education

RESEARCH REVIEWS Fortnightly round up from the leading medical journals

Wired to avoid dementia

Coffee researchers are buzzing after finding that higher caffeinated coffee intake is associated with lower dementia risk. The prospective cohort study analysed data from 131 821 participants with a median follow-up of 43 years. The hazard ratio for dementia diagnosis was 0.82 (95% confidence interval (CI) 0.76 to 0.89) for those in the highest quartile of caffeinated coffee intake compared with those in the lowest quartile. Similar findings were reported for cognitive performance, and in tea drinkers.

JAMA doi:10.1001/jama.2025.27259

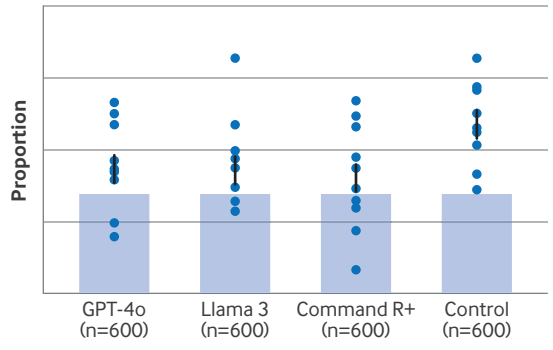
Off the cuff statistics

A cross sectional study from Finland provides some sobering statistics that may come in handy when older patients request shoulder scans. The study recruited a nationally representative sample of 602 adults aged 41 to 76 years old, and found that 99% of them had at least one rotator cuff abnormality on magnetic resonance imaging (MRI). Of the men and women in the sample, 25% had tendinopathy, 62% a partial thickness tear, and 11% a full thickness tear. Only full thickness tears were more common in those with shoulder symptoms than those without.

JAMA Intern Med doi:10.1001/jamainternmed.2025.7903

Risk of severe infections in people with obesity

A large multicohort study in the *Lancet* concludes that about one in 10 infection related deaths worldwide might be attributable to obesity. It found that people with obesity had a higher risk of fatal or non-fatal severe infection compared with people of healthy weight



The proportion of participant responses that identified relevant conditions after assistance from an LLM or a source of their choosing (control). Data are presented as mean values with unadjusted 95% confidence intervals for proportions. Markers indicate means for each scenario

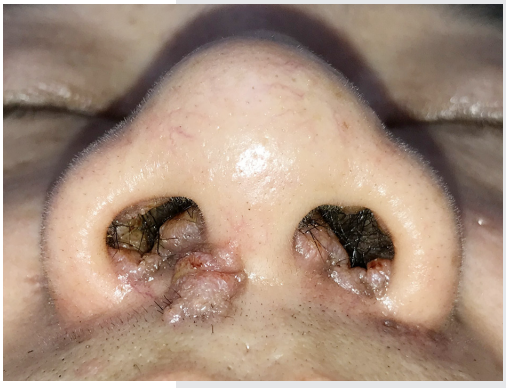
BEAN AM, PAYNE RE, PARSONS G, ET AL. *NAT MED* 2026;32:609-615. DOI:10.1038/S41591-025-04074-Y

LLM advice for the public

Much is made of how large language models (LLMs) can pass medical licensing exams with flying colours, but how well do they perform in real life? To explore this question, a new study randomised 1298 participants to ask for help with medical scenarios from an LLM or a source of their choice—for example, Google. The group using the LLMs only managed to identify a relevant differential diagnosis in 34.5% of cases—worse than the control group. Errors made by the LLMs included telling the UK based participants to call triple zero (the Australian emergency number), and suggesting to someone with symptoms of a subarachnoid haemorrhage to lie down in a dark room.

Nat Med doi:10.1038/s41591-025-04074-y

CLINICAL PICTURE



Painless lesions around the nostrils

A man in his 30s presented with a two month history of painless nasal lesions. Physical examination showed several reddish brown papules and plaques with keratinised surfaces in the nasal vestibule and below the nasal columella. He reported no systemic symptoms. He had a five year history of HIV infection, with laboratory tests done one month previously showing a serum HIV-1 RNA level of 132 000 IU/mL (reference range <250 IU/mL) and a $CD4^+$ count of 437 cells/µL (reference range 550 to 1440 cells/µL). He had never initiated antiretroviral therapy and reported episodes of unprotected intercourse with multiple sexual partners in the past six months.

Laboratory tests showed a positive result for *Treponema pallidum* particle agglutination, indicating past or present syphilis infection. A toluidine red unheated serum test (TRUST), a non-specific screening test for syphilis, showed a high antibody titre of 1:64—strongly suggestive of active, early syphilis. The patient declined a biopsy of the nasal lesions and a serum nucleic acid amplification test (NAAT) for *T pallidum*.

Nasal condyloma lata of secondary syphilis

(pooled hazard ratio 1.7, 95% confidence interval 1.7 to 1.8). Individuals with class III obesity (body mass index >40) had a three times higher risk of infection related hospital admissions and infection related death.

Lancet doi:10.1016/S0140-6736(25)02474-2

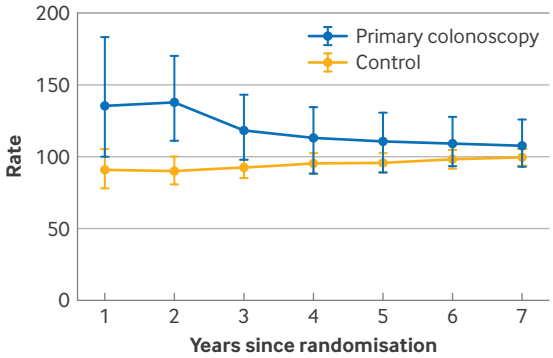
Early colorectal cancer screening trial results

The final findings from the SCREESCO trial of colonoscopy or fecal immunochemical testing (FIT) testing for colorectal cancer screening won't be published until the next decade. These will tell us whether these screening strategies led to any difference in colorectal cancer mortality at 15 years compared with a control group offered no screening. Early findings show higher rates of colorectal cancer diagnosis in the colonoscopy and FIT screening arms, although only for stage I and II cancer. In Sweden, the researchers randomised 278 280 people at the age of 60 to either be invited for colonoscopy, sent a FIT testing kit (and another one two years later, with a low cut off of 10 µg Hb/g), or have usual care (there was no national screening programme in Sweden).

Nat Med doi:10.1038/s41591-026-04225-9

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

Cite this as: *BMJ* 2026;392:s354



Yearly incidence rate (per 100 000 person years) of colorectal cancer in the primary colonoscopy arm of the SCREESCO trial

WESTERBERG M, LUDVIGSSON JF, METCALFE C, ET AL. INT MED 2026 DOI:10.1038/S41591-026-04225-9

was deemed the most likely diagnosis. Condyloma lata are a mucocutaneous manifestation of secondary syphilis, typically seen in intertriginous sites, such as the genitals and anus. Nasal localisation is rare and may be difficult to differentiate from viral warts. The patient was treated with a single dose of intramuscular benzathine penicillin G (2.4 million units), and the lesions resolved completely within one month.

Patient consent obtained.

Cite this as: *BMJ* 2026;392:e083518

Chunshao Zhang (448397422@qq.com); iayi Li, The Eighth People's Hospital of Shenzhen Longgang District, Shenzhen, China

MINERVA From the wider world of research

Sleep

Sleep is a risky business that leaves animals vulnerable to predators and environmental hazards. It also occupies time that could otherwise be spent foraging, mating, or caring for offspring. Yet it must serve a fundamental biological function, since all animals with nervous systems sleep. Even animals such as jellyfish and sea anemones—with nerve nets rather than brains—display sleep-like behaviour. One hypothesis is that sleep protects neuronal DNA by facilitating repair of damage that accumulates during wakefulness (*Nat Commun* doi:10.1038/s41467-025-67400-5).

The half life of clinical trial evidence

Reflecting on the role of beta blockers in secondary prevention of coronary artery disease, an article in *J Am Coll Cardiol* makes the point that, although clinical trials underpin rational therapeutics, they are products of their time (doi:10.1016/j.jacc.2025.12.002). Inevitably, trials are embedded in the prevailing therapies and baseline risks of the era in which they were conducted. As treatments and risk profiles evolve, even the most robust results can lose their relevance.

Paracetamol versus ibuprofen in infancy

Concerns that exposure to paracetamol in early life might increase the risk of eczema or wheeze are largely derived from observational studies. In a large randomised trial from New Zealand, infants were assigned paracetamol or ibuprofen when treatment was needed for fever or pain during the first year of life (*Lancet Child Adolesc Health* doi:10.1016/S2352-4642(25)00341-4). No meaningful differences in rates of eczema or bronchiolitis were seen between the groups.

The Eiffel Tower

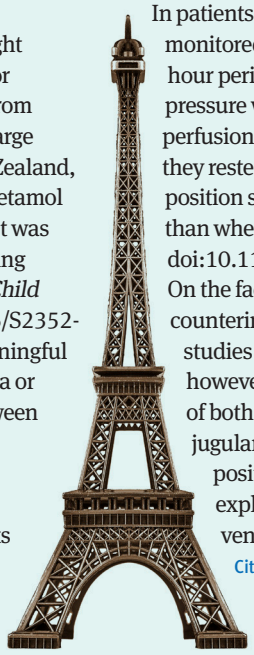
One of the quieter statements made by the Eiffel Tower is the ring of 72 French scientists' names engraved below its first platform, added at Gustave Eiffel's insistence for the tower's opening in 1889. All belonged to men. Paris has announced plans to display the names of 72 French women scientists on the tower as well. About time, thought Minerva (*Paris Presse* https://presse.paris.fr/communiques/marie-curie-sophie-germain-agnes-ullmann-decouvrez-la-liste-complete-des-72-noms-de-femmes-scientifiques-proposes-pour-rejoindre-la-frise-des-savants-sur-la-tour-eiffel).

Cannabis for neuropathic pain

Although cannabis based medicines are often tried for chronic neuropathic pain, a systematic review finds little evidence of benefit. Across 21 randomised trials involving more than 2000 participants, cannabis products did not convincingly improve pain by clinically meaningful margins compared with placebo (*Cochrane Database Syst Rev* doi:10.1002/14651858.CD012182.pub3). Small improvements were seen in some patient reported outcomes with combinations of tetrahydrocannabinol and cannabidiol, but these were not judged large enough to make a useful difference in daily life.

Sleeping posture and glaucoma

In patients with glaucoma monitored repeatedly over a 24 hour period, nocturnal intraocular pressure was higher and ocular perfusion pressure lower when they rested in a head raised position supported by two pillows than when supine (*Br J Ophthalmol* doi:10.1136/bjo-2025-328037). On the face of it, that sounds counterintuitive. Ultrasound studies in healthy volunteers, however, showed constriction of both internal and external jugular veins in the high pillow position, suggesting that the explanation lies in postural venous compression.



Cite this as: *BMJ* 2026;392:s357

Summary of WHO clinical practice guidelines for influenza

Per Olav Vandvik,[1 2] Arnav Agarwal,[1 3 4] Jamie Rylance,[5] Thomas Agoritsas,[1 6] Gordon Guyatt,[1 3] Yee-Sin Leo,[7 8 9] Steve McGloughlin,[10] Janet Diaz[5]

Full author details on bmj.com
Correspondence to: J Diaz diazj@who.int

0.5 HOURS

About this guideline

This *BMJ* Rapid Recommendation is a summary of a World Health Organization guideline published 12 September 2024. The full guideline is available in MAGICapp and in PDF on the WHO website.

Clinical questions

What is the role of medications in treating non-severe and severe influenza including zoonotic disease (novel influenza A), and in preventing infection among contacts? Which diagnostic testing strategies best enable rapid and accurate treatment decisions?

Context and current practice

New randomised controlled trial (RCT) evidence, ongoing concerns about zoonotic disease, and the increasing availability of rapid diagnostic tests require updated guidance.

Recommendations

Apply to seasonal influenza and zoonotic influenza. There are 29 recommendations; 21 related to antiviral medications and six to adjunctive therapies to prevent and treat influenza. Recommendations are stratified by severity of disease and risk of disease progression. For seasonal influenza, WHO conditionally recommends treatment within 48 hours of symptom onset with oseltamivir for severe illness, and baloxavir for patients at high risk of progression from non-severe to severe illness. WHO also conditionally recommends prophylaxis (using baloxavir, laninamivir, oseltamivir, or zanamivir) for anyone exposed to zoonotic influenza, and for those exposed to seasonal influenza who are at extremely high risk. The panel issued recommendations against the use of adjunctive therapies in patients with non-severe influenza (strong recommendation against antibiotics) and severe influenza (conditional recommendation against corticosteroids, macrolides, mTOR inhibitors, non-steroidal anti-inflammatory drugs, and passive immune therapy). A recommendation is made for diagnostic testing strategies in non-severe and severe influenza disease.

The evidence

Four systematic reviews of RCTs provided low to very low certainty evidence on benefits and harms of antiviral medications and adjunctive therapies. A systematic review of prognostic factors provided baseline risk estimates and information on individual risk factors for disease progression. A decision analysis model informed recommendations for testing based on alternative potential diagnostic pathways.

Influenza viruses cause an estimated annual one billion cases of acute respiratory disease including 3-5 million severe cases and 290 000-650 000 deaths.[1 2] Clinical management involves supportive and symptomatic care, with specific therapy directed by reliable identification of those with severe disease and those at high risk of developing severe disease. Differentiation from other viral and bacterial infection requires diagnostic testing; reference standard, RNA-based testing of respiratory specimens is far from universally accessible, although less sensitive and specific rapid diagnostic tests are increasingly available.

Randomised controlled trial (RCT) evidence for therapeutics continues to evolve, including new potential antiviral treatments.[3] Neuraminidase inhibitors (NAIs) have in vitro activity against seasonal influenza virus A and B and zoonotic influenza A.[4 5] Oral oseltamivir is the most widely studied and available. Others include inhaled laninamivir, intravenous peramivir, and inhaled zanamivir. Alternatively, baloxavir, a selective inhibitor of influenza cap-dependent endonuclease which can be administered as a single oral dose, has been approved in some jurisdictions for early treatment of paediatric and adult patients with uncomplicated influenza.[6]

The purpose of this article is to provide a summary of the WHO guideline published on 12 September 2024.[7] This WHO guideline replaced a previous version from 2022.[8] It includes recommendations on antivirals and immunomodulators for treatment of patients with influenza disease, and on chemoprophylaxis for people exposed to influenza virus. It also includes recommendations for the use of diagnostic tests for patients presenting to primary care, emergency departments, or equivalents with influenza-like illness. The box gives linked resources, including the full guidelines and the evidence informing the recommendations. These systematic reviews and the modelling study were commissioned by the WHO to explicitly answer the questions defined by the WHO guideline panel.

Key issues to consider when applying the recommendations

WHO definitions of influenza severity

This guideline applies to adults and children with influenza virus infection and those who are exposed to influenza viruses, irrespective of vaccination status. Recommendations differ based on the severity of influenza, according to WHO criteria. The systematic review of prognosis studies[13] informed baseline risk

thebmj Visual summary

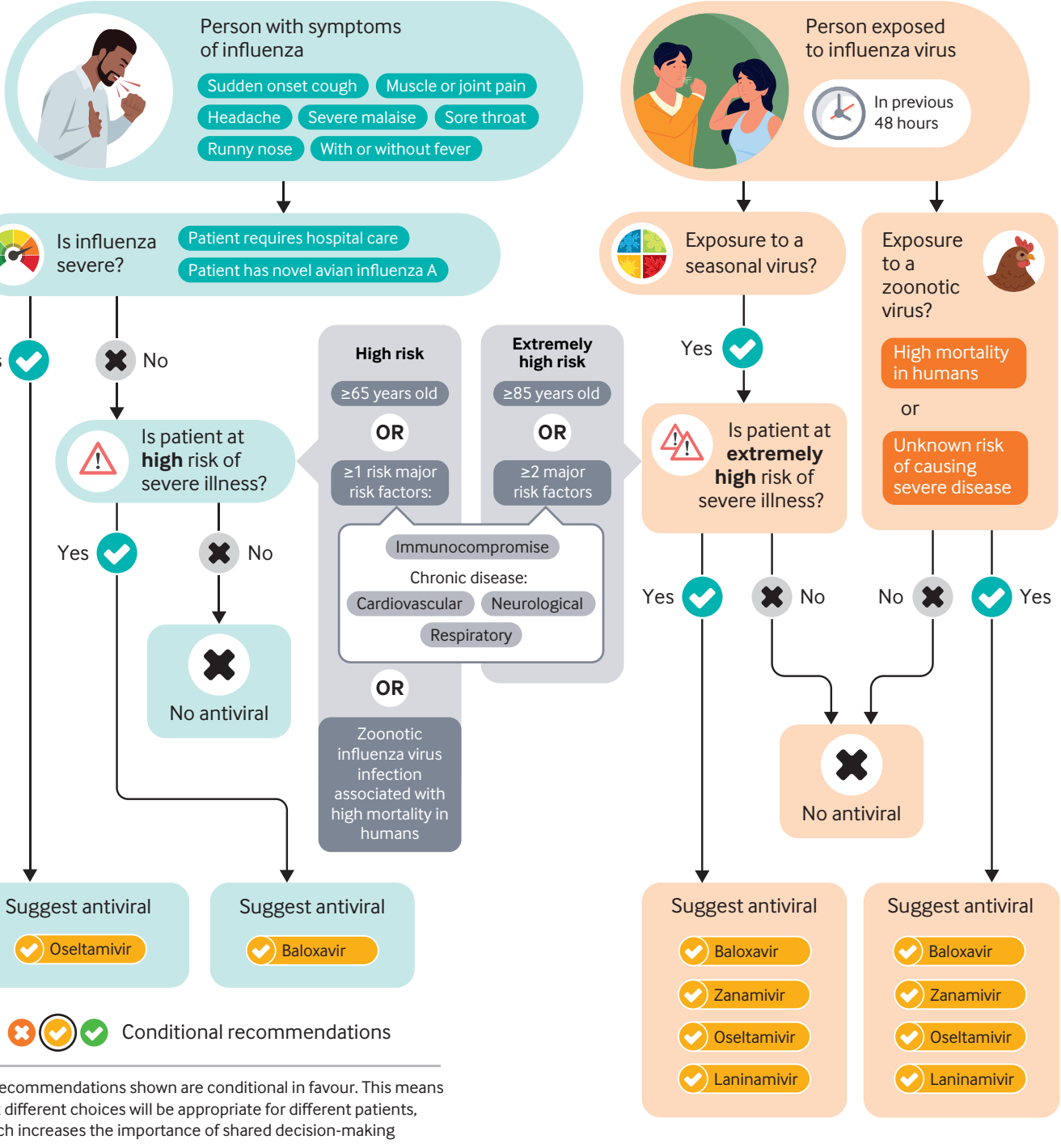
Rapid recommendation: Influenza

Clinical practice guideline on treatment and prophylaxis

See full guideline for recommendations on adjunctive therapies and diagnostics

MAGIC app
See more details of recommendations and evidence base

Guidelines from the World Health Organization suggest different antiviral treatments depending on disease severity, risks of developing severe disease, and exposures. This graphic outlines conditional recommendations in favour of antiviral treatments. However because of small benefits and uncertainty of the evidence, there are no strong recommendations in favour of any treatment. More information about conditional and strong recommendations against treatments can be found on the MAGICapp website using the links on this page



All recommendations shown are conditional in favour. This means that different choices will be appropriate for different patients, which increases the importance of shared decision-making

Linked resources in **this *BMJ* Rapid Recommendations cluster**

Full WHO guideline

- MAGICapp: https://app.magicapp.org/#/guideline/9184
- WHO portal: https://www.who.int/publications/i/item/9789240097759

Evidence informing the guideline

- Two systematic reviews and network meta-analyses on antivirals for treatment of severe and non-severe influenza patients[9 10]
- Updated systematic review on adjunctive immunomodulator treatments for treatment of patients with severe influenza[11]
- Systematic review of antivirals for prophylaxis for persons exposed to seasonal or zoonotic influenza viruses[12]
- Systematic review of observational data on prognosis which provided baseline risk estimates for hospital admission and death in patients with non-severe and severe influenza virus infections, including those with seasonal and zoonotic influenza A viruses associated with high mortality in humans.[13] This review also informed an updated list of independent risk factors associated with severe disease and mortality.
- Updated decision making model for diagnostic strategies for caring for patients with influenza virus infection (see Annex 2 in the full guideline)

This guideline contributes to the *BMJ* Rapid Recommendations series, which provides clinicians with trustworthy recommendations for potentially practice-changing evidence. *BMJ* Rapid Recommendations represent a collaborative effort between MAGIC and *The BMJ*.

Strength of recommendations and implications

Implications for…	Strong recommendation "We recommend…"	Conditional recommendation "We suggest…"
Patients	All or almost all people in this situation will want the recommended course of action and only a few will not	The majority of people in the situation would want the recommended course of action, but a substantial minority would not (or vice versa). Shared decision making should be emphasised
Clinicians	All or almost all patients should be prescribed the recommended course of action (or vice versa).	Different choices will be appropriate for different patients. Patients will need help to arrive at a management decision consistent with their values and preferences, with shared decision-making as an appropriate way to achieve this goal.
Policymakers	The recommendation could be adopted as policy.	There is a need for substantial debate and involvement of stakeholders.

estimates for hospital admission and death as well as individual risk factors associated with these outcomes:

- *Non-severe influenza* reflects the absence of any manifestation of severe disease and may include sudden onset of cough, headache, muscle and joint pain, severe malaise, sore throat, and rhinorrhoea, with or without fever. Most people recover symptomatically within a week without requiring medical attention.
- *Severe influenza* typically requires hospital admission and may include severe pneumonia, sepsis, septic shock, acute respiratory distress syndrome, multi-organ failure, and/or exacerbation of chronic medical conditions. Severe illness may, in some cases, require supplemental oxygen, invasive or non-invasive ventilation, and/or vasopressor therapy.

Disease caused by novel influenza A associated with high mortality or with an unknown risk of severe disease, is considered severe even if in the absence of the above criteria.

How to identify patients with non-severe influenza at high risk of hospital admission

Several recommendations pertain only to patients at elevated risk for severe disease (hospital admission). The systematic review of prognosis studies identified major risk factors and baseline risk estimates for hospital admission, as well as for mortality.[13] Those considered high risk have at least one major risk factor defined as an odds ratio >2.0 (that is, which increase the odds of hospitalisation at least twofold): age of 65 years or older, immunocompromising conditions, cardiovascular disease, neurological disease, and chronic respiratory disease. Baseline risk of hospital admission in these patients was estimated to be 21 per 1000 (2.1%). Patients considered extremely high risk include those aged 85 years or over, and those at any age with multiple (two or more) major risk factors.

Novel influenza A (zoonotic influenza) is associated with a high risk of mortality in humans and is considered severe disease even in the absence of risk factors. This includes infection with HPAI A(H5N1), HPAI A(H5N6) and HPAI and LPAI A(H7N9) viruses.

What is a conditional recommendation?

Most recommendations in this guideline are "conditional" in their strength. A conditional recommendation means the same as a "weak recommendation" (used in other *BMJ* Rapid Recommendations) with identical implications for practice.

The table provides interpretations of strong and conditional recommendations from the perspectives of patients, clinicians, and policymakers.

In this guideline (as detailed in the full version of this article on bmj.com and the methods section of the full guideline[7]), the WHO guideline panel considered the magnitude of benefits and harms, the certainty of evidence (high to very low) supporting estimates of the magnitude of benefits and harms, and their assumptions regarding values and preferences of stakeholders (in particular, patients infected by influenza virus).

The main reason why the strength of most recommendations was conditional in this guideline was due to a fine balance of benefits and harms in combination with low or very low certainty evidence.

Recommendations

The infographic summarises the recommendations in favour and against the use of antiviral medications. These are conditional in strength due to evidence of low or very low certainty for potentially small benefits and low likelihood of adverse effects.

The full guideline provides all 29 recommendations. These include recommendations on antiviral treatment and prophylaxis, adjunctive therapies, and diagnostic testing strategies. All treatment recommendations are based on systematic reviews, whereas diagnostic strategies are based on an updated decision model (Annex 2 in the full guideline[7]). These reviews and the decision model were commissioned by the WHO.

The accompanying infographic summarises 21 recommendations; six additional recommendations against adjunctive therapies and two recommendations

for diagnostic testing strategies not captured in the infographic are summarised below:

- *For adjunctive therapies*, WHO issued a strong recommendation against the use of antibiotics in patients with non-severe influenza with low probability of bacterial co-infection. WHO also issued conditional recommendations against adjunctive immunomodulatory therapies for patients with severe influenza, including corticosteroids, macrolides, mTOR inhibitors, non-steroidal anti-inflammatory drugs, and passive immune therapy.
- *For diagnosing patients with suspected seasonal influenza*, WHO issued a conditional recommendation for the use of nucleic acid amplification test (NAAT) or polymerase chain reaction (PCR) testing for patients with suspected severe influenza and a conditional recommendation for use of digital immunoassay (DIA) or NAAT for patients with suspected non-severe influenza who are at high risk of progression to severe influenza.

The full guideline provides complete recommendation statements with critical remarks, GRADE evidence summaries based on systematic reviews (see box) and decision aids, practical information, and justifications made by the WHO.[7] The guideline is available in multilayered digital formats through an online platform (https://app.magicapp.org/#/guideline/9184).

Applying recommendations

Recommendations provided need to be contextualised to real-world clinical practice. We present clinical vignettes illustrating some of the recommendations provided by the WHO in this guideline.

Clinical vignette—A 78 year old woman attended her primary care facility on her second day of symptoms. She has a fever, body aches and a sore throat, but no cough. She felt slightly more breathless than usual this morning, but arrived at the polyclinic on public transport. She has mild coronary artery disease which is appropriately treated, and experienced no recent angina. She has no contact with animals, and lives with her younger husband who is in good health. Several close friends were ill last week with similar symptoms. On examination, her oxygen saturations are 98%, and other vital signs are normal. There are no focal respiratory signs on examination. With suspected non-severe influenza in a patient at high risk of hospital admission (given her age and presence of ischaemic heart disease), a swab (digital immunoassay) was taken by the assessing doctor for molecular point-of-care influenza testing in the surgery, which was positive for influenza A. Other routine tests were taken.

The patient was prescribed baloxavir 80 mg single oral dose immediately for her non-severe influenza. Teleconsultation over the next five days showed that initial worsening of myalgia and headache was not associated with any symptoms that would require hospital admission. Other blood tests returned normal, and her symptoms began to improve on day three after consultation. Her husband, being a close contact but not having any factors associated with extremely high risk of severe illness, was not given chemoprophylaxis.

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

The panel included one patient with lived experience of influenza virus infection. Recognising this limitation in patient involvement, the WHO also allowed guideline panel members with direct personal experience of influenza to contribute with their perspectives while recognising limitations in considering the values and preferences associated with decision making.

Clinical vignette—A 62 year old woman presents to primary care within 36 hours of symptom onset. Presenting symptoms include a fever, cough, myalgia, and malaise during a period of known seasonal influenza circulation. She has well controlled hypertension but no other major comorbidities. She seems clinically stable, with normal oxygen saturation and no obvious signs of pneumonia.

In this setting, the clinician first assesses illness severity and risk of progression. Given the absence of severe disease features and no major risk factors, testing may not alter immediate management, which is likely to consist of watchful waiting, symptomatic care, and advice regarding when to return to seek care.

Clinical vignette—By contrast, a 78 year old man presenting to the emergency department with dyspnoea, hypoxia, hypotension, and bilateral infiltrates on chest imaging during influenza season meets the criteria for severe influenza. In this setting, the guideline conditionally recommends NAAT or PCR testing to support timely antiviral treatment and appropriate escalation of care. Given suspected severe influenza virus infection, the clinician should consider initiating a five day course of oseltamivir, ideally within 48 hours of symptom onset, in consultation with the patient through a shared decision making process.

Uncertainties and future research

There is a need for a better evidence based understanding of patients' values and preferences. Other key areas of uncertainty where more evidence is needed are summarised in the full guideline,[7] and encompass medications for which only low certainty evidence exists regarding benefits and/or harms, and modelling of outcomes for diagnostic strategies. Evidence is also lacking on key groups, including children, immunocompromised patients, and pregnant women. Safety data for baloxavir is an important priority.

Research networks should adopt efficient designs for generating evidence, including the use of "always-on platforms" (versatile research platforms, which can rapidly pivot to answer questions that arise), particularly for severe disease, and maximising the harmonisation of research protocols to allow patient-level data to be meta-analysed appropriately.

Competing interests: See bmj.com.

Cite this as: *BMJ* 2026;392:e087397

Find the full version with references at doi: 10.1136/bmj-2025-087397

STATE OF THE ART REVIEW

Evaluation and management of chest pain from cardiovascular causes in female patients

Deborah Diercks, Mengchen Cao, Mary McHugh, Caitlin Kibbey, Samia Farooqi

Emergency Medicine, University of Texas Southwestern Medical Center at Dallas, Dallas, TX

Correspondence to: D Diercks Deborah.Diercks@UTSouthwestern.edu

This is a summary of Evaluation and management of chest pain from cardiovascular causes in female patients. The full version can be read here: https://www.bmj.com/content/392/bmj-2025-086177

CPD READING

0.5 HOURS

Chest pain is a common presenting complaint in clinical practice and a leading cause of emergency department visits. However, the assessment and management of cardiac causes of chest pain in female patients present challenges owing to sex related differences in symptom presentation, underlying pathophysiology, and risk factors. Female patients are often underdiagnosed and undertreated, contributing to poorer cardiovascular outcomes. This review explores the current approaches to acute and stable chest pain in female patients while highlighting sex specific considerations in diagnosis, treatment, and differentials. Given the scope of this topic, the review focuses largely on cardiovascular causes of chest pain.

The studies we included differed on the use of terms "sex, female" and "gender, women". Recognising that these terms have distinct meanings, we are using "female patients" when citing studies in this paper.

Epidemiology

Cardiovascular disease is the leading cause of death among female patients worldwide, accounting for about one third of deaths in women globally. Approximately 30% of the total 81 765 myocardial infarctions registered in the UK between 2022 and 2023 occurred in female patients.[6] Additionally, normal coronary arteries or non-obstructive coronary artery disease (CAD) is more prevalent in female patients with suspected ischaemic heart disease (up to 65%) than in male patients (up to 32%).[7]

WHAT YOU NEED TO KNOW

- The assessment and management of chest pain in female patients must take into account clinically important differences in diagnosis, treatment, and outcomes.
- Established diagnostic algorithms, risk stratification tools, and biomarker thresholds might not adequately reflect the pathophysiological and clinical features seen in female patients, leading to delayed recognition of serious cardiac events and suboptimal care.
- Management strategies must consider biological differences as well as social and systemic factors that affect access to care for female patients.

Presentation

Symptoms

Historically, female patients were under-represented in research defining the characteristics of myocardial infarction. As research aimed to close this gap, the nuances of presenting symptoms of chest pain in female patients have varied. Guidelines have emphasised that female patients present with "atypical" chest pain.[8] Poorer outcomes for acute coronary syndrome (ACS) in female patients were believed to result from these atypical presentations leading to delayed diagnosis and treatment.[3 9] Recent prospective research has shown that typical symptoms are more common and have greater predictive value for female than male patients.[9]

A subset analysis of a prospective cohort study defined typical pain as chest, arm, or jaw pain with descriptors including dull, heavy, tight, pressure, ache, squeeze, crushing, or gripping. Atypical chest pain was characterised as epigastric or back pain or pain described as burning, stabbing, indigestion-like, or any other description.[9] This study included 1941 patients with suspected ACS and found that chest pain was the most common presenting symptom, reported by 92% of female and 91% of male patients. Pain with typical descriptors, the presence of radiation, and additional symptoms were all more common in female patients with suspected ACS.[9]

In summary, female patients are as likely as male patients to experience chest pain as their primary symptom of ACS, but they also represent a larger portion of patients presenting with ACS without chest pain. Early attempts to simplify the notion that female patients have atypical symptoms did not serve most patients, and clinicians should recognise atypical presentations in ACS for both female and male patients.

Risk factors

Assessment of risk factors is essential for evaluating chest pain in female patients. Oestrogen plays a dynamic role as a risk factor for ACS. More inclusive research indicates that certain risk factors for atherosclerotic heart disease are more present in female than male patients, including tobacco use, type 2 diabetes mellitus, and psychological risk factors such as anxiety and depression.[2 4 15] In addition, family history of diabetes has a stronger association with acute myocardial infarction (AMI) in young female than young male patients.[11] These data are crucial in acute settings when using risk stratification tools and in primary care for risk factor mitigation.

Box 1 | Presentation of acute coronary syndrome in female patients

Symptoms

- Historically labelled "atypical," but recent data show that typical chest pain (chest, arm, jaw pain—dull, tight, pressure, ache) is common
- Female patients report more associated symptoms (nausea, dyspnoea, fatigue, palpitations, neck/jaw/back pain)

Risk factors

- Higher prevalence of tobacco use, diabetes, anxiety, and depression
- Family history of diabetes carries stronger association with acute myocardial infarction in young female patients

Presentation delays

- Female patients often present >3 hours after onset
- Barriers include poor symptom recognition, underestimation of risk, focus on self-treatment, longer emergency medical services response, and lower prehospital care (aspirin, electrocardiography, transport)

Delays to presentation

Compared with male patients, female patients have a delayed presentation for evaluation of their chest pain symptoms, which may contribute to worse outcomes.[16 17] Female patients are more likely to present later than three hours after chest pain onset. In a study of patients who had ST elevation myocardial infarction, female sex was independently predictive of presentation greater than 90 minutes from symptom onset.[11] In a qualitative study of female patients who had experienced ACS, explanations for the delay in presentation included lack of recognition of symptoms, lack of acknowledgment of risk factors for ACS, and focus on treating symptoms instead of seeking care.[18 19] Even with common chest pain symptoms, female patients were less likely than male patients to intend to seek help even for typical pain, despite being more likely to identify these symptoms as cardiovascular.

Differences in prehospital treatment exacerbate this delay in presentation. A large registry study from China also found that female patients had longer times from symptom onset to arrival of emergency medical services (EMS).[19] Another study showed that female patients were less likely to receive guideline directed care across multiple measures including EMS transport, prehospital aspirin or analgesia, and electrocardiography.[20] In one EMS system, initiatives aimed at narrowing the gap in care for essential interventions, such as obtaining an electrocardiogram, showed improvement but did not entirely eliminate the gap.[21] Despite awareness of these problems regarding presentation of acute chest pain in female patients, sex differences persist (box 1).

Diagnosis

Accurate interpretation of diagnostic tests is essential when evaluating patients with chest pain. However, sex based physiological differences may complicate the use of universal diagnostic algorithms (box 2).

Electrocardiography

Differences in physiology for female patients lead to challenges to using the same diagnostic testing and algorithms as for male patients. Lower QRS voltage from smaller cardiac muscle, effects of endogenous oestrogen, and even shifting oestradiol concentrations during the menstrual cycle may affect the severity of electrocardiography based ischaemia.[23 24] Population based studies have reported that after puberty, female patients have a longer QTc than male patients.[25] Recent studies have suggested that QTc may be reflective of microvascular disease, and understanding these differences may be clinically relevant.[23 26] In AMI, new ST elevations in V2-V3 have different cut-off points between sexes: ≥2 mm for male patients ≥40 years, ≥2.5 mm for male patients ≤40 years, and ≥1.5 mm in all female patients.[27]

Troponin

High sensitivity cardiac troponins (hs-cTn) are increasingly standard of care for the diagnosis of AMI. When a sex specific value is used, female patients have significantly lower 99th centile cut-offs.[29 30] Despite this, extensive evidence for improved diagnosis of AMI with sex specific cut-off values for hs-cTn does not exist. A randomised controlled trial that evaluated the use of sex specific thresholds for hs-cTnI reported that these thresholds increased the identification of myocardial injury by 42% in female patients and 6% in male patients.[33] However, other data suggest that sex specific thresholds in hs-TnT did not substantially affect the diagnostic accuracy for AMI. These variations in data may be related to differences in populations, the use of specific troponin assays, or the inclusion of serial testing.

Box 2 | Diagnosis and management of acute coronary syndrome in female patients

Diagnosis

- Electrocardiogram—sex differences in voltage, QTc, ST segment changes
- High sensitivity troponin—female patients have lower normal cut-offs
- Stress tests—less sensitive/specific in female patients
- Imaging—positron emission tomography is better than single photon emission computed tomography; computed tomography with coronary artery calcification improves accuracy
- AI tools—show promise but often undertested in female patients

Acute treatment

- Goal directed medical therapy—cornerstone of therapy
- Nitrates—underused prehospital
- Dual antiplatelet therapy—bleeding risk higher in female patients
- Anticoagulation—low molecular weight heparin, unfractionated heparin, bivalirudin; with bleeding risk considerations
- Fibrinolytics—similar outcomes by sex
- Percutaneous coronary intervention and coronary artery bypass grafting—female patients less likely to receive; more early complications

Chronic coronary artery disease and secondary prevention

- Goal directed medical therapy and symptom management—standard approach
- Secondary prevention—female patients less likely to get β blockers or angiotensin converting enzyme inhibitors or to attend cardiac rehabilitation
- Novel agents—ezetimibe, proprotein convertase subtilisin/kexin type 9 inhibitors, bempedoic acid; show similar low density lipoprotein cholesterol reduction but sometimes lower target achievement in female patients
- Dual antiplatelet therapy—limited duration helps to reduce bleeding

Treatment

Treatment recommendations for obstructive CAD have remained relatively stable over the years. The foundation remains goal directed medical therapy, and acute medical management and revascularisation guidelines depend on the presence of occlusive myocardial infarction, as well as acuity, presentation, and comorbidities. Although these recommendations have been extensively investigated, a dearth of research into the specific needs of female patients remains.

Secondary prevention

Female patients are less likely than male patients to have secondary prevention drugs prescribed, including established treatments such as β blockers and angiotensin converting enzyme inhibitors.[60-62] Female patients are also less likely to attend cardiac rehabilitation or adhere to prescribed drugs on follow-up.[63 64]

Specific diagnoses

Myocardial infarction with non-obstructive coronary arteries (MINOCA)

MINOCA is a subtype of myocardial infarction that is characterised by an absence of major obstructive CAD. It occurs in about 6-8% of patients with myocardial infarction and disproportionately affects female patients.[71] A systematic review of 28 studies of patients with myocardial infarction who underwent qualitative coronary angiography found that in patients with MINOCA, the proportion of female patients was 43%, but female patients constituted 23% of those with myocardial infarction with CAD.[72] Causes of MINOCA include coronary plaque disruption, coronary artery vasospasm, coronary artery dissection, coronary artery thromboembolism, type 2 myocardial infarctions, and microvascular disease.[73-75] In a prospective observational study of female patients with MINOCA, 75% were found to have an ischaemic cause.[76] Patients with MINOCA were more likely to have elevated C reactive protein, B-type natriuretic peptide, and high density lipoprotein than patients with myocardial infarction with obstructive coronary arteries.[77]

For treatment, current American Heart Association guidelines focus on supportive care, cardioprotective drugs and lifestyle adjustments like those for obstructive CAD, and targeted therapies for the cause of MINOCA.[73]

Spontaneous coronary artery dissection (SCAD)

SCAD occurs when tearing of the arterial wall creates a false lumen and haematoma leading to potential obstruction of blood flow. Whereas 2-4% of patients with ACS have SCAD,[79 80] female patients comprise approximately 80-90% of SCAD cases.[81] SCAD tends to affect younger women, causing up to 45% of ACS in female patients under 50 years of age.[82] It is the most common cause of myocardial infarction in pregnancy and the postpartum state and occurs more frequently during the last trimester and within the first week of delivery.[83] Fibromuscular dysplasia, connective tissue disorders, and stress predispose to SCAD.[79 81 82 84] The diagnosis of SCAD is made with coronary angiography, and further testing with optical coherence tomography or intravascular ultrasonography can be considered if the diagnosis is unclear.[85]

Management of SCAD is primarily conservative and supportive care, as follow-up of SCAD lesions has shown that most will spontaneously heal within 30 days.[87] Guidelines recommend reserving percutaneous coronary intervention or coronary artery bypass grafting for patients with haemodynamic instability, ongoing ischaemia, or left main dissection.[79 82 85] Medical management of SCAD involves the use of β blockers (thought to reduce shear force on coronary arteries) and aspirin.[89] The role of dual antiplatelet therapy in patients managed conservatively is unclear.[84 90] Patients with SCAD who have undergone percutaneous coronary intervention should be started on dual antiplatelet therapy.[82 91]

Takotsubo syndrome

Takotsubo syndrome is a condition that mimics AMI, characterised by transient left ventricular regional dysfunction, ischaemic electrocardiographic changes, and elevated cardiac biomarkers in the absence of significant CAD. It is often triggered by emotional or physical stress.[92-94] The majority of cases occur among postmenopausal female patients.[93 94] Takotsubo syndrome accounts for 1.7-2.5% of patients with ACS and 5-6% of female patients presenting with suspected ST elevation myocardial infarction.[93 95]

The most common symptoms of Takotsubo syndrome are chest pain, dyspnoea, and syncope, which are usually indistinguishable from AMI.[96] Given the variety of potential physical triggers, symptoms related to the trigger may dominate the initial presentation.[97] Some patients present with symptoms related to complications of cardiomyopathy.[96 97]

Given that Takotsubo syndrome may initially resemble ACS, the initial management should focus on excluding and treating possible ACS with antiplatelet agents, anticoagulation, vasodilators, continuous electrocardiographic monitoring, and urgent coronary angiography.[97]

Aortic dissection

Approximately 20% of thoracic aortic aneurysms and dissections are associated with a family history of dissection. X linked inheritance patterns have been observed, predominantly consistent with X linked dominance.[99] The lower incidence in women may be due to the protective effects of female sex hormones. Older female patients have stiffer aortas with exaggerated systolic pulse amplification, potentially contributing to the development of thoracic aortic aneurysms and dissections.[98]

Female patients often present with type A dissections, whereas male patients present with both type A and type

A dearth of research into the specific needs of female patients remains

B dissections.[98] Studies evaluating type B dissection showed that male patients were less likely to be treated conservatively than female patients and had similar outcome differences to type A dissection.[104] These studies showed no differences in in-hospital outcomes after thoracic endovascular aortic repair.[103]

Myocarditis/pericarditis

Myocarditis and pericarditis can present with acute and recurrent chest pain syndromes. They share overlapping causes and may represent a continuum of disease. Female sex has been identified as a possible risk factor for cardiovascular immune related adverse events.

A systematic review and meta-analysis of 11 studies including 34 791 patients with myocarditis reported that most present with chest pain and normal ejection fraction, whereas 25% can present with heart failure or arrhythmias.[119] No differences were seen in risk of stroke, atrial fibrillation, or left ventricular ejection fraction.[107]

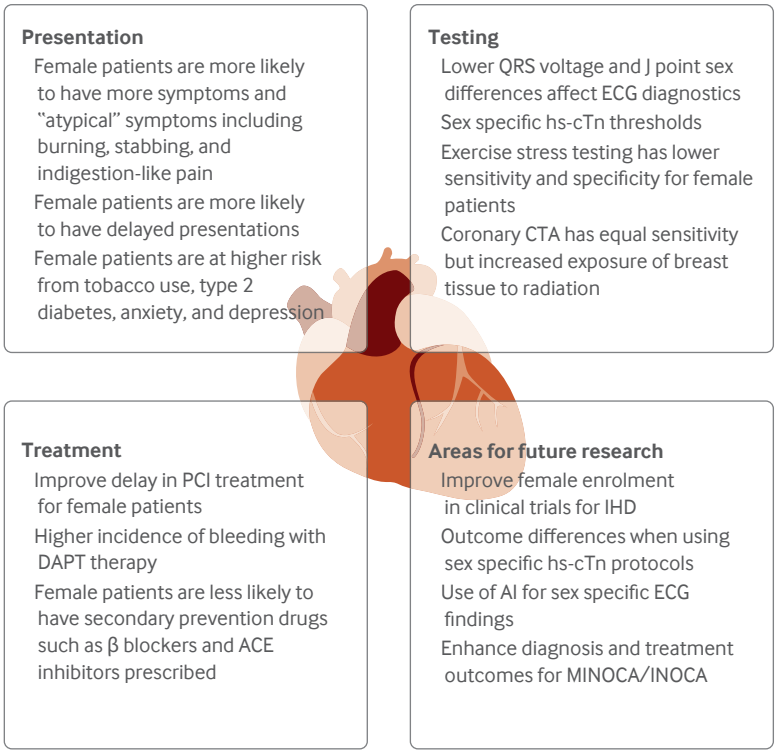
Current American Heart Association guidelines recommend that investigation of patients with acute chest pain and myocardial injury includes cardiac magnetic resonance imaging, transthoracic echocardiography to identify signs of myopericarditis, and contrast cardiac computed tomography to assess pericardial thickening,[120] as well as C reactive protein; recent published guidelines for the management of pericarditis do not provide any sex specific recommendations or discussion.[121]

Valvular disease

Differences also exist in valvular heart disease between female and male patients. Mitral valve disease is more prevalent in female patients, especially in those with rheumatic disease, with mitral valve stenosis and mitral valve prolapse being more common in female patients. At presentation, female patients may have symptoms, and, like female patients with aortic stenosis, they seem to have a higher rate of pulmonary hypertension than male patients.[122] Female patients with mitral valve prolapse are less likely to undergo surgical repair than male patients, and female sex has been associated with worse outcomes in mitral valve surgery.[111]

Tricuspid regurgitation is more prevalent in female patients; however, it can be underdiagnosed and undertreated. Prognosis is poor in both sexes, but female patients have shown increased benefit from early surgery.

Female patients with aortic stenosis tend to have smaller aortic valve area, more concentric left ventricular remodelling, and greater diastolic dysfunction, even with similar transvalvular gradients.[114] Cardiac symptoms at presentation are present in both sexes but are often more pronounced in female patients.[123] This may be due to age at presentation or the presence of concentric left ventricular hypertrophy. Smaller aortic annulus and root dimensions may lead to higher rates of inaccurate measurements, resulting in delayed diagnosis.[115] Differences in aortic valve calcification exist, with female patients having less calcific load after adjustment for body surface area.[115] Young female patients with bicuspid aortic valves may experience severe aortic stenosis without significant valvular calcium. Despite presenting with more symptoms, female patients have better survival after transcatheter aortic valve replacement but also higher rates of procedural complications.[114]



Summary of chest pain from cardiovascular causes in female patients. For full description see bmj.com

Hypertrophic cardiomyopathy

Hypertrophic cardiomyopathy is a genetic disorder characterised by thickening of the heart muscle, which can lead to symptoms such as chest pain, shortness of breath, or sudden cardiac death.

Recent guidelines on the treatment of hypertrophic cardiomyopathy include specific recommendations by sex. These recommendations advocate for the use of age and sex adjusted exercise capacity measurements to prompt consideration of advanced therapies for left ventricular outflow tract obstruction. Although no sex specific treatment recommendations were provided, the guideline recommended that algorithms use the presence of obstruction and symptoms as guides for treatment. However, it does provide specific recommendations for management of hypertrophic cardiomyopathy in pregnant patients; specifically, shared decision making should convey that maternal mortality with pregnancy is low and cardiac events usually occur in those with pre-existing conditions.[126]

Special patient populations

Box 3 summarises the key features and clinical considerations in special populations.

Older people

Although oestrogen mitigates cardiovascular risk in the younger female population, this protective effect diminishes at the onset of menopause. Reproductive

Although oestrogen mitigates cardiovascular risk, this protective effect diminishes at the onset of menopause

and ovarian age, determined using age at menopause as a proxy for cumulative ovarian ageing, seem to play an important role in the increased risk of cardiovascular disease as women age.[8 127-129] Development of metabolic syndrome, hypertension, and insulin resistance seem to be more closely linked to chronological age.[128]

When presenting with AMI, age >65 years and female sex are associated with delays to presentation.[130-133] Although the absence of typical chest pain has been identified as a contributor to delay in presentation,[134] it does not account for the significant age and sex difference noted.[130]

Absence of chest pain in AMI, as well as atypical symptoms, does increase with age.[134] Patients in the Worcester Heart Attack Study were stratified into five age groups; although chest pain remained the most common complaint among patients of all age groups, the proportion of atypical symptoms, including shortness of breath, weakness/fatigue, abdominal pain, and syncope, increased linearly with age.[134]

Guidelines

Several guidelines and risk stratification tools exist for the diagnosis, treatment, and prognosis of cardiac chest pain, some of which include female focused recommendations.

The 2025 American College of Cardiology/American Heart Association/American College of Emergency Physicians/National Association of Emergency Medical Services Physicians/Society for Cardiovascular Angiography and Interventions guidelines for ACS acknowledge that differences may exist in hs-cTn cut-off values between male and female patients; however, no recommendations are made regarding the use of sex specific hs-cTn.[13] These guidelines recommend increased use of cardiac rehabilitation, especially for female patients, who have been shown to have lower referral rates for this intervention. Guidelines from 2021 by this group discuss differences in symptomatology as well as preferred cardiac testing methods for pregnant women.[165]

Box 3 | Features and considerations in special populations

Older people

- Older age at myocardial infarction presentation
- More atypical symptoms
- Greater cognitive/functional impairment
- Less likely to undergo invasive management despite similar or higher risk

Polycystic ovary syndrome

- High prevalence of metabolic syndrome and insulin resistance
- Higher risk of cardiovascular disease events even independent of body mass index
- Long term risk monitoring needed

Peripartum

- Pregnancy/postpartum shifts increase risk of myocardial infarction
- Spontaneous coronary artery dissection is a major cause of myocardial infarction
- Drug/radiation safety concerns limit treatment options
- Adverse pregnancy outcomes (eg, pre-eclampsia, gestational diabetes mellitus) indicate long term cardiovascular disease risk

The 2023 European Society of Cardiology guidelines on the assessment and management of patients with ACS state that no current recommendations are available for differences in treatment based on sex.[67] However, they do include sections on SCAD and MINOCA, which disproportionately affect women. The guidelines also highlight the differences in treatment for pregnant women with ACS. The European Society of Cardiology calls for increased representation of female participants in randomised controlled trials and increased use of cardiac rehabilitation for female patients, and urges people to be wary of bias.

Competing interests: See bmj.com.

Cite this as: *BMJ* 2026;392:e086177

Find the full version with references at doi: 10.1136/bmj-2025-086177

PATIENT PERSPECTIVES

Taking into account patients' lived experiences with chest pain, we share the perspectives of three women, particularly highlighting what they would like their doctor to know.

A 40 year old woman presented to the emergency department with epigastric pain radiating into her chest. She waited 24 hours after the onset of her symptoms to seek care and was ultimately given a diagnosis of acute myocardial infarction

- Her delay to presentation was influenced by an initial misattribution of her symptoms to gastroesophageal reflux, as she found it difficult to believe that she could be having a heart attack. Furthermore, she considered her husband and daughter's respective schedules, believing that it would be less disruptive to present on a Saturday morning instead of a Friday afternoon
- Following discharge from the hospital, she was referred to cardiac rehabilitation but was hesitant to attend. Scheduling appointments would be difficult owing to her personal work schedule. In addition, she feared that she would be the only younger woman among a group of older men undergoing cardiac rehabilitation
- She was concerned about her future health, worried that she may have another myocardial infarction or misattribute symptoms that may lead to another delay in presentation.

A 35 year old woman experienced a spontaneous coronary artery dissection during her third trimester of pregnancy

- She felt a sense of betrayal by her own body and mourned the loss of a "normal" postpartum experience
- She feared that the stress and sleeplessness of caring for a newborn may trigger another cardiac event
- She wished a medical provider would have spoken with her at length about the risks and benefits of breastfeeding her newborn, having assumed that breastfeeding was absolutely contraindicated.

A 72 year old woman presented to the emergency department with three days of fatigue and nausea that began after she planted flowers in her garden. She was found to have non-ST segment elevation myocardial infarction

- Despite the fact that she typically had good exercise tolerance and had never before experienced these symptoms while gardening, she initially attributed her symptoms to her advancing age and presumed she was simply becoming frail
- Once given a diagnosis of a myocardial infarction, she feared a potential loss of her independence, having lived alone up until that point. If she decided to live with one of her adult children after this event, she could lose her much valued autonomy
- For several months following her discharge, she became anxious and hypervigilant, concerned that any vague symptom could be a harbinger of much more serious pathology. As a result, she limited many of the outdoor activities (including gardening) that she had previously enjoyed.

EDITORIAL

Refining diagnostic work-up for low back pain

Greater recognition of "non-spine" causes and impact on urgency of care escalation is needed

Low back pain guidelines have advocated essentially the same simple diagnostic classification as standard of practice for the past 30 years.[1 2] Most guidelines recommend classifying patients presenting with a complaint of low back pain into one of three categories: non-specific low back pain (when the precise underlying cause cannot be identified), radicular syndromes, or serious pathology.[1-4] Despite its long use, this approach has several limitations and may be too simplistic to guide satisfactory diagnostic work-up.

Non-spine causes

Most guidelines do not acknowledge the category for patients whose low back pain arises from a non-spine condition. Such conditions include renal and gastrointestinal disorders, other musculoskeletal conditions (such as hip osteoarthritis), and fracture beyond the lumbar spine, all of which can present as low back pain. Among the 28 low back pain guidelines published since 2018 that provide recommendations on diagnosis or assessment, only eight[7-14] explicitly offer a category for non-spine conditions as possible causes.

This is an important omission, as observational studies in Australian emergency departments have found that 21% to 58% of patients presenting with low back pain were subsequently diagnosed with non-spine conditions.[15 16] Similarly, a retrospective analysis of patients from one UK NHS Trust showed that, of 3872 patients presenting to the emergency department with low back pain on arrival over a year, 834 (22%) were diagnosed with a non-spine condition.[17]

Urgency of care escalation

The diagnostic classification systems proposed in many current low back pain guidelines do not clearly specify the degree of urgency for care escalation. For example, guidelines typically include only one category—serious (or specific) pathology—for low back pain attributed to identifiable underlying conditions.[19] Indeed, some conditions within the serious pathology category are potentially life threatening, such as epidural abscess or cauda equina syndrome, and require urgent care escalation. However, for other conditions such as axial spondyloarthritis, there may be less urgency. Similarly, some non-spine conditions presenting as low back pain require immediate action to prevent serious complications (such as acute pyelonephritis), but others (such as rib fracture, gastroenteritis) do not. The lack of explicit recommendations regarding the urgency of care escalation, including referral to secondary care or a specialist, may result in delayed treatment for those who require urgent attention and compromise patient safety.

Primary care guidelines should not be directly applied to emergency department and inpatient settings

Crystian B Oliveira, research fellow crystian.oliveira@sydney.edu.au

Gustavo C Machado, associate professor

Chris G Maher, professor, Institute for Musculoskeletal Health, Sydney Local Health District, Sydney, New South Wales, Australia

Frances M K Williams, professor, King's College London, London, UK

Karen Tambree, patient representative, Australia & New Zealand Low Back Pain Research Network (ANZBACK), Sydney, New South Wales, Australia

Case mix varies substantially across healthcare settings. These differences affect the probability that a patient presenting with low back pain has a condition requiring urgent escalation of care, particularly when considering the presence of "red flags" (alerting features that may indicate the presence of underlying pathology). For example, among patients with low back pain, the prevalence of vertebral fractures is 0.7% in primary care,[20] 4% in emergency departments,[21] and 14% in hospital inpatients.[22]

A history of severe trauma increases the chances of fracture from roughly 7% in primary care to 29% in the emergency department, and up to 62% in hospital wards. In primary care, pathologies requiring urgent care are so rare (accounting for less than 1% of presentations)[20] that the presence or absence of a single red flag may not change management.

These differences make it clear that primary care guidelines should not be directly applied to emergency department and inpatient settings.[24]

Moving forward

Low back pain guidelines should adopt a more nuanced approach to guide diagnostic work-up. New guidelines must recognise that low back pain may arise from non-spine conditions, and the urgency of care escalation should be made more explicit. Decisions about urgency should be guided by the strength of evidence supporting a suspected diagnosis and the potential consequences of delayed treatment.

Recommendations should, therefore, explicitly account for differences in case mix across healthcare settings. One approach is to include setting-specific guidance within dedicated sections of guidelines when appropriate.

There is also a need for additional diagnostic research, across different countries and settings, to investigate the case mix for each category to better guide the development of referral care pathways. As healthcare systems vary greatly across different countries, local initiatives are also needed to ensure that a diagnostic classification considering non-spine conditions and the urgency of care will appropriately guide management of low back pain in that country.

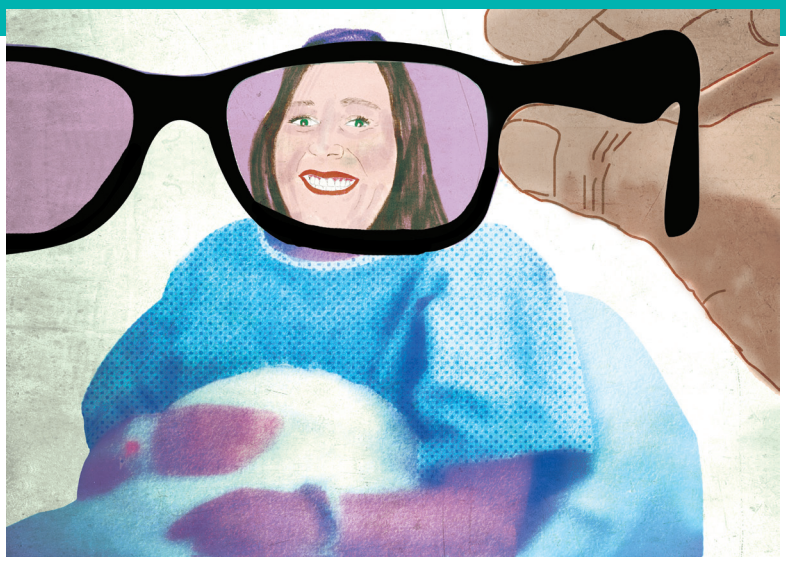
Cite this as: *BMJ* 2026;392:s353

Find the full version with references at http://dx.doi.org/10.1136/bmj.s353

WHAT YOUR PATIENT IS THINKING

See me as a person, not a patient

Siobhan Fennell describes how healthcare professionals' compassion and understanding supported her with a long term condition



PRIYA SUNDRAM

CPD READING
0.5 HOURS

I was diagnosed with multiple sclerosis (MS) in 1999. This finally explained why I was no longer the woman I wanted to be.

Having loved dancing, I was now using all my energy picking myself up after falling over. People were laughing at me, rather than with me. Blurry eyed, I tried to read documents in meetings, only to fall asleep and wake to my colleagues' laughter. Playing with my young child became an effort, and my sexuality seemed lost, though the love was no less. I sat exams for my masters degree with an eye patch and crutches.

I had been sickeningly healthy all my life. Now my body was not my own and I had lost control, but finally I knew why. My diaries from the time detail how terrified I was as I underwent different treatments. Physically, I slowly improved, but mentally I lost myself. Very few healthcare professionals took time to see who I was under the diagnosis. I felt that the real "me" was leaving. That was my first experience of being a patient rather than a person.

Finding myself

Nights in hospital were long and lonely. I questioned: why me, and why now? I wondered how I would cope, and if there were space for self-pity. I had made plans for the mundane, the trivial, and for survival, but when the darkness of night made its entrance, those plans became less. Reflection and morosity took hold until the light of day forced the strength to face another cycle.

But some healthcare professionals helped. One nurse spent half the night in conversation, listening to my fears and concerns, among other things. A healthcare assistant dyed my hair and we laughed hilariously, which made me feel human again. Physiotherapists talked to me as they gave me my treatments, and I became friends with the cleaning team while they worked. As the rehabilitation health professionals listened to my sadness and helped me find my strength, I found myself again, albeit as different from the person I was before. It felt as though MS had become a member of my family.

Value in continuity

Over the years, I have been empowered by the social model of disability. This reframes disability as created by barriers in society, rather than as deficits in an individual. To help overcome these barriers and

When I am an inpatient, my assertiveness deserts me

meet my needs, my healthcare team and I have learnt together, and we have a good relationship.

Continuity in the team has been invaluable. When in hospital, patients often have to describe and introduce themselves, time and again, to new staff. This is exhausting. When I am an inpatient, my assertiveness deserts me. If someone is brusque or forgets I am fragile and vulnerable, I do not have the strength to challenge them. Every interaction a healthcare professional has with a patient is an opportunity to think beyond their specialism. They can talk with a person about meeting their needs and making their life more manageable. Referrals made by my rehabilitation team, including to wheelchair services, physiotherapy, and environmental assistive technology, have been life changing. Specialists' knowledge is invaluable, but the person in front of them is a complex human being and should be listened to.

It is 26 years since my diagnosis. These days I help medical staff see me as a person by introducing myself, encouraging them to introduce themselves, and when there is time, building a social relationship rather than just a medical one. I have been empowered with their help. Health professionals have the power to make me feel like just a patient or a whole person. I am what they make me.

Patient author

Cite this as: *BMJ* 2026;392:s157

WHAT YOU NEED TO KNOW

- For a person who is struggling to reconcile their identity with a new diagnosis, time taken to recognise them as an individual and engage in human interactions can be valuable
- People with long term conditions may prefer a collaborative approach to care, understanding that they are experts in their own experience of the condition
- Hospitals and healthcare settings can be intimidating, and patients may not always feel able to advocate for themselves. Be a friendly, supportive ear if you can

EDUCATION INTO PRACTICE

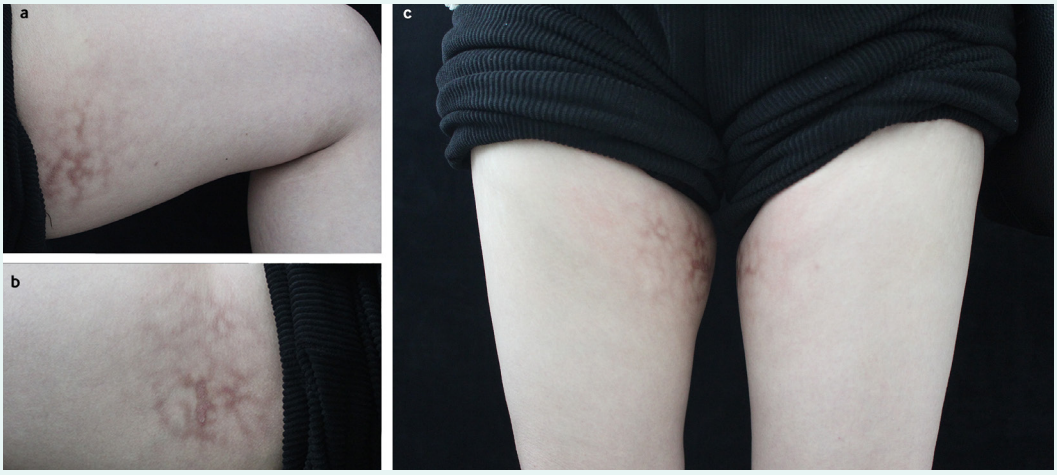
- How can you help a person understand that you see them as more than "just a patient"?

SPOT DIAGNOSIS

Erythema caused by a vacuum flask

A woman in her 20s presented with a three month history of persistent erythematous patches on both thighs. Examination revealed symmetrical, dark red, reticular patches on the bilateral inner thighs. The lesions had indistinct margins, did not blanch with pressure, and were accompanied by mild localised scaling (figure). For the past year, the patient had performed desk based work and habitually held a vacuum flask filled with hot water between her thighs during working hours.

What is the diagnosis?



Symmetrical, dark red, reticular patches on the left (a) and right (b) inner thighs (c)

Submitted by Wenhao Cheng, Fanxiang Wang, and Wenlong Hu

Patient consent obtained.

Cite this as: *BMJ* 2026;392:e086681

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answers

SPOT DIAGNOSIS **Erythema caused by a vacuum flask**

What is the diagnosis?

Erythema ab igne, a cutaneous condition caused by prolonged and repeated exposure of the skin to sub-burn thermal stimuli. Common heat sources include electric blankets, heating pads, hot water bottles, open flames, and electronic devices. Heat is transferred through conduction, radiation, or convection, resulting in characteristic skin changes.

Although the exact pathophysiology of erythema ab igne is not fully understood, proposed mechanisms include repetitive heat induced injury to superficial dermal vessels, leading to haemosiderin deposition and hyperpigmentation, as well as thermal damage to elastic fibres and basal keratinocytes with subsequent melanin release. These changes produce the characteristic reticular erythematous pattern.

Clinically, lesions initially present as transient reticular erythema and gradually evolve into fixed dark red or violaceous patches. With chronic exposure, lesions can progress to brownish pigmentation with telangiectasia and epidermal atrophy. Differential diagnoses include vasculitis, livedo reticularis, poikiloderma, cutaneous T cell lymphoma, and dermatomyositis.

Early lesions of erythema ab igne are reversible by removing the heat source. However, continued exposure can result in permanent pigmentation, blistering, or skin atrophy. Longstanding erythema ab igne has also been associated with an increased risk of cutaneous malignancies, including squamous cell carcinoma and Merkel cell carcinoma.

There is no specific treatment for erythema ab igne. Lesions typically resolve spontaneously within weeks to months after cessation of heat exposure. Persistent lesions can be managed with topical emollients, mild topical corticosteroids, tretinoin, hydroquinone, or laser therapy.

After confirming the diagnosis, the patient was advised to discontinue contact with the heat source immediately and to intensify her use of topical moisturisers. At follow-up two months later, the erythema and pigmentation had noticeably improved.

PATIENT OUTCOME

LEARNING POINTS

- Erythema ab igne results from chronic localised exposure of skin to heat that does not cause burns.
- Early recognition might help prevent irreversible skin damage, reduce the risk of malignant transformation, and avoid unnecessary investigations or overtreatment.

CPD READING
0.5 HOURS

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

LEARNING MODULE

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