

education

RESEARCH REVIEWS Fortnightly round up from the leading medical journals

Promoting milligrams on Instagram

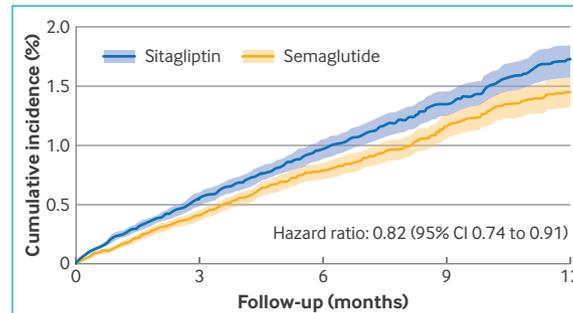
Social media platforms are awash with influencers promoting cures for all ills. They often make claims that would breach advertising



rules—particularly in the United Kingdom where advertising prescription only drugs to consumers is banned—and rarely disclose conflicts of interest. A research letter in JAMA identified 740 Facebook, Instagram, TikTok, and YouTube posts from 2023 that made promotional claims about glucagon-like peptide-1 (GLP-1) receptor agonists, attention deficit/hyperactivity disorder (ADHD) drugs, or autoimmune biologics. They found that most were posted by individuals (only 4.5% by drug companies) and

rules—particularly in the United Kingdom where advertising prescription only drugs to consumers

80% contained marketing elements without clear commercial disclosure. 69% made efficacy claims yet only 33.4% mentioned risks or adverse events.



Cumulative incidence of myocardial infarction or stroke in patients starting semaglutide versus sitagliptin

Real world settings for incretins

Incretin based drugs such as semaglutide and tirzepatide have been found to lower cardiovascular risk in randomised control trials. A target trial emulation study has confirmed these benefits using real world data from the United States. They found a reduced risk of myocardial infarction or stroke when comparing semaglutide with sitagliptin (hazard ratio 0.82, 95% confidence interval 0.74 to 0.91), and no significant difference between tirzepatide and semaglutide for a composite of myocardial infarction, stroke or all-cause mortality.

• *Nat Med* doi:10.1038/s41591-025-04102-x

80% contained marketing elements without clear commercial disclosure. 69% made efficacy claims yet only 33.4% mentioned risks or adverse events.

• *JAMA* doi:10.1001/jama.2025.19754

Stenting for carotid stenosis

A large, multicentre study sought to compare surgical treatments for high grade asymptomatic carotid stenosis with intensive

medical management. It ran two trials in parallel: stenting versus medical treatment, and carotid endarterectomy versus medical treatment. Endarterectomy did not lead to any significant benefit versus medical management, but stenting did: the four year incidence of the primary outcome (a complex composite of stroke or death within 44 days and ipsilateral ischaemic stroke during the remaining four years) was 2.8% versus 6.0% in the control group.

• *N Engl J Med* doi:10.1056/NEJMoa2508800

Stepping down antihypertensive treatment in frail older people

A randomised control trial of deprescribing antihypertensive treatments among older nursing home residents concludes that a step down strategy didn't lead to lower all cause mortality compared with usual care. On the other hand, because the purpose

CLINICAL PICTURE

Erythema nodosum, arthralgia, and lymphadenopathy

A woman in her 50s presented with a 20 day history of painful erythematous nodules on the legs and intermittent ankle arthralgia. Physical examination showed multiple, firm, tender, erythematous nodules on the lateral aspect of both legs. Computed tomography imaging of the chest showed right hilar and mediastinal lymphadenopathy. Histopathological examination of the leg nodules and enlarged lymph nodes showed septal

panniculitis and non-caseating granulomas respectively, indicating erythema nodosum and sarcoidosis. She was diagnosed as having Lofgren's syndrome.

Lofgren's syndrome is a relatively uncommon subtype of sarcoidosis, manifesting as bilateral hilar lymphadenopathy with erythema nodosum or periarticular arthritis, or both. In contrast to the insidious onset more often seen in sarcoidosis,

Lofgren's syndrome typically presents acutely. It is usually diagnosed on the basis of its characteristic clinical presentation and radiological evidence of bilateral hilar lymphadenopathy on chest radiography or computed tomography imaging of the chest. Routine histopathological examination is not always required in typical cases, but was obtained to confirm the diagnosis in this patient because of the presence of only right hilar





of deprescribing in this group of patients is less about trying to extend life than reducing medication burden, these findings could be interpreted more positively. The intervention, offered to nursing home residents age 80 years of age or older who were taking more than one antihypertensive drug and had a systolic blood pressure below 130 mm Hg, saw a reduction in the number of antihypertensive drugs prescribed from 2.6 to 1.5 per person, compared with 2.5 to 2.0 in the usual care group after a median of 38 months. Death from any cause was 61.7% and 60.2% respectively (adjusted hazard ratio 1.02, 95% confidence interval 0.86 to 1.21).

● *N Engl J Med* doi:10.1056/NEJMoa2508157

Treating low-normal potassium in people with implantable cardioverter–defibrillators

Potassium supplementation could be beneficial to people with an implantable

cardioverter–defibrillator (ICD) and low-normal potassium levels, concludes a new open label trial published in *New England Journal of Medicine*. The study recruited 1200 participants with an ICD and a baseline plasma potassium level of 4.3 mmol/L or lower to receive potassium supplementation (by means of a supplement, mineralocorticoid receptor antagonist, or both, plus dietary guidance) or standard care. Those in



the treatment group were less likely than the control group to have sustained ventricular tachycardia, appropriate ICD treatment, unplanned hospitalisation for arrhythmia or heart failure, or death from any cause over the three year follow-up period (22.7% versus 29.2%; hazard ratio 0.76, 95% CI 0.61 to 0.95).

● *N Engl J Med* doi:10.1056/NEJMoa2509542

Tom Nolan, clinical editor, *The BMJ*, London; sessional GP, Surrey

Cite this as: *BMJ* 2025;391:r2484

lymphadenopathy. Lofgren's syndrome usually follows a self-limiting course with a favourable prognosis, with resolution in up to 90% of patients within two years. This patient was treated symptomatically with non-steroidal anti-inflammatory drugs. On follow-up at six months, the lymphadenopathy had regressed and the arthralgia and skin lesions were in remission.

Ying Yan; Shunli Tang (tangshunli@zju.edu.cn), Huzhou Central Hospital, China

Patient consent obtained.

Cite this as: *BMJ* 2025;391:e084531

MINERVA From the wider world of research

Dementia in people with type 1 diabetes

As life expectancy for people with type 1 diabetes improves, so does their vulnerability to age related conditions such as dementia. A large Swedish study reports that people with type 1 diabetes had double the risk of a dementia diagnosis over 14 years of follow-up compared with age, sex, and area matched controls (*Diabetes Care* doi:10.2337/dc25-0773). The increase in risk was greater for vascular dementia than for Alzheimer's disease.



Paediatric mortality

In most Western countries, motor vehicle collisions are the single commonest cause of death among young people. In the United States, however, this is changing. Deaths from motor vehicle collisions have been decreasing, while deaths from firearms have been increasing.

Although there is variation between states, firearms are now the overall leading cause of death among people aged 1 to 19 years (*JAMA Pediatr* doi:10.1001/jamapediatrics.2025.4505).

Doxycycline in pregnancy

A population based cohort study from Israel provides new data on doxycycline exposure during pregnancy (*Infection* doi:10.1007/s15010-025-02622-9). Among 2500 babies born after first trimester exposure from 1998 to 2017, there was no evidence of an excess of major congenital malformations or organ-specific malformations when compared with the outcomes of 262 990 unexposed pregnancies.

Goodhart's law in diabetes care



Goodhart's law warns that when a measure becomes a target, it ceases to be a good measure. This is because attention is directed towards hitting the target, rather than improving the outcome the measure is intended to reflect. Continuous glucose monitoring, which is becoming a standard way of assessing control in type 1 diabetes, is in danger of becoming an example. Interventions intended to maximise time in range may create hidden harms, such as multiple hypoglycaemic episodes and over-reliance on rescue carbohydrates (*Diabetes Care* doi:10.2337/dc25-1985).

Innovation and crazy philanthropy

Although a lot of medical research is funded by private philanthropy, the way money is disbursed is usually no less bureaucratic than that of government funded research councils. Both require lengthy grant applications, external reviewers' reports, and discussion by committees before any decision is made. So who might fund eccentric, risky ideas with the potential to spark a radical change in direction? We need a few crazy philanthropists to back the long shots that conventional funding streams reject (*Palladium* www.palladiummag.com/2025/08/22/the-case-for-crazy-philanthropy).

Hearing loss

More than half the participants in the Framingham Offspring Study (aged 35 to 75 at recruitment) developed hearing loss during 25 years of follow-up (*JAMA Netw Open* doi:10.1001/jamanetworkopen.2025.39371). If that seems high, bear in mind that the average deterioration was only 15 dB across speech frequencies, and that hearing aids are seldom advised unless hearing loss exceeds 40 dB. Age was the strongest predictor of hearing loss, but lower educational attainment and a history of exposure to noise also increased risk.

Cite this as: *BMJ* 2025;391:r2482

Overweight and obesity management: summary of updated NICE guidance

Caroline Mulvihill,¹ Helen M Parretti,² Nivedita Aswani³

Full author details on [bmj.com](https://www.bmj.com)

Correspondence to: C Mulvihill caroline.mulvihill@nice.org.uk



In England, 1 in 4 adults,¹ and almost 1 in 4 children by the time they are 11 years old,² are living with obesity (based on body mass index (BMI) measurements and classification). Furthermore, about two thirds of adults in England are estimated to be living with obesity or overweight, with an upward trend since 2015-16. For children living in the most deprived areas, prevalence of obesity is about twice as high compared with those living in the least deprived areas.²

In January 2025, NICE published its guideline to support people living with overweight and obesity, updating its previous guideline published in 2022.³ The full guideline includes evidence based recommendations relevant for those working across primary, secondary, and tertiary care on the prevention and management of overweight, obesity, and central adiposity in children, young people, and adults. This update has not considered medicines for obesity management.

In this article, we summarise the key changes made to the guideline, and have selected recommendations with particular impact for those working in primary care. The NICE Quality Standard based on this guideline has also been updated in August 2025.⁴

Recommendations

NICE recommendations are based on systematic reviews of best available evidence and explicit consideration of cost effectiveness. When minimal evidence is available, recommendations are based on the guideline committee's experience and opinion of what constitutes good practice. Evidence levels for the recommendations are in the full version of this article on [bmj.com](https://www.bmj.com).

Principles of care

Living with overweight and obesity can be complex, multifaceted, and can interact with many areas of a person's life. Based on the members' experience, the guideline committee agreed a non-exhaustive list of factors related to the wider determinants, such as socioeconomic factors, the food environment, built environment, and social and cultural influences, and the context of overweight and obesity that healthcare professionals need to take into account when offering care. Many of these factors relate to health inequalities that may limit a person's ability to address overweight or obesity and that are outside their control.

The evidence review included accounts of negative experiences from people living with overweight and obesity in which healthcare providers did not take these factors into account. It is therefore important to keep the context of the person's health, social circumstances, and their openness to engage with change at the forefront when making a professional judgment. People living with overweight and obesity described experiences in which healthcare professionals talked about their weight in an insensitive manner, making them feel wary and defensive when weight was brought up in subsequent discussions. Healthcare professionals should respect a person's choice not to discuss their weight. It can also be helpful to let the person know that if this should change in the future the offer of support remains open.

Use non-stigmatising language and images, for example those provided by The World Obesity Image Bank,⁵ to promote a positive discussion. Stigma associated with obesity can negatively affect people's mental and physical health. The figure outlines broad principles of care that health professionals are recommended to take into account when discussing overweight and obesity.

- Before or during any discussions, think about the wider determinants and the context of overweight and obesity. These include:
 - General health and current comorbidities
 - Weight related comorbidities, including family history of weight related comorbidities
 - Weight history and previous experiences of managing overweight or obesity
 - Experiences of weight stigma
 - Impact of bullying and adverse childhood experiences
 - Practicality of addressing weight and readiness to engage with change
 - Developmental stage (for children and young people)
 - Ethnicity

WHAT YOU NEED TO KNOW

- When talking to people about their weight, consider the wider determinants and the context of overweight and obesity
- Consider the differences when interpreting body mass index (BMI) for children and young people and those from black, Asian, and minority ethnic family backgrounds
- Waist to height ratio is a useful additional measure to BMI in predicting health risk associated with central adiposity
- If a referral is declined, consider offering further opportunities for referral or re-referral in the future

- Language
- Socioeconomic status and financial constraints
- Personal and family circumstances, including living arrangements and major life events
- Recent pregnancy
- How any medicines the person is taking may affect their weight or appetite
- Current or previous experiences of eating disorders or disordered eating
- Psychosocial considerations (for example, depression, anxiety, or sense of self esteem or self perception)
- Physical disabilities
- Neurodevelopmental conditions and special educational needs and disabilities (SEND).
- Encourage families or carers to take the main responsibility for behavioural changes in children and young people, especially children under 12 years. Take into account the age and maturity of the child or young person, and their preferences and those of their families or carers.
- If there is concern that obesity or weight or weight related comorbidities pose a significant threat to the child or young person's health and wellbeing:
 - Refer to emotional health and wellbeing support and services
 - Refer to specialist management for any other comorbidities.

Use clinical judgment to decide when it is necessary to intervene as part of the duty of care to the child or young person.

Considerations for adults

Evidence on diagnostic overshadowing (that is, attributing symptoms to weight rather than a potential comorbid condition that could be unrelated) showed that, when people presented with a health problem such as hip pain, they often felt that the current presentation was neglected in favour of discussions about weight. Lay members on the committee confirmed that this was a common experience.

Eight qualitative studies, including four from the UK, used semi-structured interviews and focus groups in 134 health professionals and patients to address opportunistic identification of health presentations in adults living with obesity and overweight in primary care. Opportunistic identification could include registration with a general practice, consultation for related conditions (such as type 2 diabetes and cardiovascular disease), and other routine health checks. These data indicated that people living with overweight and obesity felt it was important for healthcare professionals to prioritise the presenting condition before initiating discussions about weight. In response, the committee recommended that health and care professionals first focus on the condition at hand, and then use their professional judgment to determine whether it is appropriate to raise the topic of weight. Although the review did not include direct evidence relating to children and young people, the committee agreed that the recommendation should apply across all age groups.

For patients with a BMI <35 (weight (kg)/(height (m)²)), an updated recommendation is to measure central

1. Respect me

- Ask my permission to discuss topics around overweight and obesity
- Respect my choices, even if you do not agree with them
- Do not assume all my symptoms are caused by my weight or obesity
- Explore my decisions sensitively, or delay discussions to another time, if I do not wish to talk about any issue you have raised

2. Support me

- Talk to me in a sensitive, person centred, developmentally appropriate, and non-judgmental way
- Identify and explore the terms I would prefer you to use
- Focus on improvement in my health and wellbeing rather than simply talking about weight and obesity
- Stay positive, supportive, and solution based
- Take into account my thoughts, views and cultural, religious or spiritual beliefs during our conversations
- Be mindful of factors that apply to me that prevent or restrict weight loss (such as some medicines or comorbid conditions)
- Ensure my notes are up to date so other healthcare professionals know my views, what we have covered, and agreed before, and why

3. Know about my life

- Think about family history and weight related complications
- Be aware of my weight history (and for children and young people, growth history), and previous experiences of related problems (such as eating disorders)
- Take into account my experiences of weight stigma, bullying, and adverse experiences
- Think about my family and personal context: daily life, ethnicity, culture, money worries, special needs and disabilities, mental health factors, and stage in life
- Be aware of my current medicine use and medical history
- Find out if I am ready and able to engage with change. If not, how can you help me?
- Talk about how my friends and family can help (this is especially important for children and young people)

4. Help me when we talk

- Use non-stigmatising language and images
- Ensure anything you give me to read or watch is suitable and tailored to my particular needs, such as Easy Read literature
- Ensure conversations and communications are appropriate for my age, maturity, and level of understanding. For children and young people make sure information is accurate for age (eg, BMI centile)
- Give me time to understand and process the information I have been given
- Ask me if I have any questions, and make it clear you are happy for me to ask them either now or later on

5. Understand how I feel

- Think about whether it is appropriate or important to discuss weight or obesity, or take measurements right now
- Think about the impact on my body image or self esteem of taking measurements or the way they are done
- Understand my weight may have been raised many times before
- Understand that I might be affected by an eating disorder at any weight, and I might be vulnerable to disordered eating
- Be aware of your feelings, sensitivities, and bias about weight and obesity

Principles of care as recommended by people living with overweight and obesity

adiposity using waist-to-height ratio, alongside BMI, to assess for health risks, including type 2 diabetes and cardiovascular disease. In a previous update of the guideline, the committee recommended measuring BMI, in part because it is a useful and practical means of defining overweight and obesity, but it is not a direct measure of central adiposity and therefore needs to be interpreted with caution.

Waist-to-height ratio provides a more accurate assessment of central adiposity by comparing waist circumference to height, rather than relying on overall body weight. A review of evidence from 30 studies of prognostic accuracy and 21 studies of diagnostic accuracy studies, and the guideline committee's experience, concluded that using waist-to-height ratio was a valuable addition to BMI to give a practical and accurate estimate of central adiposity in adults with a BMI <35.

- Avoid attributing all symptoms to overweight or obesity (diagnostic overshadowing). If the person is presenting with another health problem or condition (such as hip pain), address this problem or condition first before deciding whether it is appropriate to ask permission to discuss weight.
- Use BMI as a practical measure of overweight and obesity (see the NHS BMI calculator for adults⁶). Interpret it with caution because it is not a direct measure of central adiposity.
- In adults with BMI <35, measure and use their waist-to-height ratio as well as their BMI as a practical estimate of central adiposity and use these measurements to help to assess and predict health risks (for example, type 2 diabetes, hypertension, or cardiovascular disease).
- Direct people to resources that give advice on how to measure waist circumference and waist-to-height ratio, such as the video guide on the NHS obesity page.⁷
- Classify the degree of central adiposity based on waist-to-height ratio as follows:
 - Healthy central adiposity: waist-to-height ratio 0.4 to 0.49, indicating no increased health risk
 - Increased central adiposity: waist-to-height ratio 0.5 to 0.59, indicating increased health risk
 - High central adiposity: waist-to-height ratio 0.6 or more, indicating further increased health risk.
- When talking to a person about their waist-to-height ratio, explain that they should try and keep their waist to less than half their height (so a waist-to-height ratio of under 0.5).

People from black, Asian, and minority ethnic family backgrounds are prone to central adiposity and have an increased cardiometabolic health risk at lower BMI thresholds, as supported by an evidence review from 14 prognostic accuracy studies and 11 diagnostic accuracy studies demonstrating increased risk at a BMI of 25-29. Although NICE found no evidence on the thresholds for obesity classes 2 and 3 in people of these family backgrounds, the committee consensus was that it is generally good practice to reduce the BMI thresholds by about 2.5. This would mean that the threshold for obesity class 2 would be lowered to roughly BMI 32.5 and for class 3 to 37.5 in these populations.

Keep the context of the person's health, social circumstances, and their openness to engage with change at the forefront when making a professional judgment

- People with a South Asian, Chinese, other Asian, Middle Eastern, black African, or African-Caribbean background are prone to central adiposity and their cardiometabolic risk occurs at lower BMI, so use lower BMI thresholds as a practical measure of overweight and obesity:
 - Overweight: BMI 23 to 27.4
 - Obesity: BMI 27.5 or above.
- For people in these groups, obesity classes 2 and 3 are usually identified by reducing the thresholds by 2.5.

Considerations for children and young people

The evidence review found that BMI z-score—also known as BMI standard deviation score, which reflects the extent to which a child's BMI deviates from the average for their age and sex—was generally the most accurate measure for identifying health risks in children and young people, such as hypertension and type 2 diabetes. However, waist-to-height ratio was often equally accurate, and in some studies, proved to be more effective.

The evidence supporting the use of waist-to-height ratio as a practical measure of central adiposity to assess and predict health risks in children and young people is currently weaker than the evidence for adults. However the committee considered it a potentially useful indicator of future health risks in this population. They recommended that waist-to-height ratio be used only as a supplementary measure alongside standard height and weight assessments.

- Avoid attributing all symptoms to overweight or obesity (diagnostic overshadowing). If the child or young person is presenting with another health problem or condition (such as asthma) address this problem or condition first before deciding whether it is appropriate to ask permission to discuss weight.
- Use BMI as a practical estimate of overweight and obesity in children and young people, and ensure that charts used are:
 - Appropriate for children and young people and
 - Adjusted for age and sex.
- Classify the degree of overweight or obesity in children and young people using the following classifications:
 - Overweight: BMI 91st centile+1.34 standard deviations (SDs)
 - Clinical obesity: BMI 98th centile+2.05 SDs
 - Severe obesity: BMI 99.6th centile+2.68 SDs.

Use clinical judgment when interpreting BMI below the 91st centile, especially the healthy weight category in BMI charts, because a child or young person in this category may nevertheless have central adiposity.

- Interpret BMI with caution because it is not a direct measure of central adiposity. Use the NHS BMI healthy weight calculator,⁸ Royal College of Paediatrics and Child Health UK-World Health Organization (WHO) growth charts,⁹ and BMI charts¹⁰ to plot and classify BMI centile. The childhood and puberty close monitoring (CPCM) form¹¹ can also be used for continued BMI monitoring in children aged 2 years and over, especially if puberty is either premature or delayed. Refer to special BMI growth charts for children and young people with Down's syndrome¹² if needed.

- Consider measuring a child or young person's waist circumference and calculating waist-to-height ratio to predict health risks associated with central adiposity.
- Classify the degree of central adiposity based on waist-to-height ratio in children and young people as follows:
 - Healthy central adiposity: waist-to-height ratio 0.4 to 0.49, indicating no increased health risk
 - Increased central adiposity: waist-to-height ratio 0.5 to 0.59, indicating increased health risk
 - High central adiposity: waist-to-height ratio 0.6 or more, indicating further increased health risk.
- These classifications can be used for children and young people of both sexes and all ethnicities. The health risks associated with higher central adiposity levels include type 2 diabetes, hypertension, and cardiovascular disease.
- When talking to a child or young person, and their families and carers, explain that they should try and keep their waist to less than half their height (so a waist-to-height-ratio of under 0.5).

Referral

In this update, there were no substantial changes in the referral recommendations which remain aligned with local pathways. It should be noted that, since the guideline publication, obesity pathways have started to be reconfigured, partly in response to the national rollout of tirzepatide.¹³

A range of evidence—including eight UK based randomised controlled trials and eight qualitative studies—explored the types of interventions adults prefer and how these can be tailored to meet individual needs. The findings suggest that the most effective approaches are those that are culturally appropriate, responsive to specific demographic groups, and informed by individuals' previous experiences with weight management interventions. The committee highlighted the importance of engaging people in discussions about realistic, personalised goals and emphasised the broader benefits of supporting sustainable, long term behaviour changes.

The evidence showed that children and young people—and their families or carers—were not always willing to accept referrals to overweight and obesity management interventions. The committee therefore emphasised the importance of explaining the health risks associated with a higher BMI using non-judgmental, sensitive language. The committee also stressed the need to consider the underlying drivers of overweight and obesity and to advocate for the child's health in a way that is proportionate to the potential impact of their BMI. Importantly, the committee highlighted that safeguarding a child's health includes taking appropriate action to prevent avoidable harm—such as preventing and treating weight related conditions.

- Offer advice and discuss the possibility of referral to an overweight and obesity management service with the person, taking into account their individual needs and preferences.
- Address the drivers of overweight and obesity (for example, social context, mental health and wellbeing,

GUIDELINES INTO PRACTICE

- How does your organisation integrate assessment and recommended measures of overweight, obesity, and central adiposity into clinical practice?
- What actions can your organisation take to reduce weight stigma and ensure that individuals living with overweight or obesity receive a holistic, person centred assessment and care experience?

and stigma) if possible. Refer as needed for assessment for any comorbidities, or to other services such as social care, physiotherapy, eating disorder services, or the NHS diabetes prevention programme.¹⁴

- Discuss and agree realistic, personalised health goals (and any other related goals such as clothes fitting better, taking part in active play with children or grandchildren, finding it easier to breathe when walking or climbing stairs, being able to tie shoelaces or fasten a standard length seatbelt). Include the importance and wider benefits of making sustainable, long term changes to dietary behaviours and increasing physical activity levels.
- During discussions with a child or young person living with overweight or obesity, and their family or carers:
 - Explain the degree of overweight or obesity, and the health risks associated with a higher BMI
 - Encourage them to engage with overweight and obesity management
 - Advocate for the child's health proportionately to the degree of health risk.

Follow-up and long term support

A holistic approach is key to making sustainable changes, and people need information about extra sources of long term community or healthcare support.

The evidence—from six qualitative studies—showed that adults often find it stigmatising when they feel pressured to engage with overweight and obesity management, which can create barriers to participation. Therefore, healthcare professionals should acknowledge and respect an individual's decision to decline a referral. To support informed choice, professionals should ensure that people are given clear, comprehensive information about the intervention being offered—including its aims, format, duration, and potential benefits—so they can make a decision that aligns with their needs and preferences. In follow-up appointments, further opportunities for referral or re-referral should be offered.

- Give people information about more sources of long term community or healthcare support (for example, provided by social prescribers, health coaches, pharmacists, local support groups, online groups or networks, friends and family, Talking Therapies, free healthcare endorsed apps, national campaigns, and local community groups such as walking or gardening groups). These can be used while waiting for and alongside an overweight and obesity management intervention. See NICE's guideline on behaviour change: digital and mobile health interventions.¹⁵
- Give people the opportunity for a re-referral as needed, taking into account that overweight and obesity management is a long term process.

Competing interests:
See bmj.com.

Patient involvement:
The guideline committee included three lay members.

Cite this as: *BMJ* 2025;391:r2286

Find the full version with references at <http://dx.doi.org/10.1136/bmj.r2286>

Assessment and management of albuminuria in adults

Sophie E Claudel,¹ Debasish Kar,² Azeem Majeed,³ Pamela S Burgwinkle,⁴ Ashish Verma¹



0.5 HOURS

Full author details on [bmj.com](https://www.bmj.com)

Correspondence to: A Verma ashverma@bu.edu

Up to two thirds of people at risk for chronic kidney disease (CKD) may have albuminuria (albumin excreted in the urine) that is not recognised.^{1,2} Testing rates are low in both primary and secondary care settings, despite multinational guidance recommending regular testing for albuminuria as part of risk stratification for patients with diabetes, hypertension, cardiovascular disease, and/or CKD.^{3,4} It is also recommended for patients with obesity (a risk factor for CKD) by France's Haute Autorité de Santé (HAS).⁵

What is albuminuria?

Albuminuria specifically refers to elevated urine albumin concentration. Proteinuria is a more encompassing measurement (also indicative of kidney damage) that refers to any protein in the urine, including albumin, globulins, Bence-Jones protein, and more.⁶ In healthy kidneys, very little albumin enters the filtrate, therefore, albuminuria is generally atypical.⁶ When albuminuria is detected for the first time, evaluation is needed to

WHAT YOU NEED TO KNOW

- Regular testing (at least annually) for albuminuria with urine albumin-creatinine ratio (UACR) is recommended for risk stratification in patients with or at risk for chronic kidney disease (CKD), including those with diabetes, hypertension, and/or cardiovascular disease
- In epidemiological studies, a >30% reduction in albuminuria was associated with up to 56% lower risk of kidney failure and 28% lower risk of cardiovascular disease
- Antiproteinuric therapies are recommended for treatment of CKD by clinical guidelines including KDIGO. Consider angiotensin receptor blockers, angiotensin converting enzyme inhibitors, sodium glucose co-transporter 2 inhibitors, non-steroidal mineralocorticoid receptor antagonists, or glucagon-like peptide receptor agonists, depending on the clinical situation
- Consider referral to nephrology for albuminuria when there is concern for glomerulonephritis, the cause of albuminuria is unknown, risk prediction tools suggest the 5 year risk of kidney failure is >3-5%, urine albumin-to-creatinine ratio (UACR) >30 mg/mmol; UACR >3 mg/mmol with additional risk factors, or there is severe albuminuria with haematuria

discover the cause. A urine albumin-to-creatinine ratio (UACR) >3 mg/mmol for three months is diagnostic of CKD. Monitoring both albuminuria and estimated glomerular filtration rate (eGFR) is needed for accurate CKD staging and prognostication.³

Here, we use the 2024 Kidney Disease Improving Global Outcomes (KDIGO) albuminuria classification, as shown in the figure.

Prognostic significance of albuminuria

A worldwide individual-participant level meta-analysis derived from observational cohort data from >40 countries showed that albuminuria is predictive of incident CKD, CKD progression, and kidney failure, and of major cardiovascular events, including cardiovascular and all cause mortality.⁴ Patients with increasing levels of albuminuria had worse cardiorenal outcomes (including cardiovascular mortality and kidney failure), even those with relatively preserved eGFR and, in some cases, with levels of UACR <3 mg/mmol.⁴

While severely increased albuminuria (defined in fig 1) is strongly associated with adverse cardio-renal outcomes, there is also a continuous relation between albuminuria and clinical risk even in the “normal to mildly increased” range.⁴⁻⁸ For example, increasing levels of albuminuria within the historically “normal” range for UACR (<3 mg/mmol) were associated with worse cardiovascular outcomes among 12 835 adults without major pre-existing cardiovascular risk factors participating in the 1999-2014 National Health and Nutrition Examination Survey,⁸ and associated with higher risk of CKD progression in a multicentre prospective cohort study across seven clinical centres in the US.⁷ Therefore, the authors consider a patient with any relevant underlying disease process and an UACR of 2 mg/mmol, for example, to be at increased risk for cardio-renal complications compared with a similar patient with a UACR of 0.5 mg/mmol.

Clinical trials of antiproteinuric medications (including angiotensin receptor blockers, angiotensin converting enzyme inhibitors, sodium glucose co-transporter 2 inhibitors, non-steroidal mineralocorticoid receptor antagonists, and glucagon-like peptide receptor agonists) suggest that albuminuria reduction is associated with reduced mortality, admissions to hospital for heart failure, and CKD progression.^{9,10} However, no data confirm whether reducing albuminuria directly improves outcomes, or if it is a surrogate marker for other improvements in cardiovascular and kidney health.⁹

How is albuminuria assessed?

The KDIGO, National Institute for Health and Care Excellence (NICE), American Diabetes Association (ADA), and Royal Australian College of General Practitioners guidelines recommend measuring the first morning void UACR or 24 hour urine albumin excretion for greatest accuracy.³⁻¹³ However, in most clinical situations it is acceptable to measure UACR at a random time.

CKD is classified based on: Cause (C) GFR (G) Albuminuria (A)			Albuminuria categories			
			Description and range			
			A1	A2	A3	
			Normal to mildly increased	Moderately increased	Severely increased	
			<30 mg/g <3 mg/mmol	30-299 mg/g 3-29 mg/mmol	≥300 mg/g ≥30 mg/mmol	
GFR categories (mL/min/1.73m ²) Description and range	G1	Normal or high	≥90	Screen 1	Treat 1	Treat 3
	G2	Mildly decreased	60-89	Screen 1	Treat 1	Treat 3
	G3a	Mildly to moderately decreased	45-59	Treat 1	Treat 2	Treat 3
	G3b	Mildly to severely decreased	30-44	Treat 2	Treat 3	Treat 3
	G4	Severely decreased	15-29	Treat* 3	Treat* 3	Treat 4+
	G5	Kidney failure	<15	Treat 4+	Treat 4+	Treat 4+

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

Frequency of monitoring glomerular filtration rate (GFR) and albuminuria in people with chronic kidney disease (CKD). Albuminuria and GFR grid reflects the risk of progression by colour (green, yellow, orange, red, and deep red). The numbers in the boxes are a guide to the frequency of monitoring (number of times per year). Reproduced with permission from de Boer IH, Khunti K, Sadusky T, et al. *Kidney Int* 2022;102:974-89

Quantification of albuminuria is required to accurately stage and monitor CKD. Despite their accessibility, urine dipsticks have very poor sensitivity for levels of albuminuria < 30 mg/mmol (thus, they only qualitatively detect severely increased albuminuria) and under-detect non-albumin protein (despite the package stating “urine protein”).^{14 15} Furthermore, in the US, dipstick testing is rarely followed up with quantification and therefore is unlikely to drive further diagnostic testing, risk assessment, or monitoring.¹⁶

Indications for albuminuria testing

European, UK, American, and Australian guidelines recommend testing for albuminuria using a quantitative approach in patients with a variety of clinical conditions, not only diabetes, hypertension, and CKD (table).

Indications for albuminuria testing	
Albuminuria testing recommended in guidelines	Albuminuria testing may be considered
Diabetes ^{3 5 11-13 17-19}	Pre-diabetes or insulin resistance ^{9 20}
Hypertension ^{5 12 17 21-23}	Obesity ^{5 9 24}
CKD ^{3 5 11 13 19}	Metabolic associated steatotic liver dysfunction ^{9 25}
Cardiovascular disease ^{3 5 12 18 19}	Metabolic syndrome ^{9 26}
Prior acute kidney injury ^{3 5 12 27}	
Incidentally identified haematuria or proteinuria on urinalysis ^{3 12}	
Structural kidney/urological disease or stones ^{3 5 12}	
Multisystem diseases with potential for kidney involvement ^{3 5 12}	
Family history of CKD ^{3 5 12}	
Environmental risk factors specific to region of residence or occupation ^{3 5} or medication exposure ⁵	
During pregnancy for women with hypertension ^{3 21 22}	

Interpreting UACR

False positive UACR results can occur as a result of gross haematuria, active urinary tract infection, recent exposure to iodinated radiopaque contrast, recent strenuous exercise, and sarcopenia.²⁸ False negative results can occur in patients with high muscle or body mass.²⁸ In patients with a urinary tract infection, repeat UACR testing once the infection has fully resolved. In patients with extreme muscle mass (low or high), consider measuring 24 hour urine albumin excretion to increase accuracy.³

Frequency of testing

Observational data from the Netherlands suggest follow-up testing for albuminuria is even less common than initial testing²⁹; however, one time testing is insufficient for patients with an ongoing risk of CKD.³ KDIGO, NICE, HAS, American Heart Association (AHA), and ADA recommend repeat testing at least annually—to monitor patients at risk for CKD, manage progressive CKD, titrate antiproteinuric medications, and appropriately refer to nephrology—and more frequent testing in those with detectable albuminuria.³⁻³⁰ Monitoring albuminuria complements eGFR testing; both are needed for accurate CKD staging and prognostication (figure).³ The optimal frequency for repeat testing is patient specific (infographic).

How is albuminuria managed?

Consider the most likely causes of albuminuria as is appropriate with the patient’s clinical history, medications, imaging, family history, laboratory test results (including eGFR) (table 1), and physical examination.³ Nephrotic range proteinuria (greater than 3.5 g/24 h or urine protein-to-creatinine ratio >350 mg/mmol) and any proteinuria (including albuminuria) in the presence of unexplained haematuria may be features of glomerulonephritis, and KDIGO recommends specialist evaluation (referral urgency depends on the clinical situation).³

Initiate appropriate antiproteinuric therapies

Angiotensin converting enzyme inhibitors (ACEi) and angiotensin receptor blockers (ARB) have been the cornerstone of CKD care for decades, despite lacking

Considerations for patients who are pregnant or considering pregnancy

- Test patients who develop hypertension during pregnancy or with pre-existing hypertension for albuminuria owing to higher risk of pre-eclampsia and need for more frequent monitoring if albuminuria is present
- Advise patients to stop ACEi/ARB before conception to reduce the risk of fetal malformations
- Advise patients to stop SGLT2i, GLP1-RA, and MRA before conception* or when pregnancy is identified, owing to insufficient safety data and theoretical risk of fetal complications

* There is no standardised recommendation, even from the manufacturers, regarding how soon before conception to stop these medications

INDICATIONS FOR NEPHROLOGY REFERRAL FOR OTHER PATHOLOGIES³

- Rapid decline in eGFR (>5 mL/min/1.73 m² per year)
- Unexplained or persistent haematuria, especially with glomerular features (dysmorphic RBCs, RBC casts)
- Unclear origin of kidney dysfunction
- Suspected hereditary or genetic kidney disease
- Polycystic kidney disease
- Recurrent or extensive kidney stones
- Electrolyte abnormalities (eg, persistent hyperkalaemia, hyponatraemia)

WHEN TO REFER TO NEPHROLOGY FOR ALBUMINURIA³

- Unknown cause of albuminuria
- Concern for glomerulonephritis
- Greater than 3-5% 5 year risk of kidney failure using a validated tool which incorporates albuminuria (eg, the Kidney Failure Risk Equation <https://www.kidneyfailure.risk.co.uk/>)
- UACR >30 mg/mmol, even if eGFR is >60 mL/min/1.73 m²
- UACR >3 mg/mmol with additional risk factors (progressive eGFR decline, haematuria, resistant hypertension, electrolyte disorders, or high risk of kidney failure)
- Severe albuminuria (UACR ≥30 mg/mmol or urine AER ≥300 mg/24 h, approximately equivalent to PCR ≥50 mg/mmol or PER ≥500 mg/24 h) in combination with haematuria
- Doubling of albuminuria in people with moderate to severe albuminuria
- Persistent UACR >70 mg/mmol

specific approval for non-diabetic, proteinuric CKD.

Antiproteinuric therapies that are recommended for CKD treatment by KDIGO and other guidelines include^{3 11}:

- ACEi or ARB
- Sodium glucose co-transporter-2 inhibitors (SGLT2i)
- Glucagon-like peptide-1 receptor agonists (GLP1-RA)
- Non-steroidal mineralocorticoid receptor antagonists (nsMRA) (discussed below).

These medications are approved in the US and Europe for treatment of heart failure (ACEi/ARB, SGLT2i, GLP1-RA, steroidal and nsMRA), obesity (GLP1-RA), hypertension (ACEi/ARB, steroidal MRA), and type 2 diabetes (SGLT2i, GLP1-RA), and have been shown to reduce major adverse cardiovascular events and CKD progression.

Non-steroidal (ns) and steroidal MRA are used frequently in nephrology clinical practice. However, US and European drug agencies have only specifically approved nsMRA (finerenone) for treatment of type 2 diabetes with albuminuria. Positive phase 3 clinical trial results of finerenone in type 1 diabetes with albuminuria (FINE-ONE study³¹) and an ongoing trial of finerenone in non-diabetic, albuminuric CKD (FIND-CKD study³²) may support expanded approvals in the future. Steroidal MRA (spironolactone, eplerenone) have been shown to reduce albuminuria in observational studies and are used in clinical practice, but the small number of clinical trials precludes their approval for this indication. According to the European Renal Association, it is not definitively known if they carry the same reno-protection as nsMRA.³³ In cases where nsMRA are unavailable or in patients without diabetes but with persistent albuminuria, we suggest considering steroidal MRA.

Concurrent treatment with ACEi and ARB should be avoided owing to increased risk of adverse outcomes, including hyperkalaemia, without benefit.³⁴ However, multiple studies show that combination therapy—when SGLT2i, GLP1-RA, or nsMRA is added to ACEi/ARB—can slow CKD progression and prevent major cardiovascular events¹⁰⁻³⁶ (GLP1-RA are currently only approved for the treatment of albuminuric CKD with type 2 diabetes by US and European drug agencies, based on the FLOW study). In the following examples, patients were optimised on ACEi/ARB before randomisation:

- A post hoc analysis of randomised clinical trial data found that treating patients with type 2 diabetes and albuminuria with SGLT2i, GLP1-RA, and nsMRA in combination could decrease the lifetime risk of major adverse cardiovascular events by 35% (hazard ratio (HR) 0.65, 95% confidence interval (CI) 0.55 to 0.76).¹⁰ This corresponded to an absolute risk reduction of 4.4% (95% CI 3.0 to 5.7) over three years and a number needed to treat of 23 (95% CI 18 to 33)¹⁰
- The Confidence trial showed a greater reduction in albuminuria when finerenone was added to empagliflozin compared with either drug alone, among individuals with albuminuric CKD and type 2 diabetes.³⁷ A subset of patients was simultaneously initiated on finerenone and empagliflozin without increased risk of adverse events
- SGLT2i and GLP1-RA have been shown to have additive benefits when used in combination for CKD among patients with diabetes.^{35 38}
- Two post hoc meta-analyses of randomised clinical trial data found that treatment with SGLT2i reduced risk of CKD progression irrespective of baseline eGFR, UACR, or diabetes status. Importantly, 80-90% of the included trial participants were taking ACEi/ARB, but only a small minority (5-10%) were taking MRA or GLP1-RA.^{39 40}

Data to guide clinicians on increasing antiproteinuric treatment are limited. We advise using clinical judgment as the specific combination of comorbidities, drug intolerances, and the most pressing clinical concern will be unique to individual patients (infographic).

As examples:

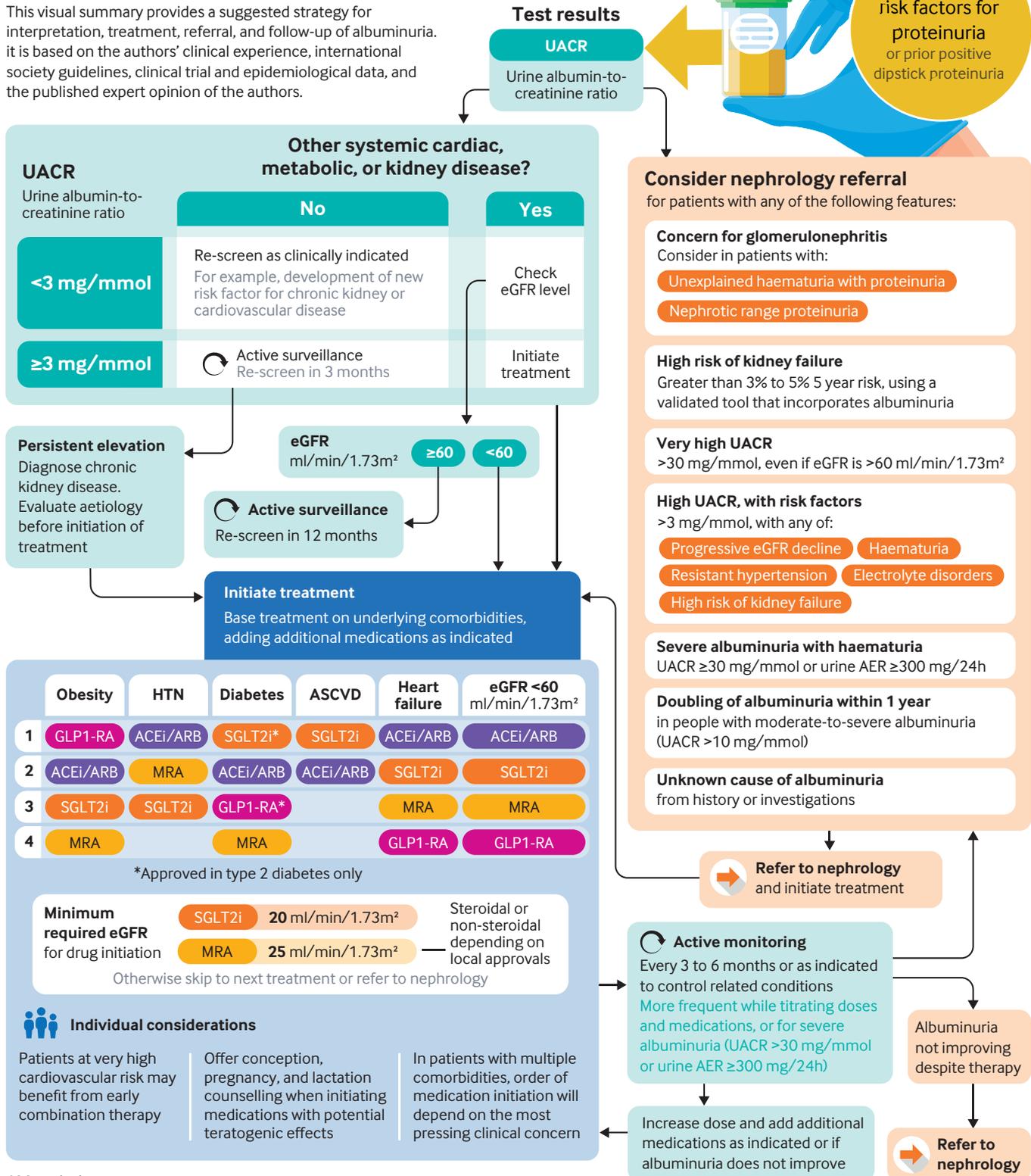
- For patients *without* cardiovascular-kidney-metabolic risk factors and with UACR ≥3 mg/mmol, re-test in three months to confirm new CKD diagnosis
- For patients *with* cardiovascular-kidney-metabolic risk factors and UACR <3 mg/mmol, initiate treatment if eGFR <60 mL/min/1.73 m² or re-test annually if eGFR ≥60 mL/min/1.73 m²
- For patients *with* cardiovascular-kidney-metabolic risk factors and UACR ≥3 mg/mmol, initiate treatment.

In patients with multiple comorbidities, treatment should prioritise the most urgent clinical concern, with other guideline recommended therapies added sequentially. For example, in diabetes with albuminuria, SGLT2i may be started first if glycaemic control is the priority, while ACEi/ARB may be the first choice if hypertension is uncontrolled. In patients at high cardiovascular risk, early or simultaneous combination

Albuminuria

Interpretation, follow-up, and initial treatment

This visual summary provides a suggested strategy for interpretation, treatment, referral, and follow-up of albuminuria. It is based on the authors' clinical experience, international society guidelines, clinical trial and epidemiological data, and the published expert opinion of the authors.



Abbreviations:

ACEi/ARB=angiotensin converting enzyme inhibitor/angiotensin receptor blocker; AER=albumin excretion rate; ASCVD=atherosclerotic cardiovascular disease; eGFR=estimated glomerular filtration rate; GLP1-RA=glucagon-like peptide receptor-1 agonist; HTN=hypertension; MRA=mineralocorticoid receptor antagonist; SGLT2i=sodium-glucose co-transporter-2 inhibitor; UACR=urine albumin-to-creatinine ratio

Disclaimer	Validation	Updating	Responsibility	Risks
	This infographic is not a validated clinical decision aid	This information is provided without any representations, conditions, or warranties that it is accurate or up to date	BMJ and its licensors assume no responsibility for any aspect of treatment administered with the aid of this information	Any reliance placed on this information is strictly at the user's own risk

For the full disclaimer wording see BMJ's terms and conditions: <http://www.bmj.com/company/legal-information/>

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

P

Feedback about treatment and monitoring from patients with CKD and albuminuria was solicited and incorporated in this article. Additionally, while planning the article, patients were informally asked about their albuminuria questions. Author Pamela S Burgwinkle is a patient who has experienced albuminuria resulting from CKD. Her experience shaped the systematic approach we included regarding investigating albuminuria in primary care settings. Specifically, she contributed to content about expected benefit from treatment with anti-proteinuric agents.

EDUCATION INTO PRACTICE

- How do you counsel patients with a new CKD diagnosis following an elevated UACR? Would you do anything differently knowing the cardio-renal risk associated with albuminuria?
- When might you consider testing for albuminuria outside the context of diabetes, hypertension, and CKD?
- When would you consider referral of patients with albuminuria to nephrology?

therapy can reduce therapeutic inertia and improve outcomes.^{37 41}

For individuals with UACR >3 mg/mmol, the authors suggest the order of drug initiation based on primary comorbidity outlined below (infographic), based on the guidelines, evidence reviewed,³⁻⁴² and expert opinion:

- Obesity: 1. GLP1-RA, 2. ACEi/ARB, 3. SGLT2i, 4. MRA
- Hypertension: 1. ACEi/ARB, 2. MRA, 3. SGLT2i
- Diabetes: 1. SGLT2i, 2. ACEi/ARB, 3. GLP1-RA, 4. MRA
- Atherosclerotic cardiovascular disease: 1. SGLT2i, 2. ACEi/ARB
- Heart failure: 1. ACEi/ARB, 2. SGLT2i, 3. MRA, 4. GLP1-RA
- eGFR <60 ml/min/1.73m²: 1. ACEi/ARB, 2. SGLT2i, 3. MRA, 4. GLP1-RA.

Key treatment considerations include:

- Minimum recommended eGFR for drug initiation (SGLT2i ≥20 ml/min/1.73 m²; steroidal or nsMRA ≥25 ml/min/1.73 m²)
- Diabetes subtype (SGLT2i, nsMRA, GLP1-RA only approved for type 2 diabetes)
- Pregnancy/lactation status (box 1).

Treat isolated albuminuria

Currently, SGLT2is are the only antiproteinuric medications approved by US and European regulators for the treatment of albuminuria (CKD stages 1-4) in patients without diabetes or hypertension. Nonetheless, off-label use of ACEi/ARB, MRA, or GLP1-RA is common and encouraged by nephrology societies such as KDIGO, reflecting decades of clinical experience.³ Because GLP1-RA and SGLT2i have modest effects on blood pressure, they may be well tolerated in a normotensive patient population. We recommend that, with careful monitoring, low dose ACEi, ARB, or MRA may also be considered in albuminuric patients without hypertension, heart failure, or

diabetes.⁹ This recommendation is supported by trial and epidemiological evidence showing reduced cardiovascular and CKD risk with therapies that lower albuminuria.³⁶⁻⁴⁶

Manage hyperkalaemia

Hyperkalaemia is a potential complication of prescribing ACEi/ARB or MRA in individuals with low GFR. KDIGO recommends monitoring creatinine and potassium within 2-4 weeks of initiating or titrating these medications.³ Discontinuation and dose reductions in these medications owing to hyperkalaemia are associated with increased cardiovascular mortality, all cause mortality, and progression to kidney failure.⁴⁷ Many patients can continue these therapies following dietary modification, discontinuation of other medications known to cause hyperkalaemia (eg, non-steroidal anti-inflammatory medications), initiation of loop diuretics or SGLT2i (for potassium excretion), or initiation of potassium binders (eg, patiromer, sodium zirconium cyclosilicate).^{3 48} In cases of refractory hyperkalaemia, refer patients to nephrology.

Recommend lifestyle medicine

Lifestyle measures such as smoking cessation, weight management, regular exercise, and a low sodium diet are recommended by KDIGO.³ Consider offering support in line with local services, including patient education and referral to multidisciplinary providers, to encourage sustainable behaviour change.³

How is treatment response assessed?

The ADA recommends a goal of >30% reduction in albuminuria to slow CKD progression and prevent kidney failure in diabetes,¹¹ though nephrology guidelines note that reductions of up to 50% can be due to random fluctuations.³ A >30% increase in albuminuria is associated with increased risk of CKD progression (kidney failure, eGFR <15 mL/min/1.73m², or doubling of serum creatinine) and major cardiovascular events, whereas a >30% reduction in albuminuria is associated with lower risk of these outcomes.⁴⁹ Similarly, a 30% reduction in albuminuria was associated with a 27% lower hazard for CKD progression among clinical trial participants.⁵⁰ However, there is no evidence based treatment target for percentage reduction or a universal target for UACR. The suggested frequency of albuminuria testing is summarised in the infographic.

Random variability in UACR makes treatment monitoring challenging. Nonetheless, a doubling of albuminuria warrants further investigation for new pathology or progressive kidney disease.³

Some patients treated with ACEi/ARB will not respond or will exhibit treatment resistance over time. This may be owing to increased dietary sodium intake or poor blood pressure control. In these cases, clinicians can either rotate to or add a different class of antiproteinuric therapy.⁵¹

Competing interests: None declared.

Cite this as: *BMJ* 2025;391:e084911

Find the full version with references at doi: 10.1136/bmj-2025-084911

Priorities in addressing rifampicin resistant TB

Progress in testing and trial design is needed

Rifampicin is a critical component of tuberculosis (TB) treatment regimens. Recent positive developments in rifampicin resistant TB—the emergence of new drugs and treatment regimens, declines in incidence, and improvements in the proportion of people being diagnosed and successfully treated—are now threatened by the rapid emergence of resistance to other critical drugs and by poor political choices.¹

Drug susceptibility testing

Failure to diagnose rifampicin resistance, and rifampicin resistant TB with additional resistance to critical second line drugs, in a timely manner, risks poor clinical outcomes, acquired resistance, and transmission of resistant strains.^{2,3} There are two types of drug susceptibility tests—genotypic and phenotypic. Genotypic tests identify genetic mutations that cause drug resistance. Phenotypic tests identify resistance by observing the organism's ability to grow in the presence of drugs.

Some rapid drug susceptibility tests can be performed in the clinic or a local laboratory (near patient), reducing delays in providing results to clinicians. In recent years, rapid near patient drug susceptibility testing has become more widely available. In Peru, rapid near patient phenotypic drug susceptibility testing to multiple critical drugs was rolled out successfully, with associated improvements in clinical outcomes.⁴ In much of the rest of the world, despite issues with pricing of some test kits and problems with assays missing some rifampicin resistant strains,^{5,6} commercial genotypic rifampicin drug susceptibility testing, often performed near patient, has been adopted instead.

Bedaquiline is a key component of most modern rifampicin resistant



TONY KARLUMBA/AFP/GETTY IMAGES

Most phase 3 trials have been underpowered or taken a decade to produce results

TB regimens. Bedaquiline resistance is now reported in up to 20% of people with rifampicin resistant TB.⁵⁻⁹ As with other drugs used to treat rifampicin resistant TB,¹⁰ much bedaquiline resistance is transmitted instead of acquired.⁹

Currently, no scalable rapid near patient drug susceptibility test exists for bedaquiline and other critical new drugs. The current gold standard, laboratory based phenotypic drug susceptibility testing, is slow and prone to contamination.¹¹

Clinical trials

The emergence of resistance to new drugs requires new treatment regimens, with better options for people with bedaquiline resistant TB. With a growing number of drugs in development, the number of potential regimens is large. A range of regimens is needed to accommodate variations in baseline drug susceptibility, comorbidities, drug interactions, and other factors that restrict treatment choices.

Most phase 3 trials of rifampicin resistant TB treatment regimens have been underpowered or have taken a decade to produce results.¹⁸ While research funders should urgently invest in TB trials capacity, better operational and statistical efficiency could be achieved by transitioning from multiple small “regimen A versus regimen B” trials, to a single large platform trial.¹⁸ Modern platform designs could permit such

a trial to both have broad eligibility criteria and to compare the relative efficacy of multiple regimens.¹⁹

The choice of primary efficacy endpoints in phase 3 trials of rifampicin resistant TB treatment regimens is critical. The vogue for composite primary efficacy endpoints that are often dominated by non-microbiological events, such as treatment switches, is problematic. Including non-microbiological events in composite efficacy endpoints risks falsely concluding non-inferiority; biases results in favour of shorter regimens; and does not improve study power.²⁰ Future clinical trials should, therefore, try to demonstrate non-inferiority with respect to a purely microbiological primary efficacy endpoint, plus superiority in other domains important to people with TB and treatment programmes,^{22,23} such as tolerability and cost.

Funding cuts

We are witnessing unprecedented cuts to both research funding and international development assistance.^{24,25} Projections of the direct impact of cuts to TB programmes are stark: more than three million more people are expected to develop TB by 2035, with over a million additional deaths anticipated in the same period.²⁴ People with rifampicin resistant TB, which is costlier to diagnose and manage than rifampicin susceptible TB, might be disproportionately affected. Cuts to development assistance may also adversely affect the social determinants of TB, from conflict to food security. These cuts are a political choice, which healthcare professionals and affected communities must challenge if recent gains against rifampicin resistant TB are not to be lost.

Cite this as: *BMJ* 2025;390:r1983

Find the full version with references at <http://dx.doi.org/10.1136/bmj.r1983>

Tom A Yates, clinical lecturer

t.yates@ucl.ac.uk

Jessica L Potter, honorary senior clinical lecturer, University College London, UK

Rouxjeane Venter, postdoctoral research fellow, Stellenbosch University, South Africa

WHAT YOUR PATIENT IS THINKING

Recovering from stroke against the clock



Matthew Berryman describes the pressure he felt to recover within a defined timeframe following his haemorrhagic stroke

Around one week after having a haemorrhagic stroke, I was told by healthcare professionals that the six months following the stroke were the most important for recovery. After that time window, I should expect physical recovery to plateau. I received this information at a time when I was only able to wriggle the toes of my right foot. I was unable to speak at all, to ask even basic questions, of which I had so many: Would I walk again? Would I talk again?

Time boundaries

I felt under pressure to get started on rehabilitation right away, but I was delayed entering the rehabilitation facility because there wasn't a bed available, which increased my anxiety. I understood that, at that stage, the healthcare professionals couldn't give me a definitive prognosis, but I wish I hadn't been given such a rigid timeframe for recovery. It would have been better if someone had communicated that six months was an estimate for when most of my recovery was likely to occur with access to rehabilitation, rather than a hard deadline.

Here I am, more than two years after my stroke, still making progress. For instance, my touch typing—using all my fingers on both hands without looking at the keyboard—continues to improve. I'm now

able to speak more fluently and I stutter and stumble over words less than before. In writing this piece, every keystroke has felt like a small everyday miracle—I couldn't have typed it as quickly and accurately at the six or even 12 month mark post stroke.

I was lucky to have ongoing access to physiotherapists, occupational therapists, and speech therapists who worked with me to set meaningful and achievable goals. We focused on finding individualised tasks—like typing practice for writing software in particular and practising the violin in a mirror to watch my technique—that would help me meet those goals, and they encouraged me to keep going. It would have been easy to stop my extra practice after six months, but I have persevered and made further, meaningful improvements in a range of areas and skills.



PRIVA SUNDARAM

Small or incremental gains can have significant value

Inspiration and motivation

I bought myself a nice fountain pen and notebook as a motivation to take up regular writing practice, and my ability to write neatly and in cursive font is improving. I have returned to work where I give regular presentations in meetings. Colleagues tell me I speak clearly. I learnt to play the violin as a child and re-learned to play in the months and now years following my stroke. This is despite being told I would plateau after six months.

At a time when mental health is vital for recovery, it can feel disempowering to be given a limited period in which functional recovery should occur. Healthcare professionals can support people after a

stroke by communicating clearly that ongoing recovery is possible. They can also inspire and motivate sustained patient engagement in rehabilitative therapy by working with patients to set personally relevant goals and to indicate to the patient when each goal is met. For me it was reassuring that I was encouraged to set long term goals that were relevant to my life and took into account things I loved to do before the stroke. The occupational therapists broke these long term goals into short term achievable ones—for example, just holding the violin bow was a goal at one point—and they helped me track my progress over time, which kept me motivated.

There is often a balance between hope and hype in how healthcare professionals communicate the nature and timeframe of recovery. Patients need to feel empowered to explore continuing opportunities for rehabilitation, no matter how much time has passed since their stroke. This is not an attempt to over-sell what may be possible. Undoubtedly, not all abilities will return to pre-stroke levels. Rather, small or incremental gains can have significant value, and, compounded over time, will likely lead to improved quality of life.

Patient author
mattjb@me.com

Cite this as: *BMJ* 2025;391:r2349

WHAT YOU NEED TO KNOW

- Recovery after stroke is individual and can continue for years with ongoing rehabilitation efforts
- For some patients, intensive, repetitive rehabilitation approaches can enhance motor recovery, functional ability and quality of life, even in chronic stroke
- Healthcare professionals can encourage stroke survivors by clearly communicating the ongoing potential for recovery, avoiding time limit expectations

EDUCATION IN PRACTICE

- How might you encourage patients and caregivers to maintain long term engagement with rehabilitation therapies and exercise?
- How could you ensure that your understanding of stroke recovery timelines reflects best current evidence?

CASE REVIEW

Bilateral thumb nail deformities

A teenage boy presented with a two year history of deformities in the central parts of both thumb nails. He had previously been diagnosed with nail dystrophy at another hospital, but the underlying cause had not been identified and no specific treatment was provided. The patient was otherwise in good health with no relevant medical history.

On physical examination, the cuticles of both thumb nails were absent, the proximal nailfolds were keratinised, and the lunulae were enlarged. A distinct

longitudinal groove extended from the proximal nailfold to the distal tip of the nail. The radial edges of the groove were sharp, although the ulnar edges appeared smooth (figure). During the consultation, the patient was observed repeatedly rubbing the nail plates of both thumbs with the tips of his index fingers.

- 1 What is the most likely diagnosis?
- 2 What are the differential diagnoses?
- 3 How would you manage this patient?



Proximal nail fold hyperkeratosis of both thumb nails (a), sharp radial edge of nail groove (b), and smooth ulnar edge (c)

Submitted by Xinting Wang, Wenhao Chen, and Wenlong Hu
Parental consent obtained.

Cite this as: *BMJ* 2025;391:e084847

LEARNING POINTS

- Habit tic deformity arises from repetitive conscious or unconscious manipulation, classified as a body focused repetitive behaviour.
- Clinical features include longitudinal grooves, cuticle loss, hyperkeratosis, lunular enlargement, and asymmetric ridging.
- Management involves patient education, the use of protective barriers to minimise friction, and behavioural or drug interventions when needed.

PATIENT OUTCOME

See bmj.com.

Other differential diagnoses include onychomycosis, 20-nail dystrophy (trachyonychia), nail psoriasis, and nail lichen planus.

3 How would you manage this patient?

The first step in managing habit tic nail deformity is educating the patient about the condition. Once the patient ceases rubbing or picking at the affected nails, the nail deformity often resolves. To aid in breaking the habit, a physical barrier such as a bandage can be applied over the proximal nail fold or cuticle to prevent further trauma. For patients diagnosed with associated psychiatric conditions, such as obsessive-compulsive disorder or anxiety disorders, management could include cognitive behavioural therapy, habit reversal training, and selective serotonin reuptake inhibitors.

CASE REVIEW Bilateral thumb nail deformities

1 What is the most likely diagnosis?

Habit tic nail deformity is a form of body focused repetitive behaviour, and affected individuals might also exhibit onychophagia (nail biting) and trichotillomania (hair pulling). It is characterised by repetitive manipulation of specific body areas, particularly the nails. The characteristic clinical manifestation is a central longitudinal furrow extending from the proximal nail fold to the distal end of the nail plate. The proximal nail folds often exhibit keratosis or pigmentation.

2 What are the differential diagnoses?

The primary differential diagnosis is median canaliform dystrophy, which is characterised by a central longitudinal split in the nail plate that forms a groove that extends to the distal edge of the nail. The groove can be accompanied by lateral fissures, creating an inverted fir tree pattern. Median canaliform dystrophy usually preserves the integrity of the cuticle, which differentiates it from habit tic nail deformity. It is typically acquired, and often associated with trauma, but some familial cases have been reported.

3 How would you manage this patient?

In this case, an additional noteworthy feature was the sharp radial edges and smooth ulnar edges, likely owing to the directional pattern of the frictional behaviour.



Articles with a "learning module" logo have a linked BMJ Learning module at learning.bmj.com.



0.5 HOURS

You can record CPD points for reading any article. We suggest half an hour to read and reflect on each.