primary care — and carry an explicit remit to address health system implementation challenges, not only clinical evidence questions.

Case Study[100] [101]
United States — The Cardiometabolic Center Alliance (CMCA) and AHA CKM Centre of Excellence: A Cross-Condition Learning Network at National Scale

The CMCA was established on the premise that cardiovascular disease, type 2 diabetes and CKD are better managed together than in parallel. Member health systems adopt a standardised, team-based care model — developed and validated at the originating centre — and contribute patient-level outcome data to a shared national registry. By the time of its acquisition in 2025, the Alliance encompassed 22 member centres with a five-year longitudinal patient dataset — providing the kind of real-world evidence base that single-site or single-condition models cannot generate.

In 2025, the American Heart Association (AHA) acquired the CMCA's programme assets, explicitly to enhance the development of a Cardiovascular-Kidney-Metabolic (CKM) Centre of Excellence certification programme. The certification programme will provide a rigorous national standard for clinical best practice across all three domains, disseminate care protocols across the AHA's infrastructure, and continue the shared registry model on a substantially larger scale.

Consultation

This roadmap is a draft and has been developed based on an extensive evidence and literature review, set of expert interviews and feedback from different countries. This roadmap aims to deliver on a number of global health policy goals including:

- Sustainable Development Goal 3.4 — to reduce premature mortality from NCDs[102]
- WHO 2025 Resolution on 'Reducing the burden of noncommunicable diseases through promotion of kidney health and strengthening prevention and control of kidney disease'[103]
- UN Political Declaration on NCDs which includes commitments to CKD and MASLD diagnosis and management[104]
- WHO 2026 draft Resolution on 'Steatotic liver disease: a missing piece in the global noncommunicable disease response'[105]

Future Health is now seeking feedback on this draft roadmap, specifically:

- Identifying further evidence and examples of health systems making changes to increase access to CKD and MASH screening
- Any gaps or areas that need strengthening in the draft roadmap
- How the recommended actions should be prioritised and rolled out

Future Health looks forward to engaging with policymakers and other stakeholders in this consultative phase with a final document published later in 2026.

Please do get in touch at richard@futurehealth-research.com

ANNEX A: ABOUT THIS ROADMAP AND METHODOLOGY

This draft roadmap is designed to initiate discussions amongst global and country-level policymakers on how to improve the screening and earlier diagnosis of CKD and MASH.

The draft roadmap was commissioned by Boehringer Ingelheim in late 2025. Future Health has full editorial control of the draft roadmap.

This draft roadmap was built through a two stage development process.

An initial structured search using a defined set of key terms was conducted across the published literature and grey literature, supplemented by a snowballing strategy in which the reference lists of relevant sources were screened to identify additional material. A total of 97 studies, articles and policy documents were included in the final review. To inform the country-level analysis, evidence was prioritised from eight focus markets selected on the basis of disease burden, health system relevance and data availability: the USA, China, Japan, Germany, the UK, France, Spain and Italy.

The literature and evidence review was then supplemented with interviews with a set of expert stakeholders. Expert stakeholders who contributed included:

- Giacomo Donnini, Program Director, Global Liver Institute
- Euan Woodward, Executive Director, EASO
- Jeffrey Lazarus, Co-director, Global Think-Tank on Steatotic Liver Disease
- Alison Railton, Director of Policy and Public Affairs, Kidney Research UK
- Monica Suengas, Manager, European Kidney Patients Federation

Expert stakeholders participated voluntarily and the views in this research are those of Future Health alone.

References

1 Future Health. The power of connection: Strengthening health policy responses to cardiovascular, renal and metabolic diseases. 2025. Available from: https://www.futurehealth-research.com/site/wp-content/uploads/2025/05/Power-of-connection-lo-res.pdf

2 Institute for Health Metrics and Evaluation (IHME). Global Burden of Disease 2021: Findings from the GBD 2021 Study. 2024. https://www.healthdata.org/sites/default/files/2024-05/GBD_2021_Booklet_FINAL_2024.05.16.pdf

3 Future Health Research. The power of connection: Strengthening health policy responses to cardiovascular, renal and metabolic diseases. 2025. https://futurehealth-research.com/report/the-power-of-connection-strengthening-health-policy-responses-to-cardiovascular-renal-and-metabolic-diseases/

4 WHO. SDG Target 3.4 | Noncommunicable diseases and mental health. https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/sdg-target-3.4-noncommunicable-diseases-and-mental-health

5 Jankowski J et al. Cardiovascular disease in chronic kidney disease: pathophysiological insights and therapeutic options. 2021. https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.120.050686

6 Minetti ET et al. Drivers of cardiovascular disease in metabolic dysfunction-associated steatotic liver disease: the threats of oxidative stress. 2024. https://www.frontiersin.org/journals/cardiovascular-medicine/articles/10.3389/fcvm.2024.1469492/full

7 Global Patient Alliance for Kidney Health. An Open Letter to the Delegates to the 77th World Health Assembly. 2024. https://globalkidneyalliance.org/wp-content/uploads/2024/05/WHA-open-letter_052724f.pdf

8 Guo Z et al. Global burden of MAFLD, MAFLD related cirrhosis and MASH related liver cancer from 1990 to 2021. 2025. https://www.nature.com/articles/s41598-025-91312-5

9 Lazarus JV, et al. A call for doubling the diagnostic rate of at-risk metabolic dysfunction-associated steatohepatitis. 2025. https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762(25)00112-7/fulltext

10 Luthra R et al. Understanding MASH: An Examination of Progression and Clinical Outcomes by Disease Severity in the TARGET-NASH Database. 2024. https://link.springer.com/article/10.1007/s12325-024-03085-4

11 Mody SH. Reducing the Economic and Clinical Burden of CKD in the Managed Care Setting. 2004. https://pmc.ncbi.nlm.nih.gov/articles/PMC3564292/

12 Kandasamy G et al. Determinants of Health-Related Quality of Life in Patients with Chronic Kidney Disease: A Cross-Sectional Study. 2025. https://www.mdpi.com/2227-9032/13/10/1167

13 Spencer D et al. Health care costs associated with unrecognized progression to late-stage kidney disease. 2023. https://www.ajmc.com/view/health-care-costs-associated-with-unrecognized-progression-to-late-stage-kidney-disease

14 Fishman JC et al. Cost burden of cirrhosis and liver disease progression in metabolic dysfunction-associated steatohepatitis: A US cohort study. 2024. https://www.jmcp.org/doi/10.18553/jmcp.2024.24069

15 Sloan L. SGLT2 inhibitors across the spectrum of chronic kidney disease: a narrative review. 2024. https://www.tandfonline.com/doi/full/10.1080/00325481.2024.2418795

16 Cusi K 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. 2025. https://diabetesjournals.org/care/article/48/7/1057/160536/Metabolic-Dysfunction-Associated-Steatotic-Liver

17 World Health Organisation. Reducing the burden of noncommunicable diseases through promotion of kidney health and strengthening prevention and control of kidney disease. 2025. https://apps.who.int/gb/ebwha/pdf_files/EB156/B156_(20)-en.pdf

18 United Nations. Political Declaration of the Fourth High-Level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases and the Promotion of Mental Health and Well-being. 2025. https://cdn.who.int/media/docs/default-source/ncds/finalized-pd-on-ncds-and-mental-health-rev4-3-september-2025.pdf

19 KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. 2024. https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

20 EASL–EASD–EASO Clinical Practice Guidelines on the management of metabolic dysfunction-associated steatotic liver disease (MASLD). 2024. https://www.journal-of-hepatology.eu/article/S0168-8278(24)00329-5/fulltext

21 KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. 2024. https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

22 EASL–EASD–EASO Clinical Practice Guidelines on the management of metabolic dysfunction-associated steatotic liver disease (MASLD). 2024. https://www.journal-of-hepatology.eu/article/S0168-8278(24)00329-5/fulltext

23 Mil DV, et al. Cost-effectiveness of screening for chronic kidney disease: existing evidence and knowledge gaps. 2023. https://doi.org/10.1093/ckj/sfad254

24 Younossi ZM et al. Pharmaco-economic assessment of screening strategies for high-risk MASLD in primary care. 2025. https://doi.org/10.1111/liv.16119

25 Intelligent liver function testing (iLFT): automated intelligent liver function testing for early diagnosis of liver disease. 2019. https://www.journal-of-hepatology.eu/article/S0168-8278(19)30354-X/abstract

26 Mil DV, et al. Cost-effectiveness of screening for chronic kidney disease: existing evidence and knowledge gaps. 2023. https://doi.org/10.1093/ckj/sfad254

27 Younossi ZM et al. Pharmaco-economic assessment of screening strategies for high-risk MASLD in primary care. 2025. https://doi.org/10.1111/liv.16119 ; Intelligent liver function testing (iLFT): automated intelligent liver function testing for early diagnosis of liver disease. 2019. https://www.journal-of-hepatology.eu/article/S0168-8278(19)30354-X/abstract

28 Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. 2024. Link: https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

29 EASL-EASD-EASO Clinical Practice Guidelines on the management of metabolic dysfunction-associated steatotic liver disease (MASLD). 2024. https://www.journal-of-hepatology.eu/article/S0168-8278(24)00329-5/fulltext

30 Xiao TG et al. Identifying and Linking Patients At Risk for MASLD with Advanced Fibrosis to Care in Primary Care. 2024. https://link.springer.com/article/10.1007/s11606-024-08955-9

31 KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. 2024. https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

32 EASL–EASD–EASO Clinical Practice Guidelines on the management of metabolic dysfunction-associated steatotic liver disease (MASLD). 2024. https://www.journal-of-hepatology.eu/article/S0168-8278(24)00329-5/fulltext

33 Fan Y. et al. Low awareness of MASH symptoms and diagnostic criteria. 2023. https://onlinelibrary.wiley.com/doi/10.1002/ueg2.12445

34 Lazarus JV et al. Awareness of metabolic dysfunction-associated steatotic liver disease (MASLD) in 4 major cities in the United States. 2025. https://journals.lww.com/hepcomm/fulltext/2025/05010/awareness_of_metabolic_dysfunction_associated.17.aspx

35 Kidney Research UK. Information for Healthcare Professionals. https://www.kidneyresearchuk.org/research/information-for-healthcare-professionals/

36 American Liver Foundation. Think Liver Think Life. https://thinkliverthinklife.org/

37 British Heart Foundation. Check your heart age. https://www.bhf.org.uk/informationsupport/risk-factors/check-your-heart-age

38 Healthdirect Australia. Risk Checker: heart disease, kidney disease and type 2 diabetes. https://www.healthdirect.gov.au/risk-checker/heart-kidney-diabetes

39 Diabetes UK / Kidney Research UK. CPD Module: Kidney Health and Early Detection of CKD. https://cpd.diabetes.org.uk/resources-kidney-health

40 Górriz JL et al. Improvement in the detection, diagnosis, and early treatment of chronic kidney disease in Spain. The IntERKit project. 2025. https://pubmed.ncbi.nlm.nih.gov/40436675/

41 Lazarus JV et al. Research letter: Awareness of MASLD among primary care providers in the four most populous US cities. 2025. https://www.sciencedirect.com/science/article/pii/S1665268126000219

42 Lazarus JV, et al. Original article: Awareness of metabolic dysfunction–associated steatotic liver disease (MASLD) in 4 major cities in the United States. https://www.sciencedirect.com/science/article/pii/S1665268126000219

43 Targeted risk factor-based CKD screening in primary care. https://pubmed.ncbi.nlm.nih.gov/38490803/

44 Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. 2024. https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

45 EASL–EASD–EASO Clinical Practice Guidelines on the management of metabolic dysfunction-associated steatotic liver disease (MASLD). 2024. https://www.journal-of-hepatology.eu/article/S0168-8278(24)00329-5/fulltext

46 Kostev K et al. The underdiagnosis of chronic kidney disease in patients with a documented estimated glomerular filtration rate and/or urine albumin–creatinine ratio in Germany. 2025. https://www.mdpi.com/1648-9144/61/5/843

47 KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

48 Tangri N et al. Machine learning for prediction of chronic kidney disease progression: validation of the Klinrisk model in the CANVAS Program and CREDENCE trial. 2024. https://pubmed.ncbi.nlm.nih.gov/38807510/

49 Tangri N et al. Validation of the Klinrisk chronic kidney disease progression model in the FIDELITY population. 2024. https://academic.oup.com/ckj/article/17/4/sfae052/7623605

50 Renalytix. KidneyIntelX included in final KDIGO 2024 Clinical Guideline for Chronic Kidney Disease. 2024. https://renalytix.com/kidneyintelx-included-in-final-kdigo-2024-clinical-guideline-for-chronic-kidney-disease-ckd/

51 KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

52 Younossi ZM et al. Global Consensus Recommendations for Metabolic Dysfunction-Associated Steatotic Liver Disease and Steatohepatitis. 2025. https://www.gastrojournal.org/article/S0016-5085(25)00632-8/fulltext

53 EASL–EASD–EASO joint guidelines EASL–EASD–EASO Clinical Practice Guidelines on the management of metabolic dysfunction-associated steatotic liver disease (MASLD). 2024. https://www.journal-of-hepatology.eu/article/S0168-8278(24)00329-5/fulltext

54 Lazarus JV et al. Best buys for metabolic dysfunction-associated steatotic liver disease and metabolic dysfunction-associated steatohepatitis: a global Delphi study. 2025. https://www.thelancet.com/journals/langas/article/PIIS2468-1253(25)00300-0/abstract

55 Shah AG et al. Use of the FIB4 index for non-invasive evaluation of fibrosis in nonalcoholic fatty liver disease. 2009. https://pmc.ncbi.nlm.nih.gov/articles/PMC3079239/

56 Hippisley-Cox J, et al. Predicting the risk of chronic kidney disease in men and women in England and Wales: prospective derivation and external validation of the QKidney scores. 2010. https://bmcfampract.biomedcentral.com/articles/10.1186/1471-2296-11-49

57 Sperrin M et al. An external validation of models to predict the onset of chronic kidney disease using population-based electronic health records from Salford, UK. 2016. https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-016-0650-2

58 Global Patient Alliance for Kidney Health. Open Letter to the Delegates to the 77th World Health Assembly: Recognising Chronic Kidney Disease as an Urgent Global Health Priority. 2024. https://globalkidneyalliance.org/wp-content/uploads/2024/05/WHA-open-letter_052724f.pdf

59 Lazarus JV, et al. A call for doubling the diagnostic rate of at-risk metabolic dysfunction-associated steatohepatitis. 2025. https://doi.org/10.1016/j.lanepe.2025.101320

60 KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. 2024. https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

61 EASL–EASD–EASO Clinical Practice Guidelines on the management of metabolic dysfunction-associated steatotic liver disease (MASLD). 2024. https://www.journal-of-hepatology.eu/article/S0168-8278(24)00329-5/fulltext

62 Lazarus JV et al. Best buys for metabolic dysfunction-associated steatotic liver disease and metabolic dysfunction-associated steatohepatitis: a global Delphi study. 2025. https://www.thelancet.com/journals/langas/article/PIIS2468-1253(25)00300-0/abstract

63 American Diabetes Association. Standards of Care in Diabetes. 2025. https://doi.org/10.2337/dc25-S004

64 Kan VY et al. Patient preference and willingness to pay for transient elastography versus liver biopsy: A perspective from British Columbia. 2015. https://pubmed.ncbi.nlm.nih.gov/25803016/

65 Górriz JL et al. Improvement in the detection, diagnosis, and early treatment of chronic kidney disease in Spain. The IntERKit project. 2025. https://pubmed.ncbi.nlm.nih.gov/40436675/ (case study also included within pillar 1: awareness)

66 European Society of Cardiology. Recommendations for EU-wide Cardiometabolic Health Checks. 2026. https://www.escardio.org/news/news-room/recommendations-for-eu-wide-cardiometabolic-health-checks/

67 Kohro T, et al. The Japanese national health screening and intervention program aimed at preventing worsening of the metabolic syndrome. 2008. https://doi.org/10.1536/ihj.49.193

68 Nakao YM, et al. Effectiveness of nationwide screening and lifestyle intervention for abdominal obesity and cardiometabolic risks in Japan: the MetS ACTION-J study. 2018. https://doi.org/10.1371/journal.pone.0190862

69 Ramos Salas X, et al. Pervasiveness, impact and implications of weight stigma. 2022. https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(22)00138-9/fulltext

70 See table 1 on page 7

71 Jong D de et al. Global research initiative for patient screening on MASH (GRIPonMASH) protocol: rationale and design of a prospective multicentre study 2025. https://bmjopen.bmj.com/content/15/5/e092731.full

72 ALCER Salud renal, bajo control. Resultasdos Campanas Actua port us Rinones Mayo. 2025. https://alcer.org/wp-content/uploads/2025/09/Actua-por-tus-rinones.pdf

73 Borderline24. Nephropathy screening in the workplace: a national prevention model from the Bari Polyclinic. 2025. https://www.borderline24.com/2025/07/30/screening-nefropatie-nei-luoghi-di-lavoro-dal-policlinico-di-bari-un-modello-per-la-prevenzione-nazionale/

74 Assurance Maladie. Améliorer la qualité du système de santé et maîtriser les dépenses : les propositions de l'Assurance Maladie pour 2025. Juillet 2024. https://www.assurance-maladie.ameli.fr/etudes-et-donnees/2024-rapport-propositions-pour-2025-charges-produits

75 Assurance Maladie. Rémunération sur objectifs de santé publique 2024. Mai 2025. https://www.assurance-maladie.ameli.fr/presse/rosp-2024

76 Mulè: An early diagnosis plan to prevent the progression of chronic kidney disease. 2025. https://en.ilsole24ore.com/art/mule-piano-diagnosi-precoci-intercettare-progressione-malattia-renale-cronica-AGeuKFkD

77 Italpress. Chronic Kidney Disease: Strategic Document Presented to the Chamber. 2025. https://www.italpress.com/malattia-renale-cronica-presentato-alla-camera-il-documento-strategico-2/

78 Harrison SA, et al. NIS2+™, an optimisation of the blood-based biomarker NIS4® technology for the detection of at-risk NASH: a prospective derivation and validation study. 2023. https://www.journal-of-hepatology.eu/article/S0168-8278(23)00318-5/fulltext

79 Indira Chandran V, et al. Circulating TREM2 as a noninvasive diagnostic biomarker for NASH in patients with elevated liver stiffness. 2023. https://pubmed.ncbi.nlm.nih.gov/35712786/

80 Farrah TE, et al. Choroidal and retinal thinning in chronic kidney disease independently associate with eGFR decline and are modifiable with treatment. 2023. https://doi.org/10.1038/s41467-023-43125-1

81 Future Health Research. The power of connection: Strengthening health policy responses to cardiovascular, renal and metabolic diseases. 2025. https://futurehealth-research.com/report/the-power-of-connection-strengthening-health-policy-responses-to-cardiovascular-renal-and-metabolic-diseases/

82 Press Information Bureau, Government of India. Union Health Ministry Releases Revised Operational Guidelines and Training Manual of Non-Alcoholic Fatty Liver Disease. 2024. https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=2059351

83 Kaushal K, et al. Non-alcoholic fatty liver disease (NAFLD) integration into India's NCD program – obstacles and solutions for the implementation of guidelines at the national level. 2024. https://pmc.ncbi.nlm.nih.gov/articles/PMC11504830/

84 Rangaswami et al. Cardio-Renal-Metabolic Care Models. 2020. https://www.ahajournals.org/doi/10.1161/CIRCOUTCOMES.120.007264

85 Reiter-Brennan, C., et al. Comprehensive Care Models for Cardiometabolic Disease. 2021. https://doi.org/10.1007/s11886-021-01450-1

86 L'Assurance Maladie. What is the Sophia service? 2025. https://www.ameli.fr/assure/sante/assurance-maladie/comment-reduire-mon-risque-cardiovasculaire/le-service-sophia-accompagne-les-malades/qu-est-ce-que-sophia/qu-est-ce-que-le-service-sophia

87 Pugliese NR et al. Clinical and Economic Impact of Early Diagnosis of Chronic Kidney Disease in General Practice: The Endorse Study. 2024. https://pmc.ncbi.nlm.nih.gov/articles/PMC11313497/

88 MBS Review Taskforce. Final Report. Australian Government Department of Health; December 2020. https://www.health.gov.au/resources/publications/medicare-benefits-schedule-review-taskforce-final-report.

89 Australian Government Department of Health, Disability and Ageing. Upcoming changes to MBS Chronic Disease Management Arrangements. https://www.health.gov.au/our-work/upcoming-changes-to-mbs-chronic-disease-management-arrangements

90 The Australian Government's 2023–24 Budget announcement reforming MBS chronic disease management, effective 1 July 2025. https://www.health.gov.au/our-work/upcoming-changes-to-mbs-chronic-disease-management-arrangements

91 Lopez-Garrigos M, et al. A pilot study of opportunistic chronic kidney disease screening in primary care using a clinical decision support system. 2025. https://doi.org/10.3390/diagnostics16010008

92 LiverScreen. Screening for liver fibrosis population-based study across European countries. https://www.liverscreen.eu/

93 Serra-Burriel M et al. Development, validation, and prognostic evaluation of a risk score for long-term liver-related outcomes in the general population: a multicohort study. 2023. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(23)01174-1/abstract

94 See Table 1 for information on these groups

95 Vassalotti JA, et al. Kidney early evaluation program: a community-based screening approach to address disparities in chronic kidney disease. 2010. https://pubmed.ncbi.nlm.nih.gov/20116650/

96 Jurkovitz CT, et al. The Kidney Early Evaluation Program (KEEP): program design and demographic characteristics of the population. 2008. https://doi.org/10.1053/j.ajkd.2007.12.022

97 Ohmit SE et al. Longitudinal Study of the National Kidney Foundation's (NKF) Kidney Early Evaluation Program (KEEP). 2003. https://pubmed.ncbi.nlm.nih.gov/12819315/

98 National Institute of Diabetes and Digestive and Kidney Diseases. https://www.niddk.nih.gov/

99 Bansal N, et al. The NIDDK Central Repositories: a valuable resource for nephrology research. 2015. https://pmc.ncbi.nlm.nih.gov/articles/PMC4386252/

100 Thomas M, et al. A multicenter initiative to improve care in cardiometabolic disease: initial report from the Cardiometabolic Center Alliance. 2021 https://doi.org/10.1161/CIRCOUTCOMES.120.007682

101 American Heart Association. Combined resources will improve cardiovascular-kidney-metabolic care [press release]. 2025. https://newsroom.heart.org/news/combined-resources-will-improve-cardiovascular-kidney-metabolic-care

102 WHO. SDG Target 3.4 | Noncommunicable diseases and mental health. https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/sdg-target-3.4-noncommunicable-diseases-and-mental-health

103 World Health Organisation. Reducing the burden of noncommunicable diseases through promotion of kidney health and strengthening prevention and control of kidney disease. 2025. https://apps.who.int/gb/ebwha/pdf_files/EB156/B156_(20)-en.pdf

104 United Nations. Political Declaration of the Fourth High-Level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases and the Promotion of Mental Health and Well-being. 2025. https://cdn.who.int/media/docs/default-source/ncds/finalized-pd-on-ncds-and-mental-health-rev4-3-september-2025.pdf

105 World Health Organization. Steatotic liver disease: a missing piece in the global noncommunicable disease response. 2026. https://apps.who.int/gb/ebwha/pdf_files/EB158/B158_R1-en.pdf

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