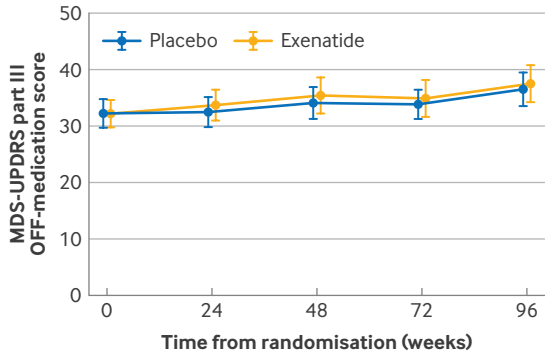
education

RESEARCH REVIEWS Fortnightly round up from the leading medical journals

Plastic people

Microplastics and nanoplastics (MNPs) are being found just about everywhere we look, and they have now been found in our brains. A report in *Nature Medicine* describes their appearance as "shards or flakes," neither of which I really want to imagine being deposited around my grey matter. They found higher levels of MNPs in brain samples from 2024 than from 2016 and in those who had been diagnosed with dementia. The authors are careful to point out that their study doesn't establish a causal role for microplastics and dementia and other neurological disease but urges more research to explore this possibility.

Nat Med doi:10.1038/s41591-024-03453-1



Effect of exenatide versus placebo on mean MDS-UPDRS part III OFF-medication score, a measure of motor function in Parkinson's disease

Is the exenatide going out for Parkinson's disease?

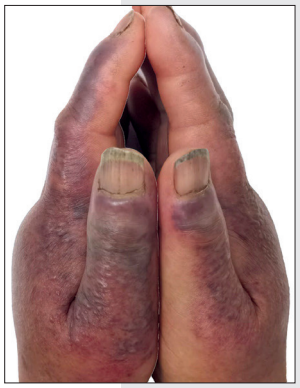
Epidemiological and laboratory studies have suggested that GLP-1 receptor agonists could have a role in prevention and treatment of Parkinson's disease. But once again, evidence from clinical trials seems to be lacking. A new study, published in the *Lancet*, is the largest and longest trial so far of a GLP-1 receptor agonist as treatment for Parkinson's disease: 194 people with moderate severity Parkinson's disease received exenatide or placebo and were followed up for 96 weeks. There was no benefit with exenatide on any measures of disease severity (including motor function, see figure). This may not be the end, though: the authors suggest higher doses may be required to achieve therapeutic concentrations of the drug in the central nervous system.

Lancet doi:10.1016/S0140-6736(24)02808-3

Age and sex differences with newer diabetes drugs

SGLT-2 inhibitors seem to be more effective at reducing major adverse cardiovascular events and HbA_{1c} in older people with diabetes than younger people. Meanwhile, the opposite effect has been found for GLP-1 receptor agonists, which seem less effective at reducing major adverse cardiovascular events and HbA_{1c} in older people. These are the findings of a network meta-analysis that looked at individual participant data from 103 trials. The study also found no difference in outcomes according to sex with SGLT-2 inhibitors and GLP-1 receptor agonists.

JAMA doi:10.1001/jama.2024.27402



CLINICAL PICTURE

Swelling and ecchymoses on the face and hands

This woman in her late 60s presented with painful swelling, ecchymoses, and vesicles on sun exposed areas. She had no medical history, regular medications, or relevant family history, but three days previously she had ingested stir fried *Chenopodium album*, which is commonly known as lambsquarters and widely used as a vegetable in Asian cuisine. Differential diagnoses included localised disseminated intravascular coagulopathy, contact dermatitis, and angioedema. On the basis of her history, distribution of the lesions, and blood test results showing normal coagulation parameters, she was diagnosed as having phytophotodermatitis.

Phytophotodermatitis is a non-immunological photocutaneous reaction induced by skin contact with, or ingestion of, plants containing the photosensitising compounds furocoumarins, exacerbated by ultraviolet A exposure. Plants containing furocoumarins include celery, parsnip, and lime, as well as *C album*. Phytophotodermatitis presents as erythema, oedema, vesicles, bullae, or hyperpigmentation in sun exposed areas.

Stopping indication creep in endovascular treatment for acute stroke

There's been a growing literature exploring the possible benefits of endovascular treatment for acute ischaemic stroke caused by medium or distal vessel occlusion. However, the first randomised control trials of thrombectomy for medium and distal vessel occlusion, DISTAL and ESCAPE MeVO, have just been published and found that endovascular treatment did not lead to any added clinical benefit compared with medical management alone.
An editorial concludes that "performance of thrombectomy for medium- or distal-vessel occlusion in a manner consistent with these trials is not evidence-based."

N Engl J Med doi:10.1056/NEJMoa2408954, doi:10.1056/NEJMoa2411668

Make some noise for blood pressure screening in public spaces

Investigators of a randomised crossover trial examining differences in blood pressure measured in loud versus quiet places were in a win-win situation: find higher blood pressures in loud public places, and they could warn of the health harms of noise; find no difference between blood pressure measured in loud and quiet environments, and they sound the claxon for blood pressure screening interventions in busy environments. It turned out to be the latter, so grab your sphig and a megaphone and get out there: "Get your free blood pressure check, roll up, roll up (your sleeves)."

Ann Intern Med doi:10.7326/ANNALS-24-00873

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

Cite this as: *BMJ* 2025;388:r296

Management is primarily symptomatic, involving moist dressings, analgesia, corticosteroids, and antihistamines. Prevention focuses on photoprotection and photo-allergen avoidance. This patient was treated with intravenous methylprednisolone and oral antihistamines, and she showed improvement within a month.

Yan Jing Chen; Lin Wang (lkzwl@126.com), West China Hospital, Sichuan University, Chengdu, Sichuan, China.

Patient consent obtained.

Cite this as: *BMJ* 2025;388:e081993

MINERVA From the wider world of research

Find the penguin

In 2020, after its doors had been closed by the pandemic, the Shedd Aquarium in Chicago gave its Rockhopper penguins the run of the place (x.com/shedd_aquarium/status/1239661654629023747). Entertaining videos of the penguins, as they explored areas usually restricted to humans, inspired *Nature* to publish photographs of scientifically interesting locations containing a hidden image of a Rockhopper (www.nature.com/articles/d41586-020-03610-9). The series turned out to be unexpectedly popular. Test your observational skills with a collection of the first three years' worth of the "Can you spot the penguin?" puzzles.

Lung cancer screening by computed tomography

Screening programmes that use low dose chest computed tomography to detect lung cancer also detect coronary artery calcium deposition. A retrospective analysis reports that extensive coronary calcification was present in around a quarter of the people who were screened—a finding that was associated with a doubling in risk of all cause and cardiovascular mortality (*CMAJ* doi:10.1503/cmaj.231602).

Exercise and weight loss

People who hope to lose weight by taking more exercise often fail to realise how many calories must be burnt to make much difference. A reduction of one kilogram in body weight is roughly equivalent to a deficit of 8000 calories. A meta-analysis of 116 clinical trials confirms the equation (*JAMA Netw Open* doi:10.1001/jamanetworkopen.2024.52185). Notable improvements in waist circumference and other measures of body fat were only achieved with moderate or high intensity aerobic exercise lasting more than 150 minutes per week.

Diet and colorectal cancer

Among 97 dietary factors measured in the Million Women Study, alcohol intake was the one most strongly associated with colorectal cancer risk (*Nat Commun* doi:10.1038/s41467-024-55219-5). Consumption of two units a day increased risk by around 15%. Red and processed meat intake was also associated with increased risk. Dairy products, on the other hand, were protective, probably because of their high calcium content.

Vitamin D and omega 3 fatty acids

Muscle strength tends to decrease with age, which increases risk of falls, fractures, and premature death. Disappointingly, a large randomised clinical trial finds that dietary supplementation with vitamin D_3 or omega 3 fatty acids is no better than placebo in slowing the decline (*J Clin Endocrinol Metab* doi:10.1210/clinem/dgae150). At two years, all groups showed worsening of walking speed, grip strength, and other measures of physical performance regardless of which intervention they received.

Myocardial injury in patients with hip fracture

Nearly a quarter of older patients presenting with a hip fracture have raised levels of troponins, perhaps because the stress response to the fracture leads to myocardial injury. A secondary analysis of trial data suggests that patients with raised troponins benefit from immediate treatment (*J Bone Joint Surg Am* doi:10.2106/JBJS.23.01459). Mortality in those receiving surgery within six hours was halved compared with those whose surgery was delayed.

Cite this as: *BMJ* 2025;388:r275

Commonly used interventional procedures for non-cancer chronic spine pain: a clinical practice guideline

Full author details on bmj.com

Correspondence to: J W Busse bussejw@mcmaster.ca

0.5 HOURS

Clinical question

What is the comparative effectiveness and safety of commonly used interventional procedures (such as spinal injections and ablation procedures) for chronic axial and radicular spine pain that is not associated with cancer or inflammatory arthropathy?

Current practice

Chronic spine pain is a common, potentially disabling complaint, for which clinicians often administer interventional procedures. However, clinical practice guidelines provide inconsistent recommendations for their use.

Recommendations

For people living with chronic axial spine pain (≥3 months), the guideline panel issued strong recommendations against joint radiofrequency ablation with or without joint targeted injection of local anaesthetic plus steroid; epidural injection of local anaesthetic, steroids, or their combination; joint targeted injection of local anaesthetic, steroids, or their combination; and intramuscular injection of local anaesthetic with or without steroids. For people living with chronic radicular spine pain (≥3 months), the guideline panel issued strong recommendations against dorsal root ganglion radiofrequency with or without epidural injection of local anaesthetic or local anaesthetic plus steroids; and epidural injection of local anaesthetic, steroids, or their combination.

How this guideline was created

An international guideline development panel including four people living with chronic spine pain, 10 clinicians with experience managing chronic spine pain, and eight methodologists, produced these recommendations in adherence with standards for trustworthy guidelines using the GRADE approach. The MAGIC Evidence Ecosystem Foundation provided methodological support. The guideline panel applied an individual patient perspective when formulating recommendations.

The evidence

These recommendations are informed by a linked systematic review and network meta-analysis of randomised trials and a systematic review of observational studies, summarising the current body of evidence for benefits and harms of common interventional procedures for axial and radicular, chronic, non-cancer spine pain. Specifically, injection of local anaesthetic, steroids, or their combination into the cervical or lumbar facet joint or sacroiliac joint; epidural injections of local anaesthetic, steroids, or their combination; radiofrequency of dorsal root ganglion; radiofrequency denervation of cervical or lumbar facet joints or the sacroiliac joint; and paravertebral intramuscular injections of local anaesthetic, steroids, or their combination.

Understanding the recommendations

These recommendations apply to people living with chronic spine pain (≥3 months' duration) that is not associated with cancer or inflammatory arthropathy and do not apply to the management of acute spine pain. Further research is warranted and may alter recommendations in the future: in particular, whether there are differences in treatment effects based on subtypes of chronic spine pain, establishing the effectiveness of interventional procedures currently supported by low or very low certainty evidence, and effects on poorly reported patient-important outcomes (such as opioid use, return to work, and sleep quality).

Introduction

Spine pain is defined as chronic when it persists for three months or longer and has resulted in pain on at least half of the days in the past six months.[1] Pain may be localised to the midline (axial) or referred distally (radicular) typically because of nerve root irritation (such as sciatica). Advanced imaging is often acquired for chronic spine pain, but incidental findings are common[2-4] and there is low correlation between pathology and symptoms.[5] Most chronic spine pain cannot be attributed to a specific cause, and approximately 85% of patients present with non-specific pain.[6-9]

The global prevalence of chronic low back pain has been estimated at 4% among adults aged 24-39 years and 20% among adults aged 20-59.[10] The prevalence among older adults is likely higher,[11] and chronic low back pain is the leading cause of disability worldwide.[12] Neck pain is another common type of chronic spinal pain, estimated as the third leading cause of years lived with disability.[13] In 2016, low back and neck pain accounted for the highest healthcare spending in the US at $134.5 billion, of which 9.2% was patients' out-of-pocket expenses.[14]

Visual summary of recommendation

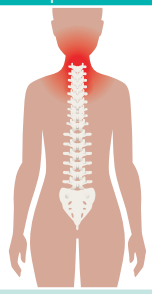
Population

This recommendation applies only to people with these characteristics:

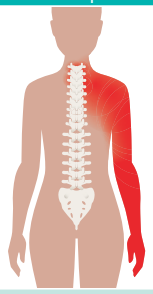
✔ Adults with chronic spine pain (≥3 months' duration)

Cervical spinal level

✔ Axial pain

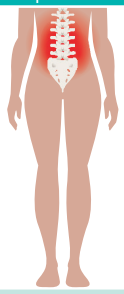


✔ Radicular pain

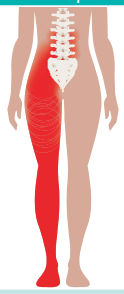


Lumbar or sacroiliac spinal level

✔ Axial pain



✔ Radicular pain



Does NOT apply to:

✖ Acute spine pain
- <3 months duration

✖ Chronic spine pain secondary to
- cancer
- inflammatory arthropathy

Strong recommendations AGAINST

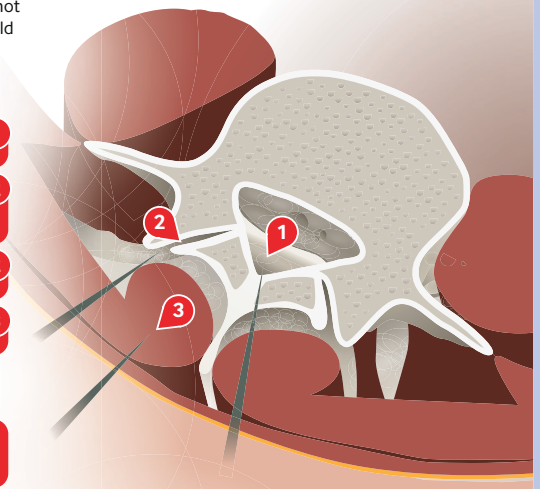
All or nearly all well informed people would likely not want such interventions. Such interventions should therefore not be offered outside of a clinical trial

Chronic axial spine pain

- ✖ Epidural injection of local anaesthetic, steroids, or their combination (1)
- ✖ Joint radiofrequency ablation with or without joint targeted injection of local anaesthetic and steroids (2)
- ✖ Joint targeted injection of local anaesthetic, steroids, or their combination (2)
- ✖ Intramuscular injection of local anaesthetic with or without steroids (3)

Chronic radicular spine pain

- ✖ Dorsal root ganglion radiofrequency with or without epidural injection of local anaesthetic, or local anaesthetic and steroids
- ✖ Epidural injection of local anaesthetic, steroids, or their combination (1)



Additional areas of uncertainty

Subgroup effects

There may be differential effects of interventional procedures based on subtypes of chronic spine pain

Research needed

Chronic axial spine pain:
- effectiveness of joint radiofrequency ablation
- intramuscular injection of local anaesthetic with or without steroids
- joint targeted injection of local anaesthetic with or without steroids

Evidence required

How interventions affect other patient-important outcomes that are poorly reported among existing trials:
- role functioning (including return to work)
- social functioning
- mental functioning
- sleep quality
- opioid use
- adverse events

A detailed summary of benefits and harms associated with interventional procedures is available in the linked systematic review and network meta-analysis

https://bit.ly/bmj-spine

Practical issues

Cost and access

- Expense may be a barrier to accessing procedures unless patients have public or private coverage
- Patients must travel to a clinic or hospital that administers interventional procedures and, if perceived effective, return approximately every 2 weeks to 3 months for injections and approximately every 6 months for nerve ablation procedures

Adverse effects

- Interventional procedures may be associated with a small risk of moderate to serious harms, such as deep infection, and temporary altered level of consciousness
- Interventional procedures may be associated with a very small risk of catastrophic harms, such as paralysis and death following epidural injection

Values and preferences

Chronic spine pain

Most adults living with chronic spine pain place high value on small but important pain relief

Acceptable risks - interventional procedures

Patients would be willing to accept the typical risks and burden associated with interventional procedures for an improvement in pain approximating the minimally important difference of 1.5 cm on a 10 cm visual analogue scale

Unacceptable risks

Patients would be disinclined to receive treatment with an interventional procedure for which there is very low certainty of evidence for benefit or low certainty of evidence for no benefit, and moderate to high certainty evidence of risk of harm and/or burden

Box 1 | Linked articles in this BMJ Rapid Recommendations cluster

- Busse JW, Genevay S, Agarwal A, et al. Commonly used interventional procedures for non-cancer chronic spine pain: a clinical practice guideline. *BMJ* 2025;388:e079970, doi:10.1136/bmj-2024-079970
  - Summary of results from the Rapid Recommendation process
- Wang X, Martin G, Sadeghirad B, et al. Common interventional procedures for chronic non-cancer spine pain: a systematic review and network meta-analysis of randomised trials. *BMJ* 2025;388:e079971, doi:10.1136/bmj-2024-079971
- Malam F, Asif MS, Khalid MF, et al. Adverse events associated with common interventional procedures for chronic spine pain: a systematic review and meta-analysis of non-randomized studies. *BMJ Open* (submitted)
- MAGICapp (https://app.magicapp.org/#/guideline/nBRK8n) multi-layered version of recommendations, rationale, and evidence summaries for use on all electronic devices

Current practice

Interventional procedures—including paravertebral intramuscular injections, epidural injections, nerve blocks, and nerve ablation procedures—are increasingly used to manage chronic spine pain, particularly in North America. These procedures are hypothesised to attenuate chronic pain by interrupting pain related nerve signals through reducing local inflammation (epidural steroids), numbing nerves (nerve blocks), or targeted destruction of nerves responsible for transmitting pain (radiofrequency ablation).

Between 1994 and 2001 in the US, there was a 271% increase in lumbar epidural steroid injections (from 553 to 2055 per 100 000 patients) and a 231% increase in facet injections (from 80 to 264 per 100 000 patients) for low back pain.[15] Facet joint or sacroiliac joint interventions in US Medicare recipients increased from approximately 425 000 in 2000 to 2.2 million interventions in 2013.[16] From 2007 to 2016, data from a national US insurer showed a 131% increase in the use of lumbar radiofrequency procedures (from 49 to 113 per 100 000 patients).[17] The number of US Medicare providers administering steroid injections along the spine increased 13% from 2012 to 2016.[18]

Despite rapid growth in use of interventional procedures for chronic spine pain, the supporting evidence is uncertain. An analysis of 17 review articles on epidural steroid injections for spine pain found inconsistent conclusions, and that positive results were three times more likely when the review was authored by an interventionalist (9 of 10 positive; 90%) versus a non-interventionalist (2 of 7 positive; 29%).[19] The study authors suggested several explanations, including confirmation bias and secondary gain, as interventional procedures for chronic pain are often well reimbursed.

Despite rapid growth in use of interventional procedures for chronic spine pain, the supporting evidence is uncertain

Why is the guideline needed?

A 2023 synthesis of 21 clinical practice guidelines on interventional procedures for low back pain concluded: "there was no consistency in recommendations for or against any interventional procedure, even after accounting for the quality of the [clinical practice guideline]".[23] Given the lack of trustworthy guidelines in this area of high unmet clinical need, the Rapid Recommendations team identified that a careful appraisal of the full body of evidence would produce guidance that, if followed, would optimise the concordance between evidence and clinical use of interventional procedures for chronic spine pain.

The population considered for our guideline was adult patients living with chronic axial and/or radicular spine pain that was not associated with cancer, infection, or inflammatory spondyloarthritis. Eligible procedures included joint targeted injections (injection of local anaesthetic, steroids, or their combination into the cervical or lumbar facet joint, or sacroiliac joint); epidural injections of local anaesthetic, steroids, or their combination; radiofrequency of dorsal root ganglion; radiofrequency denervation of cervical or lumbar facet joints, or the sacroiliac joint; and paravertebral intramuscular injections of local anaesthetic, steroids, or their combination. The panel's recommendations were informed by linked systematic reviews (box 1). The infographic provides the recommendations and links to MAGICapp with evidence summaries of absolute benefits and harms of common interventional procedures for chronic spine pain in the standard GRADE format.

Patient and public involvement

Four people living with chronic spine pain, who were full members of the guideline panel, contributed to the selection and prioritisation of outcomes, values and preferences assessments, critical feedback to the protocol, and interpretation of findings for the *BMJ* Rapid Recommendation and the associated systematic reviews.

The evidence

The linked systematic review and network meta-analysis included 132 randomised trials, of which 81 trials with 7977 participants were included in meta-analyses.[36] These trials reported on 13 categories of interventional procedures compared with usual care or sham procedures in patients with axial or radicular chronic spine pain (box 2). Our panel selected eight patient-important outcomes: (1) pain relief, (2) physical functioning, (3) emotional functioning, (4) role functioning, including return to work, (5) social functioning, (6) sleep quality, (7) opioid use, and (8) adverse events. Our selection process was guided by the Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT).[39 40] The panel designated pain relief as our critical outcome. This is supported by a discrete choice experiment involving 211 adults living with chronic low back pain, which found that patients are most concerned with pain relief, followed by duration of pain relief.[41]

Understanding the recommendations

The panel reviewed the evidence for benefits and harms among the 13 selected interventional procedures or combinations of procedures for chronic spine pain.[36 44] There was no high certainty evidence of important pain

relief (or benefit on any other effectiveness outcome) for any intervention for either chronic axial spine pain or chronic radicular spine pain. All interventional procedures supported by moderate or low certainty evidence showed little to no pain relief compared with sham procedures (see infographic).

We found no evidence of subgroup effects based on clinical condition.[36] Further, since all pooled effects in our network meta-analysis supported by low or moderate certainty evidence showed little to no effect on pain relief relative to sham procedures, then if an interventional procedure was effective in certain subtypes of axial or radicular pain it must increase pain in other subtypes; we judged this was unlikely.

Low certainty evidence supported a 0.7% incidence of deep infection (after joint radiofrequency nerve ablation, joint targeted steroid injection, and epidural injection of local anaesthetic and steroids), a 1.4% incidence of dural puncture (after epidural steroid injection, joint radiofrequency nerve ablation, and joint targeted injection of local anaesthetic and steroids), an 8.6% incidence of prolonged (>48 hours) pain or stiffness (after joint radiofrequency nerve ablation with or without joint targeted injection of steroids, and dorsal root ganglion radiofrequency) and a 2.1% incidence of temporary altered level of consciousness (after joint targeted steroid injection, and epidural steroid injection).[44] The panel was also aware of very rare but catastrophic complications of interventional procedures for spine pain not captured in our evidence syntheses, such as paraplegia after epidural injection.[48-50] The panel had high certainty that undergoing interventional procedures for chronic spine pain was associated with important burden (such as travel, discomfort, productivity loss), which would be recurring as these interventions are typically repeated on a regular basis, and that some patients would bear substantial out-of-pocket costs.

The panel concluded that all or almost all informed patients would choose to avoid interventional procedures for axial or radicular chronic spine pain because all low and moderate certainty evidence suggests little to no benefit on pain relief compared with sham procedures, and these procedures are burdensome and may result in adverse events.[51 52] The panel acknowledged that the evidence for some interventional procedures was of only low or very low certainty and agreed it would be appropriate to provide them in a research setting.

Box 2 | Categories of interventional procedures administered for chronic spine pain that were considered in the BMJ Rapid Recommendations review

- Epidural injection of local anaesthetic
- Epidural steroid injection
- Epidural injection of local anaesthetic and steroids
- Joint targeted injection of local anaesthetic
- Joint targeted steroid injection
- Joint targeted injection of local anaesthetic and steroids
- Intramuscular injection of local anaesthetic
- Intramuscular injection of local anaesthetic and steroids
- Dorsal root ganglion radiofrequency
- Dorsal root ganglion radiofrequency with epidural injection of local anaesthetic
- Dorsal root ganglion radiofrequency with epidural injection of local anaesthetic with steroids
- Joint radiofrequency nerve ablation
- Joint radiofrequency nerve ablation with joint-targeted injection of local anaesthetic and steroids

All interventional procedures supported by moderate or low certainty evidence showed little to no pain relief compared with sham procedures

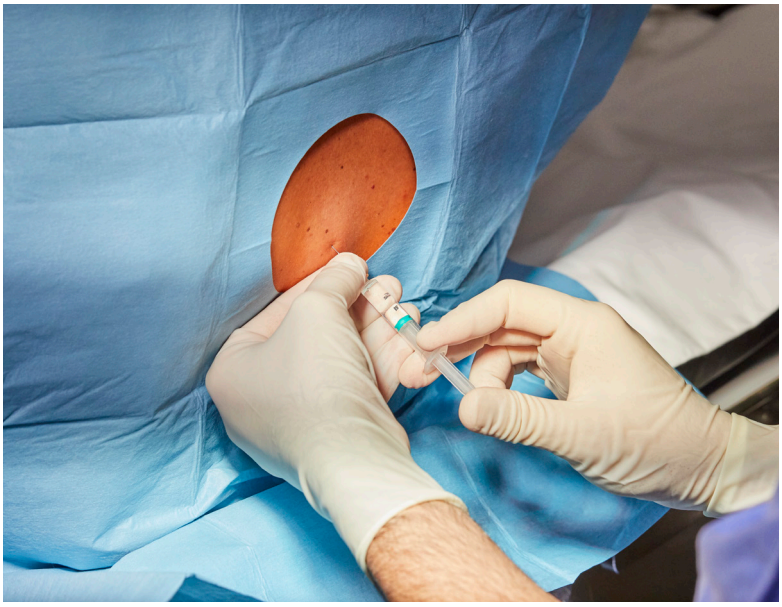
To whom do the recommendations apply?

The recommendations apply to adults living with moderate to severe chronic, axial or radicular, spine pain (that is, neck, back, sacroiliac) lasting three months or longer in duration. They do not apply to the management of acute spine pain (<3 months' duration), or chronic spine pain associated with cancer or inflammatory arthropathy.

Absolute benefits and harms

The infographic explains the recommendations and provides links to MAGICapp with evidence summaries of absolute benefits and harms of interventional procedures for chronic spine pain. Estimates of baseline risk for effects come from the control arms of eligible trials from the associated network meta-analysis.[36] Only approximately half of randomised trials eligible for our network meta-analysis reported adverse events, and this evidence, as well as the results from our systematic review of observational studies on harms from interventional procedures,[44] proved only low or very low certainty.

The clinical experts on our panel considered findings from our evidence syntheses regarding the potential harms associated with interventional procedures, as well as published reports on very rare but severe harms. The resulting consensus was that interventional procedures



for chronic spine pain were costly and may be associated with a small risk of moderate harms (for example, an 8.6% risk of prolonged (>48 hours) pain or stiffness, 2.1% risk of temporary altered level of consciousness, 1.4% risk of dural puncture, 0.7% risk of deep infection),[44 53] and a very small risk of catastrophic harms (such as infection resulting in meningitis, spinal cord injury, and paraplegia).[54-58] We were unable to quantify the risks of catastrophic harms as they were reported in case studies or databases that did not specify a denominator. For example, between 1997 and 2014, a total of 90 serious adverse events that occurred within minutes to 48 hours after epidural injections of corticosteroids for management of neck and back pain were captured by the US Food and Drug Administration (FDA) Adverse Event Reporting System database. These included death, spinal cord infarction, paraplegia, quadriplegia, cortical blindness, stroke, seizures, and brain oedema.[59 60]

The panel was confident of the following, relative to sham procedures:

- Moderate certainty evidence showed that, for chronic axial spine pain, epidural injection of local anaesthetic (with or without steroids) and joint targeted steroid injections probably have little to no effect on pain relief.[36]
- Moderate certainty evidence showed that, for chronic radicular spine pain, epidural injection of local anaesthetic with steroids and dorsal root ganglion radiofrequency probably have little to no effect on pain relief.[36]
- It is unlikely that new information will result in important changes in best estimates of effect for outcomes that are supported by moderate certainty evidence.

The panel was less confident about:

- For chronic axial spine pain, the effect of intramuscular injection of local anaesthetic (with or without steroids), epidural injection of steroids, and joint targeted injection of local anaesthetic (with or without steroids) on pain relief. Although effects showed little to no difference in pain relief (except for intramuscular injection of local anaesthetic and steroids, which showed increased pain) versus sham procedures, the evidence was of only low certainty. We considered that a beneficial effect of epidural injection of steroids is unlikely because there is moderate certainty evidence that an epidural injection with steroids and local anaesthetic probably has little to no effect on pain. The effect of joint radiofrequency was supported by only very low certainty evidence owing to small study effects and risk of bias. Four trials with unblinded providers reported larger effects on pain relief than did seven trials with blinded providers (−1.74 cm on a 10 cm visual analogue scale for pain relief (95% confidence interval −2.73 to −0.76) for unblinded trials versus −0.23 cm (−0.60 to 0.14) for blinded trials; test of interaction P value 0.005).[36]
- For chronic radicular spine pain, epidural injection of local anaesthetic or steroids showed little to no difference in pain relief, but the evidence was only low certainty. However, the effect of epidural injection of either local anaesthetic or steroids in isolation is unlikely as we found moderate evidence that the combination is probably not effective.[36]
- Harms associated with interventional procedures for chronic spine pain, which were supported by very low to low certainty evidence.[36 44]

Interventional procedures are associated with burden to patients

Practical issues and other considerations

Interventional procedures are associated with burden to patients, who must travel to a healthcare provider. They are not curative and, if they have any effect at all, intramuscular, joint targeted, or epidural injections are typically repeated approximately every 2 weeks to 3 months. Nerve ablation procedures, if they have any effect at all, are typically repeated approximately every 6 months.

In some jurisdictions, patients will bear the costs of interventional procedures, which may be substantial. Despite our finding that current evidence suggests common interventional procedures are no more effective than sham procedures for chronic spine pain, the substantial reimbursement associated with these procedures may act as a perverse incentive for their delivery as opposed to less well paying, and more time consuming, interventions that have evidence of effectiveness (for example, cognitive functional therapy,[64] exercise therapy,[65] pain reprocessing therapy[66]).

Costs and resources

When formulating recommendations, the panel focused on patients' perspectives rather than that of society. However, both availability and costs of interventional procedures for chronic spine pain are likely to influence decision making.

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

Four people living with chronic spine pain, including two military veterans, were full panel members. These panel members identified important outcomes, informed the discussion on values and preferences, and voted on all recommendations. They participated in online meetings and email discussions and met all authorship criteria.

EDUCATION IN PRACTICE

- How do you currently approach the management of people living with chronic spine pain that is not associated with cancer or inflammatory arthropathy?
- How can this article help you explain the evidence to patients considering common interventional procedures for their chronic spine pain?

Competing interests: None declared.

Cite this as: *BMJ* 2025;388:e079970

Find the full version with references at doi: 10.1136/bmj-2024-079970

Common interventional procedures for chronic non-cancer spine pain

Wang X, Martin G, Sadeghirad B, et al

Cite this as: *BMJ* 2025;388:e079971
Find this at doi: 10.1136/bmj-2024-079971

Study question What is the comparative effectiveness of common interventional procedures for chronic, non-cancer, axial or radicular spine pain?

Methods A systematic review and network meta-analysis of randomised clinical trials (RCTs) that enrolled patients with chronic non-cancer spine pain randomised to receive a commonly used interventional procedure versus a sham procedure, usual care, or another interventional procedure. The GRADE approach was used to rate the certainty of evidence.

Study answer and limitations Of 132 eligible studies, 81 trials with 7977 patients that explored 15 interventional procedures were included in meta-analyses. All subsequent effects refer to comparisons with sham procedures.

For chronic axial spine pain, the commonly performed interventional procedures epidural injection of local anaesthetic, with or without steroids, and joint targeted steroid injection probably result in little to no difference in pain relief (moderate certainty evidence); intramuscular injection of local anaesthetic, epidural steroid injection, joint targeted injection of local anaesthetic, and joint targeted injection of local anaesthetic with steroids may provide little to no difference in pain relief (low certainty); and intramuscular injection of local anaesthetic with steroids may increase pain (low certainty). Available evidence for joint radiofrequency ablation proved to be very uncertain.

For radicular pain, epidural injection of local anaesthetic and steroids, and radiofrequency of the dorsal root ganglion probably result in little to no difference in pain relief (moderate certainty); and epidural injection of local anaesthetic or epidural injection of steroids may result in little to no difference in pain relief (low certainty).

3a. Pain relief (VAS 0-10cm, lower scores are better) for chronic axial spine pain

Treatment *v* placebo	MD (NMA)	RD for achieving MID (95% CI)	COE
EI (LA,S)	0.20 (-1.11 to 1.51)	-3 (-21 to 18)	Moderate
EI (LA)	0.28 (-1.18 to 1.75)	-4 (-23 to 19)	Moderate
JTI (S)	0.83 (-0.26 to 1.93)	-12 (-25 to 4)	Moderate
IM (LA)	-0.53 (-1.97 to 0.92)	9 (-14 to 32)	Low
Usual care	0.15 (-0.56 to 0.85)	-2 (-13 to 9)	Low
JTI (LA,S)	0.22 (-0.42 to 0.87)	-3 (-13 to 7)	Low
EI (S)	0.39 (-0.94 to 1.71)	-6 (-23 to 15)	Low
JTI (LA)	0.63 (-0.57 to 1.83)	-9 (-24 to 9)	Low
IM (LA,S)	1.82 (-0.29 to 3.93)	-24 (-36 to 5)	Low
Joint RF	-0.89 (-1.37 to -0.40)	15 (7 to 23)	Very low
Joint RF+JTI (LA,S)	-0.68 (-1.71 to 0.35)	11 (-5 to 28)	Very low

3b. Pain relief (VAS 0-10cm, lower scores are better) for chronic spine related radicular pain

Treatment *v* placebo	MD (NMA)	RD for achieving MID (95% CI)	COE
EI (LA,S)	-0.49 (-1.54 to 0.55)	4 (-4 to 16)	Moderate
DRG RF	0.15 (-0.98 to 1.28)	-1 (-8 to 9)	Moderate
EI (S)	-0.56 (-1.30 to 0.17)	5 (-1 to 13)	Low
EI (LA)	-0.26 (-1.37 to 0.84)	2 (-6 to 14)	Low
EI (LA)+DRG RF	-2.26 (-3.97 to -0.56)	26 (5 to 51)	Very low
EI (LA,S)+DRG RF	-0.94 (-2.52 to 0.65)	9 (-5 to 30)	Very low
Usual care	0.49 (-0.71 to 1.70)	-4 (-9 to 6)	Very low

Certainty	Classifications (the higher level, the better effectiveness)
Moderate to high	Category 2: More effective than sham procedures
	Category 1: No more effective than sham procedure
Low to very low	Category 2: May be more effective than sham procedures
	Category 1: May be no more effective than sham procedures

COE = certainty of evidence, DRG RF = dorsal root ganglion radiofrequency ablation, EI = epidural injection, IM = intramuscular injection, Joint RF = joint radiofrequency ablation, JTI = joint targeted injection, LA = local anaesthetic, MD (NMA) = mean difference (network meta-analysis), MID = minimally important difference (1.5 cm on 10 cm scale), RD = risk difference (%), S = steroid, VAS = visual analogue scale

Network meta-analysis results, sorted by GRADE certainty of evidence and effect estimate, for the comparisons of interventional procedures versus sham procedures for pain relief of chronic spine pain. Table a. Pain relief scores for axial pain. Table b. Pain relief scores for radicular pain

What this study adds This network meta-analysis provides low to moderate certainty evidence that, compared with sham procedures, commonly performed interventional procedures for axial or radicular chronic non-cancer spine pain may provide little to no pain relief.

Funding, competing interests, and data sharing This study was funded by the Chronic Pain Centre of Excellence for Canadian Veterans. The authors declare no competing interests. Study data can be obtained from the first author.

Study registration PROSPERO (CRD42020170667).

EDITORIAL

Spinal interventions for chronic back pain

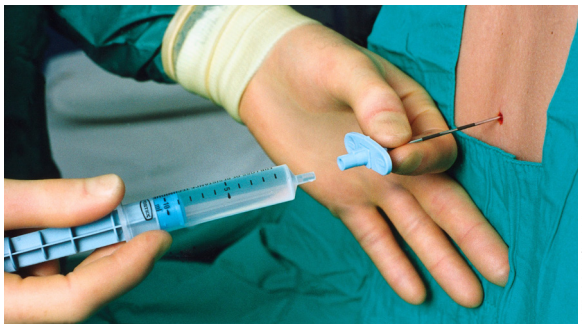
Does a strong recommendation against the use of spine injections demand action?

Despite the common use of spine injections in pain clinics around the world, it has been hard to come up with evidence that strongly supports this practice when applied to chronic back pain (persisting for >3 months). Existing guidelines range from recommending use to recommending avoidance.[1-5] A new addition to the BMJ Rapid Recommendations series,[6 7] produced by an international team of experts, methodologists, and patients carefully selected to have no conflicts of interest, attempts to correct some of the shortcomings of previous confusing and conflicting evidence synthesis and evidence based guidelines. Most notably, a clear distinction is made between acute and chronic back pain, and the effort involves not just one type of spine pain, but a range of common spine pain conditions and the most common interventions used to treat them. The research and guideline recommendations are worthy of attention, especially the conclusion that spine injections result in little or no pain relief for either axial or radicular back pain, leading the guideline to strongly recommend against their use.[7] The question this recommendation raises is whether it is reasonable to continue to offer these procedures to people with chronic back pain.

Increasing use of interventional procedures

Chronic back pain is highly prevalent,[8] a great deal of money is spent on the injections,[9 10] and a lot of patient hopes and expectations are vested in this type of treatment.[11] It is estimated, for example, assuming 9 million epidural injections a year[12] at an average cost of $1000, epidural injections alone would cost the United States $9 billion annually.

One might ask how the situation arose whereby we spend so much of our healthcare capital on a treatment for a common condition that compromises the lives of so many people but seemingly does not work. This is where a look at the history helps. Pain medicine was founded in the mid-20th century by anaesthetists, who dominated its early years and continue to be key players in pain clinics and pain training programmes. They had discovered effective ways to treat acute pain and believed they could apply anaesthetic principles to the treatment of chronic pain. But it never really panned out.[13]



MEDISCAN/ALAMY

We spend so much of our healthcare capital on a treatment for a common condition that compromises the lives of so many people but seemingly does not work

Through corticosteroids, opioids, NSAIDs, and now injections, we learn that treatments that may be highly effective for acute, subacute, or acute-on-chronic pain are often ineffective or problematic when used to treat chronic pain. Today, the dominance of procedural treatments in pain clinics is perpetuated because trainees, including non-anaesthetists, want to acquire procedural skills and gravitate to the anaesthesia-run programmes that teach them.[13-15] For whatever reason, reimbursement is often far more favourable for procedural than non-procedural treatments.

On the patient side, there is a persistent demand for procedures. After all, what patient struggling with debilitating pain does not want to try an injection that has low risk, even if they know it has little chance of helping? And what patient does not actually improve, at least temporarily, because their pain is acknowledged, and because the white coat and hospital setting are a comfort in themselves?[16] On the provider side, pain practitioners are motivated by the gratification of acquiring skills that are in demand, that often produce high patient satisfaction at least in the short term, and that are well reimbursed.

Time for a rethink

Would the conclusions of the linked meta-analysis have looked different if series of injections rather than single injections had been studied, or if the injections had only been provided in the context of comprehensive rehabilitation, or if the injections were confined to acute exacerbations of chronic back pain? These are all questions that future research must answer.

But in the meantime, does the strong recommendation against the use of spine injections made in the linked Rapid Recommendation demand action? It is never easy to change entrenched culture, and injections have undoubtedly become entrenched as a key component of pain clinic treatments. One way to change physician and patient behaviour is through financial incentive. Yes, there are many pressures on providers to keep doing spine injections, and on payers to keep paying for them, but the more the evidence fails to support the widespread use of these injections, the less inclined healthcare systems will be to fund them.

This Rapid Recommendation cluster will not be the last word on spine injections for chronic back pain, but it adds to a growing sense that chronic pain management needs a major rethink that is perhaps best achieved by a better balance of reimbursements between procedural and non-procedural chronic pain treatments.

Jane C Ballantyne, professor, University of Washington School of Medicine, Seattle, WA 98195-6560, USA
jcb12@uw.edu

Cite this as: *BMJ* 2025;388:r179

Find the full version with references at http://dx.doi.org/10.1136/bmj.r179

PRACTICE POINTER

How to recognise and manage measles

Chris Bird,[1 2] Frances Dutton[1 3]

[1]Emergency Department, Birmingham Women's and Children's NHS Foundation Trust, Birmingham B4 6NH, UK
[2]Nuffield Department of Primary Care Health Sciences, University of Oxford, UK
[3]Small Heath Medical Practice, Birmingham, UK
Correspondence to: C Bird christopher.bird2@nhs.net

CPD READING
0.5 HOURS

Measles is caused by *Morbillivirus hominis*, a member of the Paramyxoviridae family (which includes mumps, parainfluenza, and Nipah viruses).[1] Spread is airborne through aerosol and respiratory droplets, or through touching a surface contaminated with infected droplets (fomites). Infection normally results in lifelong immunity.[2]

Measles is highly infectious, with an estimated R_0 of 12-18 (basic reproduction number, in which one case will go on to infect 12-18 other people), approximately 10 times higher than for covid-19 or influenza.[3] Infection can have serious consequences for vulnerable patients (including those who are immunosuppressed or pregnant) but also causes transient immune suppression that can last from months to years in otherwise healthy individuals. This immunosuppression is the main cause of death from measles, especially in areas with high rates of malnutrition (such as in humanitarian emergencies).[2 4] In most countries, including the UK, measles is a notifiable disease.

Epidemiology

Measles vaccination is estimated to have prevented 57 million deaths worldwide between 2000 and 2020, but missed measles vaccinations and decreased surveillance during the covid-19 pandemic led to an 18% increase in measles cases and a 43% rise in measles related deaths globally in 2022 compared with 2021.[5] Approximately 1.2 million children in Europe missed their measles vaccine during the pandemic, which, combined with the end of covid-19 public health measures, led to a 30-fold rise in measles cases in Europe in 2023 (30 000 cases compared with 941 cases in 2022).[6]

Conflict, rapid urbanisation, and fears around vaccination are global issues,[7] and the UK is no exception, losing its measles elimination status in 2018.[8] This was driven by vaccine hesitancy but also by less well publicised issues around access; both issues disproportionately affecting marginalised communities.[9 10] The UK Health Security Agency (UKHSA) declared a national incident in January 2024 around a measles outbreak in the West Midlands region, where there are areas of low measles vaccine uptake.[11]

WHAT YOU NEED TO KNOW

- Measles is a highly contagious virus primarily spread through airborne droplets from coughing, sneezing, and touching contaminated surfaces
- Careful attention to symptoms and the timing of their appearance can help distinguish measles from other common acute respiratory infections
- Healthcare workers play a vital role in educating families around the proved safety of the MMR vaccine. Alongside an effective public health response, vaccination is key to halting a measles outbreak

What are the signs of measles?

Based on UKHSA guidance, the incubation period for measles from exposure to onset of symptoms is normally between 10 and 14 days but can vary from seven to 21 days.[12] Symptoms commonly start with fever and the "three Cs" (cough, coryza, and conjunctivitis). A few days later, the maculopapular rash typically begins around the face and neck, and then spreads to the trunk and beyond. Infected children are often also irritable, with poor feeding and lethargy. The clinical presentation may vary in immunocompromised patients.

Patients are usually contagious for four days before and up to four days after the rash appears (see figs 1-3).[12] Koplik spots are white-grey spots on an erythematous base inside the mouth on the buccal mucosa. These occur in 50-70% of patients (fig 4) and are highly characteristic of measles. Since they appear 1-2 days before the rash, they can help make a clinical diagnosis earlier.[14]

As well as examining the patient for the signs and symptoms above, ask about the following points:

- MMR vaccination (highly effective at preventing measles infection although breakthrough infections occur in 1-3 of every 100 vaccinated individuals)[15]
- Any recent potential exposure to measles virus (school, nursery, or hospital attendance[16]; travel to an area where measles is circulating; or attendance at a large international mass gathering[17])
- Ask about vulnerable contacts (such as those who are immunocompromised, pregnant, or infants under 12 months old) as they are at a greater risk for complications.

Differential diagnoses include:

- Enteroviral or adenoviral infections—cough and coryza are common symptoms
- Roseola (HHV6 infection)—common viral infection in young children with rash appearing when the fever resolves
- Parvovirus B19—viral infection with characteristic "slapped cheek" rash
- Streptococcal infection—bacterial cause of tonsillitis and scarlet fever
- Influenza—viral infection with high fever

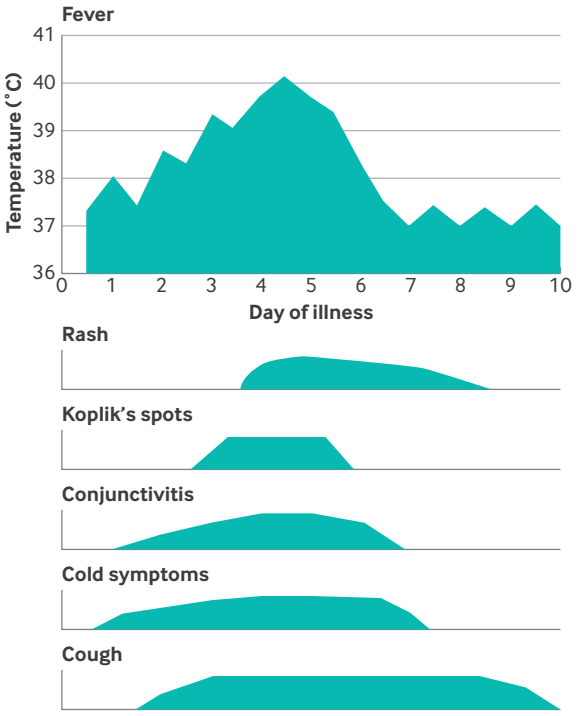


Fig 1 | Clinical course in measles (adapted from WHO *Manual for the laboratory diagnosis of measles and rubella virus infection*[13])

- Kawasaki's disease—vasculitis of unknown aetiology in children, especially if prolonged fever (>5 days).

However, these can often be difficult to differentiate, especially before the rash appears.

What investigations are necessary to diagnose measles?

Diagnosis is clinical, based on contact history (risk of infection) and clinical features. Where available, minimally invasive oral fluid kits can detect IgM, IgG, and measles RNA, enabling public health teams to exclude or confirm cases, establish if a case is primary or breakthrough infection, and establish the genotype of confirmed cases, with test sensitivity dependent on when a sample is taken in the course of the disease (see fig 2).[12] Blood tests for serum IgM can produce false negative results as the rise in IgM only occurs around three days after rash appears (see fig 2).[18]

What are the complications of measles?

Complications of measles are experienced mainly by infants (<1 year old) and adults, the commonest being:

- *Early*—Otitis media (7-9%); pneumonia (1-6%); diarrhoea (8%); febrile convulsion (0.5%).[15]
- *Late*—Measles encephalitis occurs in approximately one in 1000-2000 infections (symptoms around 1-2 weeks after onset of rash), while the late presenting (years later) and fatal subacute sclerosing pan-encephalitis (SSPE) occurs in one in 25 000 cases (rates of SSPE are 16 times higher in children originally infected as infants).[15]

Immunocompromised patients experience more severe measles disease. Infection in pregnancy can lead to preterm delivery, and vertical transmission can be particularly high risk for a preterm neonate.[12]

Data from the US during a rise in cases in 2019 saw 10% of patients hospitalised, the commonest complication being pneumonia.[20] A study from a 2018 outbreak in Jerusalem found a higher incidence of hepatitis in adults and higher incidences of respiratory problems and poor feeding in children.[21] Of the over 2000 confirmed cases in this Jerusalem outbreak, 161 patients were hospitalised, of whom 53.4% were <5 years.[21] Case fatality rates range from 0.1% in rich country settings to 15% in resource-limited settings, where there is often underlying malnutrition.[18]

How is measles managed?

Once measles is suspected, treatment and isolation should begin without waiting for laboratory confirmation. Advise patients to isolate for four days after the appearance of the rash, after which they will no longer be infectious. In the UK, unvaccinated household members must isolate for 21 days to ensure they are not infected. Vulnerable patients—pregnant, immunocompromised, or infants—should be discussed with the public health team to assess for post-exposure prophylaxis (see box 2).[23] Measles is a notifiable disease in the UK, and suspected cases must be reported to the local health protection team as soon as possible for it to conduct contact tracing (see box 2)—do not wait for laboratory confirmation.

Treatment is largely supportive, based on good hydration, pain relief, and early recognition and treatment of any bacterial complications.

Conservative management at home may be considered in patients who are alert, tolerating oral fluids, with no signs of dehydration, not requiring oxygen, and with only minor complications (such as otitis media, diarrhoea, pneumonia not requiring oxygen or feeding support).[12]

Hospital admission—consider admitting patients, especially in resource-limited settings, with:

- Dehydration
- Altered level of consciousness
- Seizures
- Severe pneumonia
- Croup
- Corneal lesions
- Malnutrition
- Unable to tolerate feeds and/or vomiting.[23]

Vulnerable patients—Discuss patients who are pregnant, immunocompromised, or infants with your local public health team (see box 2).[23]

Should vitamin A be given?

Measles infection depletes stores of vitamin A, causing eye disease (xerophthalmia), and this can be diagnosed clinically by corneal clouding or a pale, foamy spot found on the conjunctiva (known as a Bitot spot) at the 3

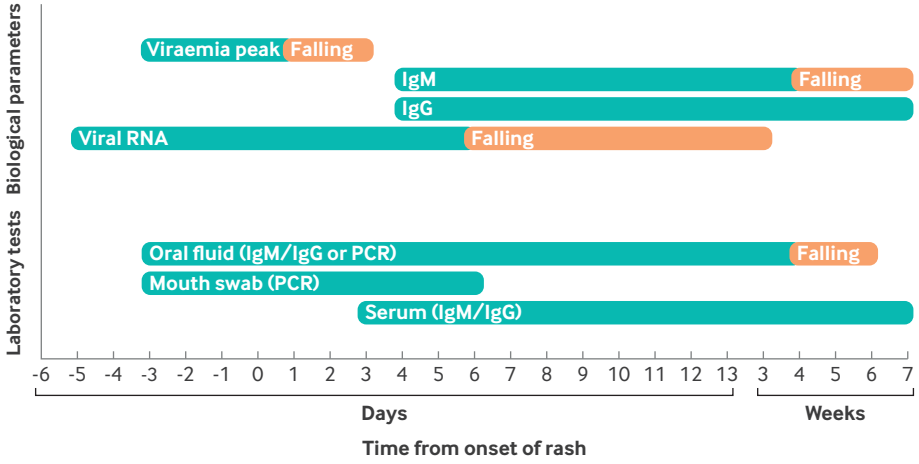


Fig 2 | Immune response in measles and related tests (adapted from UK Health Security Agency National measles guidelines[12])

Box 2 | What to do if a vulnerable contact has been identified

- Inform the local public health team, which in the UK will conduct a risk assessment to advise on use of post-exposure prophylaxis (PEP)
- Human normal immunoglobulin (HNIG) or immunoglobulin (intramuscular or intravenous) can be given as PEP (refer to national guidelines)
- MMR vaccine can be used as PEP for those who are not pregnant, immunocompromised, or young infants
- Both immunoglobulin and MMR are recommended to be given within 72 hours of exposure for maximum benefit[22]

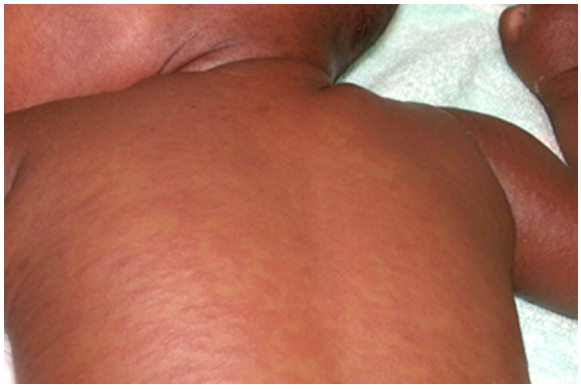
and 9 o'clock positions. The UK Health Security Agency currently does not advocate this, based on a Cochrane review that found insufficient evidence that vitamin A supplementation prevented blindness caused by measles.[24]

How can the spread of measles be reduced in a healthcare setting?

Healthcare settings are potential sites for spread in a measles outbreak, so every effort must be made to isolate patients with possible infection.[16] In the UK, NHS guidance for infection prevention and control[12] recommends that patients presenting with rash and fever (or fever in a measles outbreak) should be screened and triaged to identify suspected measles cases:

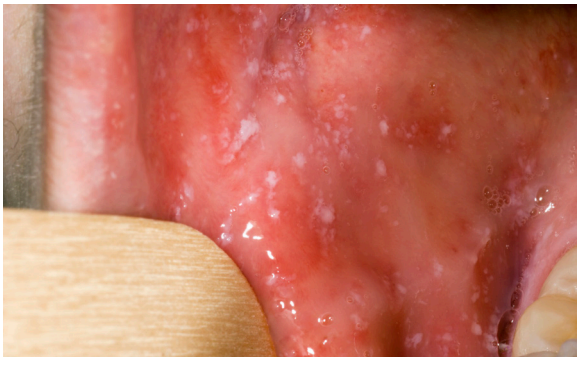
- In primary care this is via telephone triage
- Front door at hospitals or walk-in centres (during the recent outbreak in the West Midlands, a nurse was stationed at the entry of our emergency department to assess children for their MMR vaccination status and for signs and symptoms of measles).

Isolate suspected or confirmed cases promptly. If making a referral to hospital, pre-alert the staff to the patient's measles status if possible. Advise clinical staff to use appropriate personal protective equipment (PPE) informed by local national guidance. In our hospital, this means wearing properly fitted FFP3 masks, gloves, aprons, and goggles. All patient-facing staff should demonstrate measles immunity with evidence of two MMR vaccinations or documented to be positive for measles IgG.[12]



DFTSKINDEEP

Fig 3 | Classic maculopapular ("morbilliform") rash of measles. In people with darker skin, the redness is less apparent



P. MARAZZI/SPL

Fig 4 | Koplik spots inside the buccal mucosa

What can be done to stop or prevent outbreaks?

Vaccination is the key to stopping a measles outbreak alongside a prompt response by public health to suspected cases and efficient contact tracing to prevent spread, hence the vital importance of notifying cases quickly (based on clinical suspicion, not waiting for laboratory confirmation).[15] To achieve herd immunity, 95% of the population need to be vaccinated against measles, especially important for the protection of infants who must wait until age 12 months for their first MMR vaccination to ensure an adequate immune response.[15]

Competing interests: None declared.

Cite this as: *BMJ* 2025;388:e079895

Find the full version with references at doi: 10.1136/bmj-2024-079895

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

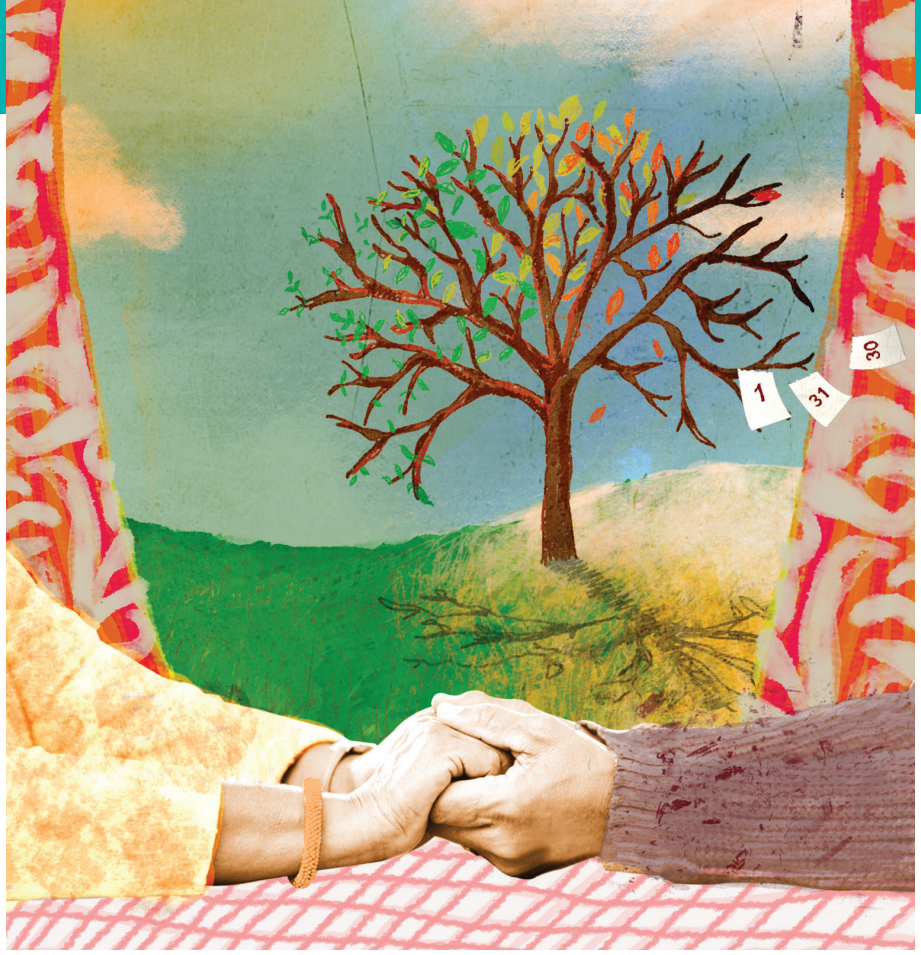
Patients not formally involved, but CB and FD have learnt both from patients and their families about many aspects of the management of measles, issues around low MMR uptake, and the importance of clear messaging around measles and vaccination.

WHAT YOUR PATIENT IS THINKING

The value of a little extra time

Chris Bennett shares her thoughts about the year she and her husband had together after he was found to have a brain tumour

CPD READING
0.5 HOURS



PRIYA SUNDRAM

Today my husband wrote me a love letter. Well, if I'm honest, I'm not certain it is a love letter, but I think I can read a couple of "darlings" amongst the scrawly bits I can't quite make out. He has certainly signed his name at the bottom, and when I asked him if the other words were "darling" he grinned that marvellous grin which, over our past 25 years, has always meant everything was just great.

The lines of scribble start at the very topmost edge of the paper, as if they are almost falling off, presumably an effect of the hemianopia we were told to expect if he opted for his third operation for a malignant brain tumour in less than 12 months. Faced with imminent coma and death, and tormented with headache and nausea, some loss of visual field seemed a small price to pay for the chance of a bit more liveable life.

Hope, a most precious commodity

People say how hard it is for me, but all I can think is how hard it is for him. When a grand mal fit came out of the blue one morning last year, the discovery of a right frontal lobe glioma led inexorably to retirement from his much loved work as a GP and altered our lives for ever.

He has changed so much this year, and now I hardly notice the changes. He used to be punctilious about small matters, but I now remind him to put on his seat belt in the car he is no longer allowed to drive. I work the day of the week into our early morning conversation so he doesn't have the embarrassment of asking. I even find myself getting irritated by his complete disregard for how long it takes him to prepare to go out—when I was the one who used to aggravate him by never being ready on time.

Now, with the postoperative cerebral oedema persisting, hope has nearly failed us all. I shall never forget our caring surgeon's unfeigned reluctance to be going on holiday and leaving the situation so uncertain. All we can do is wait and see. I'm going to believe it is a love letter, I'm going to believe we have a little more time. I must. A scrap of hope is all we have left.

Was intervention worth it?

The preceding words were written a year ago while my husband was still in hospital. He came home, spent another month with the family, and managed to say "I love you," before slipping peacefully away, just six days before the anniversary of his first fit a year earlier.

There is much debate today about how far to go with palliative treatment, and sometimes criticism of intervention when there is little hope of recovery. Many may indeed wonder if it was all worthwhile, for so little time. Certainly, it was all very expensive and might not be considered cost effective.

Yet intervention bought us a year. A year when for much of the time he felt well, giving us a chance to spend time together, to rediscover one another and to appreciate every day and experience we shared. It was a wonderful gift that I shall always treasure. I don't know whether it would have been worth it for everyone, but it was worth it for us. Thank you, everyone who made it possible.

Patient author
chris.e.bennett@btinternet.com
Cite this as: *BMJ* 2025;388:q2862

WHAT YOU NEED TO KNOW

- Sometimes even a little extra life can be important to those living it
- Feeling convinced that medical professionals genuinely care makes a big difference
- Honest explanations of choices and their consequences give a valuable feeling of having some personal control

EDUCATION IN PRACTICE

- How could you best support a patient, and their family, in the final months of life?
- What information could you provide to patients and families trying to decide on when, or if, to move into palliative treatment?

CASE REVIEW

Optic discs swelling in a child

A teenage girl presented to the hospital emergency department with a three-week history of intermittent frontal headache, which was worse in the morning and associated with nausea, vomiting, lethargy, and poor appetite. She denied any history of tinnitus, dizziness, numbness or weakness of limbs, weight loss, fever, or visual disturbance. She was otherwise fit and well, had normal body mass index, and was not taking any medication.

Systemic examination was unremarkable with normal blood pressure at 100/68 mm Hg. Her Snellen visual acuity was 6/6 in both eyes with normal colour vision and normal confrontational visual field test. Pupils were equal and reactive to light and accommodation with no relative afferent pupillary defect. Both anterior segments were normal. Fundus examination showed bilateral optic discs swelling (right Frisén grade 3, left Frisén grade 4) with obscuration of major vessels and flame-shaped haemorrhages of the nerve fibre layer. The retinal blood vessels and maculae were otherwise healthy.

Blood tests including full blood count, urea and electrolytes, and inflammatory markers were normal. The patient then underwent urgent magnetic resonance imaging (MRI) of the head and venogram, which were unremarkable. Subsequent lumbar puncture showed raised opening pressure at 32 cm H_2O with normal cerebrospinal fluid constituents.

1 What are the differential diagnoses?

2 What is the most likely diagnosis?

3 What is the management of this condition?

Submitted by Sook Kien Yen, Boon Lin Teh, and Lawrence Gnanaraj

Parental consent obtained.

Cite this as: *BMJ* 2025;388:e082059

If you would like to write an Endgames article, please see our author guidelines at bit.ly/29HCBAL and submit online at bit.ly/29yyGSx

answers

CASE REVIEW **Optic discs swelling in a child**

1 What are the differential diagnoses?

Most important is raised intracranial pressure (papilloedema). Papilloedema could be due to intracranial space-occupying lesions, cerebral venous sinus thrombosis, meningitis, severe hypertensive retinopathy, endocrine conditions (such as Cushing's syndrome, hypothyroidism), medication-related, or idiopathic intracranial hypertension (IIH), which is a diagnosis of exclusion. Rarely it can also be caused by spinal cord tumours, craniosynostosis, or primary hydrocephalus. In most patients with acute papilloedema, optic nerve function (visual acuity, colour vision, visual field, pupillary reaction) remains normal.

Other differential diagnoses for bilateral optic disc swelling include optic disc drusens, anomalous optic discs, or bilateral optic neuropathy. Although visual function of optic disc drusens and anomalous optic discs is also normal, peripapillary haemorrhages would be absent in most cases. On the other hand, bilateral optic neuropathy results in impaired visual function.

2 What is the most likely diagnosis?

Idiopathic intracranial hypertension (IIH). IIH is a rare condition in the paediatric age group (1-16 years), estimated to affect around 1 per 140 000 population per year. Risk factors include female sex, obesity, and older age (incidence peaks at 20-29 years). However, sex and obesity are weaker associations with IIH in paediatric population compared with adults. Patients typically present with symptoms of raised intracranial pressure such as headache, nausea, vomiting, pulsatile tinnitus, and sometimes visual complaints of diplopia or transient visual loss.

The Friedman criteria for diagnosis of IIH are presence of papilloedema (with or without peripapillary haemorrhages), normal neurological examination, normal neuroimaging (which rules out space-occupying lesions and cerebral venous sinus thrombosis), normal CSF constituents (ruling out meningitis), and elevated lumbar puncture opening pressure of ≥25 cm H_2O. Our patient met all five diagnostic criteria to be classified as "definite" IIH.

3 What is the management of this condition?

Management of IIH is aimed at protecting the optic nerves and preserving vision. First line medical treatment is the use of carbonic anhydrase inhibitors such as acetazolamide to reduce intracranial pressure.

If visual function is threatened, optic nerve sheath fenestration and neurosurgical procedures such as ventriculoperitoneal or lumboperitoneal shunt may be required. Patients with IIH should be monitored within the hospital services at least until the resolution of papilloedema.

PATIENT OUTCOME

See bmj.com.

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.