

education

FROM THE JOURNALS Edited highlights of weekly research reviews on <https://bit.ly/2PLtl18>

Weight loss "gamechanger"

Glucagon-like peptide-1 (GLP-1) receptor agonists are an established treatment for type 2 diabetes. However, the STEP 1 trial tested semaglutide in people who were obese but without diabetes. This double-blind randomised trial showed a dramatic reduction in weight with once weekly injectable semaglutide (15% reduction) compared with placebo (3% reduction) at one year. The word "gamechanger" has been used to describe this result, and, for once, it probably is. This is because lifestyle intervention and existing drugs such as orlistat haven't really helped much. Bariatric surgery is effective but is a serious undertaking. This drug may truly offer hope. It's not terribly pleasant though; three quarters of those in the treatment group had gastrointestinal disorders, compared with just under half of those in the placebo group. But these side effects led to only 5% of people stopping the treatment (compared with 1% of those in the placebo group).

• *N Engl J Med* doi:10.1056/NEJMoa2032183



Null result for exercise for HFpEF

Heart failure with preserved ejection fraction (HFpEF) is notoriously lacking in effective therapies. This is often attributed to the syndrome not being well understood and having a range of definitions. This well designed and well conducted randomised trial of 180 patients tested whether high intensity interval training or moderate continuous exercise improved exercise capacity compared with guideline-recommended exercise (standard care) at three months. Neither type of exercise helped substantially. This is disappointing but useful evidence to have.

• *JAMA* doi:10.1001/jama.2020.26812

Bicuspid valves and associated aortic disease

Sillesen and colleagues found a 0.77% prevalence of bicuspid valves (with a third of these also having aortopathy) based on transthoracic echocardiography in over 25 000 newborns in Denmark. The size of the sample and the fact that there was no bias in who got scanned (all newborns were systematically scanned rather than scanning only those felt to be at risk) adds weight to the findings. Given the high rate of concomitant aortic abnormalities, it is likely that the aortopathy is a fetal abnormality rather than dilatation subsequent to the bicuspid valve.

• *JAMA* doi:10.1001/jama.2020.27205

A hospital covid-19 outbreak

This study, set in the US Brigham and Women's Hospital, has an important message: "SARS-CoV-2 clusters can occur in hospitals despite robust infection control policies." The cluster studied consisted of 52 infections (14 patients and 38 members of staff) in September 2020. The infection control policies in place included all the usual things. And what happened was totally run of the mill. A patient had a negative admission swab and tested positive four days later after spiking a fever. By the time the positive test was known, several staff members were already symptomatic. Whole-genome sequencing was used to test whether infections could be related to the cluster.

Then comes the most interesting aspect of the investigation—a case-control assessment of factors associated with infection of staff: being present while patients used nebulisers, caring for patients with breathlessness or cough, interacting with staff members who tested positive, and not wearing eye protection. Unfortunately, it is not possible to establish these factors as contributory to infection because they are susceptible to confounding and to recall and ascertainment biases—not to mention that this is only an analysis of a single cluster, albeit a fascinating and detailed one.

• *Ann Intern Med* doi:10.7326/M20-7567

Prediabetes downgrade in older adults

In medicine, people can sometimes be reduced to a collection of diagnoses. It's not really a great way to live, defined by your disease. So it makes sense to default to avoiding overdiagnosis. Overdiagnosis, or creating new "diseases" such as prediabetes to add to the collection, is always done with good intentions, but it might be better to wait until it's shown that diagnosing something is helpful for preventing unwanted outcomes. Rooney and colleagues' cohort study showed that people aged 70-90 years with prediabetes (almost a third of the 3412 older adults) were more likely to revert to normoglycaemia, or die, than progress to diabetes six years later. This suggests that prediabetes isn't an important mediator of issues in older adults and so may not be useful to diagnose. Unfortunately, these data are limited by incomplete follow-up, meaning that the risk of diabetes at follow-up could have been underestimated. Also, participants may have received lifestyle modification in a way that may differ from the general population.

• *JAMA Intern Med* doi:10.1001/jamainternmed.2020.8774

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Do not routinely offer imaging for uncomplicated low back pain



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The clinical problem

For managing low back pain (LBP), evidence now indicates that imaging is useful only in the small subgroup of patients for whom there is suspicion of red flag conditions, which together account for only 5-10% of LBP presentations in primary care.¹ For the remaining 90-95% of LBP cases (called non-specific or uncomplicated LBP), imaging will not guide management and can cause more harm than benefit.

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

BT is a patient adviser with lived experience of low back pain over many years. He reviewed literature that informed the "Patient perspectives" section in addition to reviewing and commenting on the manuscript.

WHAT YOU NEED TO KNOW

- Less than 5-10% of all low back pain is due to a specific underlying spinal pathology
- The remaining 90-95% has no indication of a serious cause and should be managed conservatively
- Diagnostic triage based on clinical history and examination can help distinguish between non-specific or more serious low back pain
- Imaging may do more harm than good when serious conditions are not suspected and is likely to prolong recovery in patients with non-specific low back pain

WHAT PATIENTS NEED TO KNOW

- Most cases of LBP are simple strains and sprains of the back that, while painful and unpleasant, improve rapidly just like a sprained ankle
- Having an image (radiograph or CT or MRI scan) of your back does not usually help to find the cause of the back pain or guide treatment
- The treatment for most cases of back pain is the same whether imaging is used or not; and we have seen that those who have unnecessary imaging often have a delayed recovery
- Unnecessary imaging has some risks, including radiation exposure and delay in appropriate treatment, and has been associated with worse patient outcomes and an increase in unnecessary surgery
- You may know people who have had a radiograph, CT, or MRI scan of their back that showed "changes"; but most of these changes are normal and are more common the older you get, just like grey hair and wrinkles. As these changes also occur in people without back pain, their relevance is unclear

The evidence for change

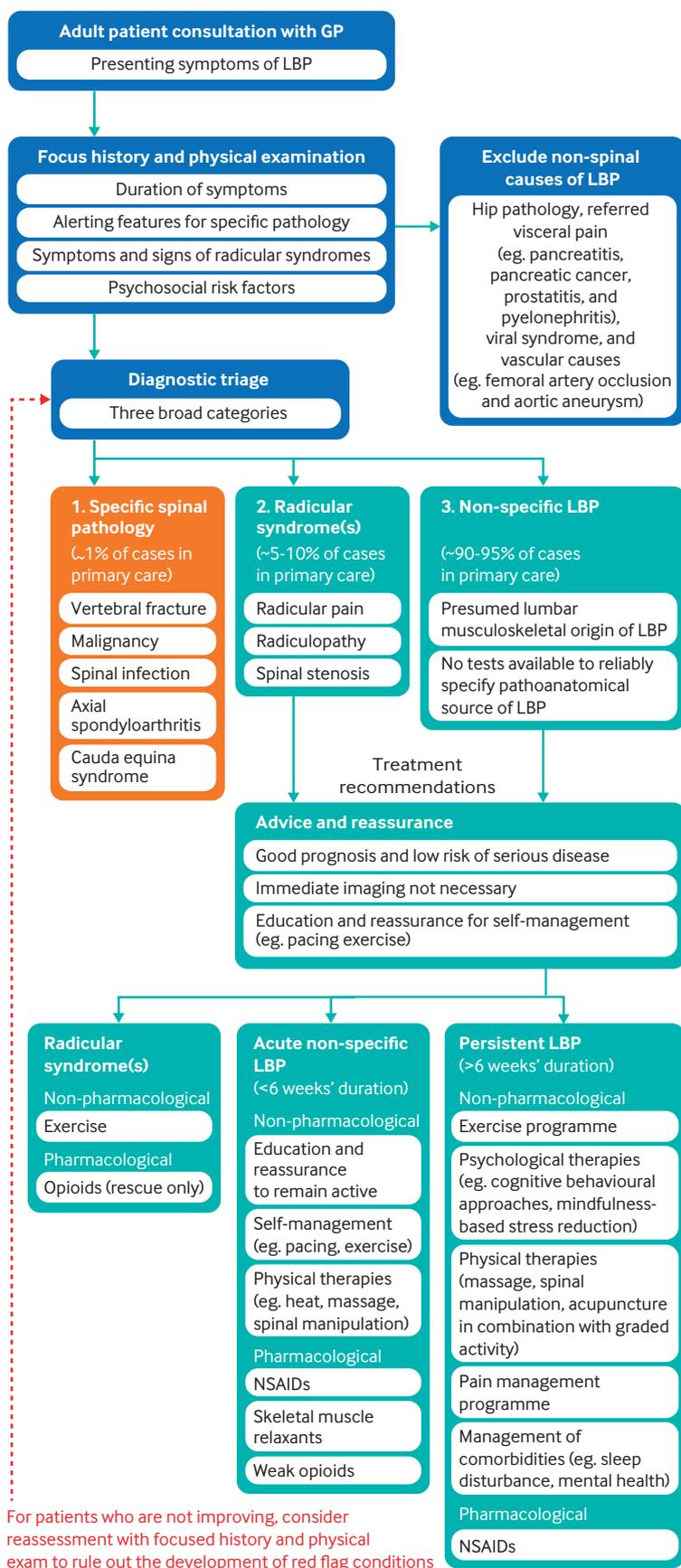
Evidence from randomised controlled trials has established that imaging does not improve clinical outcomes, and several observational studies have linked liberal imaging with greater work absence and unnecessary use of health services.⁵ Unnecessary LBP imaging has the potential for harm. The most obvious is exposure to radiation from x-rays. Harm is also possible if a clinician acts on incidental findings from any imaging method or if these findings are not appropriately explained to patients. For example, disc abnormalities such as bulging disc or degenerative disc disease are commonly seen on images but may not be the source of pain, as they are also seen on images in up to 97% of asymptomatic patients.⁶ Incidental findings may lead to further investigations, specialist referral, and more intensive treatment such as surgery.

Two systematic reviews of six randomised controlled trials (1804 participants) both concluded that patients who received imaging without a clear clinical indication did not have improvements to pain, function, or quality of life compared with those who did not have imaging.^{11,12} Additionally, observational studies have found that those who received imaging when not indicated had greater use of health services such as injections and surgery and greater work absence than their counterparts who did not receive imaging.^{5,13-15}



Barriers to change

Lack of awareness of current back pain guidelines and knowledge about how to apply them in practice are likely contributors to the over-reliance on imaging in primary care. Recent systematic reviews suggest that the clinical environment itself may encourage physicians to order imaging owing to (a) accommodating patient requests, (b) believing that imaging will reassure the patient, and (c) not having time to explain and justify a non-imaging approach.¹⁷ Additional factors include worry about missing a specific pathology, not being aware of conservative interventions besides medication, and a lack of access to conservative management such as exercise therapy, physical therapy, chiropractic care, cognitive behavioural therapy, and pain management programmes.^{17,18}



For patients who are not improving, consider reassessment with focused history and physical exam to rule out the development of red flag conditions

LBP = low back pain, NSAIDs = non-steroidal anti-inflammatory drugs

Fig 1 | Diagnostic triage for low back pain. (Adapted from Traegar et al²¹)

Patient perspectives

Clinicians often report that they order imaging when patients specifically request it. Systematic reviews of surveys and interviews suggest that about half of patients expect imaging from their health provider because they believe it can help rule out a sinister cause for the pain.¹⁹ There is still considerable uncertainty as to what alternatives to imaging would convey the diagnosis of non-specific LBP satisfactorily from the patient's perspective.

How should practice change?

Practice changes in the following key areas are required to support appropriate imaging use:

Diagnostic triage and management—By conducting a more thorough diagnostic triage,²⁰ clinicians can discern which patients fall into the category of non-specific LBP. Bardin et al²⁰ and Traegar et al²¹ developed a useful visual aid (fig 1) for conducting diagnostic triage in patients with LBP. Bardin et al's visual aid also details evidence based treatments for patients assessed to have radicular syndrome or non-specific LBP. We have supplemented this with a decision support tool (fig 2) to help clinicians identify the small subgroup of patients with suspected red flag conditions who do need imaging. As detailed in figure 1, advise all patients with non-specific LBP or radicular syndromes, regardless of pain duration, to remain active and reassure them of a good prognosis.

Patient education—Offer patients with non-specific LBP reassurance that imaging is not required and provide advice on self-management as first-line care. "What patients need to know" summarises key points to cover when providing reassurance. Jenkins et al's education booklet *Understanding My Low Back Pain* guides clinicians and patients through points to cover within a consultation²² and can be given to patients as an educational and treatment advice tool.

Communication style—Four key behaviours from clinicians that can help patients feel reassured.²³

- Show that you "know the whole story" by summarising the patient's medical history and conducting a thorough assessment
- Demonstrate empathy and communicate that you are qualified and experienced, helping the patient to feel that they are "seeing the right person"
- Reduce the use of generic statements such as "nothing to worry about" and recognise the patient's distress
- Explain the likely cause(s) of LBP and provide a clear self-management plan to help the patient understand and manage their LBP.²²

Competing interests: None declared.

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Find the full version with references at <http://dx.doi.org/10.1136/bmj.n291>

EDUCATION INTO PRACTICE

- How will your referrals for imaging in people with low back pain change as a result of reading this article?
- Audit the number of spinal radiographs and MRI scans requested in your practice in the past six months. How many of those are in line with the recommendations?
- How might you go about providing reassurance that imaging is not required?

Alerting features	Diagnosis and prevalence	Image type	Timing
<ul style="list-style-type: none"> Older age (>65 years for men, >75 years for women) Prolonged corticosteroid use Severe trauma Presence of contusion or abrasion 	Vertebral fracture 0.7% - 4.5%	X ray possible CT scan	<ul style="list-style-type: none"> Major risk: immediate Minor risk: 1 month "watch and wait"
<ul style="list-style-type: none"> History of malignancy Strong clinical suspicion Unexplained weight loss, >50 years 	Malignancy 0.2%	X ray and MRI	<ul style="list-style-type: none"> Major risk: immediate Minor risk: delay
<ul style="list-style-type: none"> Fever or chills Immune compromised patient Pain at rest or at night Intravenous drug user Recent injury, dental or spine procedure 	Spinal infection 0.01%	X ray and MRI	Immediate
<ul style="list-style-type: none"> New bowel or bladder dysfunction Perineal numbness or saddle anaesthesia Persistent or progressive lower motor neuron changes 	Cauda equina syndrome 0.04%	MRI	Immediate
<ul style="list-style-type: none"> Progressive lower limb motor weakness Motor deficits at multiple levels 	Severe neurologic deficits	MRI	Immediate
<p>Chronic back pain (>3 months' duration), with back pain onset before 45 years of age and one or more of the following</p> <ul style="list-style-type: none"> Inflammatory back pain with at least 4 of: <ul style="list-style-type: none"> - Age of onset 40 years or younger - Insidious onset - Improvement with exercise - No improvement with rest - Pain at night - with improvement when getting up Peripheral manifestations (in particular arthritis, enthesitis, or dactylitis) Extra-articular manifestation (psoriasis, inflammatory bowel disease, or uveitis) Positive family history of spondyloarthritis Good response to NSAIDs 	Axial spondyloarthritis 0.1% - 1.4%		Refer to rheumatologist if strong suspicion of axial spondyloarthritis

Alerting features	Diagnosis and prevalence	Image type	Timing
<ul style="list-style-type: none"> Back pain with leg pain in an L4, L5, or S1 nerve root distribution Positive result on straight leg raise or crossed straight leg raise twist 	Radicular pain or radiculopathy	Consider MRI in patients who are candidates for surgery	Defer work up until a trial of therapy has been completed
<ul style="list-style-type: none"> Bilateral buttock, thigh, or leg pain Older age Pseudoclaudication 	Spinal canal stenosis	Consider MRI in patients who are candidates for surgery	Defer work up until a trial of therapy has been completed

CT = computed tomography, MRI = magnetic resonance imaging, NSAIDs = non-steroidal anti-inflammatory drugs

Fig 2 | Decision aid based on the latest evidence for triaging LBP patients. (Imaging for all other conditions is probably not useful and may be harmful) (Adapted from Bardin and colleagues²⁰)

SPOT DIAGNOSIS

An irregular ulcer in the rectum

A man in his 50s was referred to hospital by his general practitioner with a suspected rectal lesion after rectal examination. He had also experienced intermittent constipation without rectal pain for five years, which he had managed with self-administered simple enemas once a week for the past three years, but these were not effective at relieving the constipation. He had a medical history of intolerance to penicillin. Full details of his sexual history could not be elicited.

Digital rectal examination showed a non-tender rectal lesion of about 3 cm in diameter on the left side of the rectum; it had a smooth base, was slightly raised, and had indurated borders.

Relevant laboratory test results are shown in the table.

Magnetic resonance imaging showed irregular low rectal wall thickening (about 4 cm in diameter), which invaded the left mesorectal fascia with multiple lymph node enlargement in the peri-intestinal tract as well as the anterior sacrum.

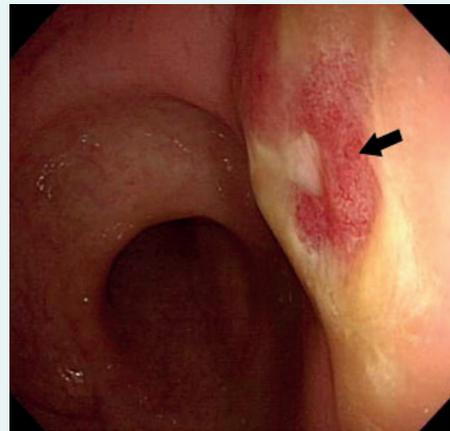
Colonoscopy showed an irregular rectal ulcer with a fibrinous surface and marked mucosal friability that was about 1.5 cm in diameter (figure, black arrow). No neoplastic cells were found on biopsy of the rectal lesion; however, there was inflammatory infiltration with a large number of lymphocytes and many mature plasma cells.

What is the most likely diagnosis?

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Patient consent obtained.

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Colonoscopy showed an irregular rectal ulcer with a fibrinous surface and marked mucosal friability about 1.5 cm in diameter (black arrow)

Relevant laboratory test results

Test	Result
HIV antibody test	Negative
Alpha-fetoprotein	Negative
Carcinoembryonic antigen	Negative
Carbohydrate antigen 19-9 (CA19-9), CA125, CA153, and CA724	Negative
Toluidine red unheated serological test	Positive with a titre of 1:1
<i>Treponema pallidum</i> particle agglutination assay	Positive

answers

SPOT DIAGNOSIS An irregular ulcer in the rectum

What is the most likely diagnosis? Sphilitic chancre of the rectum, confirmed by toluidine red unheated serological test and *Treponema pallidum* particle agglutination assay. Sphilitic chancres appear during the primary stage of syphilis after an incubation period of 9-90 days at the site of *T pallidum* inoculation. Chancres are usually genital but may also be found in the anal, rectal, or oral regions, or on the hands. Chancre of the rectum is usually asymptomatic, but in some people it might cause mild rectal pain or discomfort, and occasionally rectal secretions, constipation, rectal bleeding, and the primary chancre usually heals spontaneously within 3-10 weeks, leaving a slightly indurated scar. Documented evidence of

primary rectal syphilis is limited to case reports. The differential diagnosis of rectal ulcers is extensive. The most common conditions to rule out during initial investigations are benign neoplasms, melanoma, carcinoma and adenocarcinoma. Reaction to the following drugs can also cause rectal ulcers: incoamycin, 5-fluorouracil, some oral contraceptives, and aminophylline suppositories. Other infective causes include herpes simplex virus and HIV. In this case, these differentials were ruled out by magnetic resonance imaging, endoscopic biopsy, medication history, and the laboratory investigations listed in the table. Diagnosis can be complicated if an accurate sexual history is not available.

Attempt to take a comprehensive history in patients with suspected rectal lesions, including an accurate sexual and medication history.

LEARNING POINT
Attempt to take a comprehensive history in patients with suspected rectal lesions, including an accurate sexual and medication history.

PATIENT OUTCOME
The patient was treated with intravenous ceftriaxone (2 g daily) for two weeks. A follow-up toluidine red unheated serological test one day after the initial treatment increased to a titre of 1:8 suggesting that the response to the initial treatment was poor. Follow-up magnetic resonance imaging one day after the initial treatment showed that the irregular low rectal wall thickening was still present and the enlarged lymph nodes had become necrotic. The patient was then treated with oral doxycycline hydrochloride (0.2 g daily) for 30 days. Follow-up toluidine red unheated serological test 23 days after the second treatment decreased to a titre of 1:1. Follow-up colonoscopy 23 days after the second treatment showed keloid formation where the rectal lesion had been. Follow-up toluidine red unheated serological test nine months after the second treatment was negative.



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



Articles with a "learning module" logo have a linked BMJ Learning module at <http://learning.bmj.com>.

MINERVA

Beware of the bleeding nodule

This is a lesion of the post-auricular area in a man in his 50s. The lesion had been present for four months, with no reported history of trauma. A bleeding pyogenic granuloma was suspected because of the rapid growth.

Examination showed an 8 mm eroded, ulcerated, and bleeding nodule. Excision was performed because of the crusted and hyperpigmented base, and histology revealed advanced malignant melanoma. A new neck lump was identified on examination and fine needle aspiration biopsy confirmed nodal metastasis (stage pT4b N3b M0-III).

Amelanotic melanoma can mimic benign

and malignant skin tumours, including pyogenic granuloma, basal cell carcinoma, and inflamed skin tags. Diagnosis can be missed if such lesions are not sent for histological examination. Careful search for a hyperpigmented base is imperative to avoid missing a subtle diagnosis of amelanotic melanoma.

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Patient consent obtained.

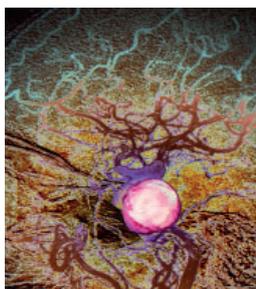
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If you would like to write a Minerva picture case, please see our author guidelines at <http://bit.ly/29HCBAL> and submit online at <http://bit.ly/29yyGSx>

Intracranial aneurysms

A French study collected data on 2500 patients with intracranial aneurysms. The researchers then compared the characteristics of unruptured aneurysms that had been discovered incidentally with ruptured aneurysms discovered during investigation for intracranial haemorrhage. On average, people with ruptured aneurysms were older and their aneurysms were larger and more likely to be located in the posterior cerebral circulation (*Neurol Neurosurg Psych* doi:10.1136/jnnp-2020-324371). Rather surprisingly, systemic hypertension wasn't associated with rupture.



Disinfecting surfaces

It's now clear that transmission of coronavirus SARS-CoV-2 is predominantly airborne. Under some conditions, the virus can survive on surfaces but spread by fomites seems to be rare ([https://www.thelancet.com/pdfs/journals/laninf/PIIS1473-3099\(20\)30561-2.pdf](https://www.thelancet.com/pdfs/journals/laninf/PIIS1473-3099(20)30561-2.pdf)). An editorial in *Nature* asks why public health agencies continue to emphasise that surfaces pose a threat and require frequent disinfection (<https://www.nature.com/articles/d41586-021-00277-8>). It's surely time to update this advice and prioritise more effective ways of preventing the virus spreading.

Brown fat

White fat stores excess energy. Brown fat, on the other hand, is thermogenic and dissipates energy as heat. Brown fat is present in only a minority of humans but, according to a retrospective study of 50 000 patients who had positron emission scanning during diagnosis and treatment of cancer, it confers a metabolic advantage. Around 10% of patients had brown fat deposits, mainly in a supraclavicular or cervical location. Compared with those without brown fat they were less likely to have type 2 diabetes, dyslipidemia, cardiovascular disease, or hypertension (*Nat Med* doi:10.1038/s41591-020-1126-7).

Working outdoors

A case-control study from Denmark compared the occupational histories of 40 000 women with breast cancer with those of randomly selected women of the same age without cancer. Women older than 50 who had worked outside for 20 years or more had a slightly lower risk of breast cancer (*Occup Env Med* doi:10.1136/oemed-2020-107125). The investigators wonder if outdoor workers were exposed to more sunlight, boosting their levels of vitamin D and protecting them against the disease.

Vision influences hearing

Biphasic movements of the hand in time with the rhythms of speech—beat gestures—are a feature of many languages across the world. Experiments show that they influence the perception of lexical

stress which, in turn, influences the vowel sounds that listeners hear. Rather like lip movements, beat gestures aid the interpretation of speech. They are part of the reason why face-to-face communication is less vulnerable to error than telephone conversations (*Proc Royal Soc B* doi:10.1098/rspb.2020.2419).

History of vaccination

In the 18th century, it was folk knowledge that milkmaids rarely suffered smallpox. The Gloucestershire physician Edward Jenner took this observation a step further by inoculating a young boy with pus from a cowpox sore. However, the history of vaccination begins much earlier. Long before Jenner, precursors of vaccination such as variolation had been in use in many countries including Denmark, Switzerland, and Poland. And the Chinese had been blowing dried, ground-up smallpox material up the nose for centuries (<https://www.lrb.co.uk/the-paper/v43/n03/steven-shapin/a-pox-on-the-poor>).

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