How do you know if you have covid-19?
This question is probably one of the most important of our time, especially if you deal with vulnerable people at work or in your family. Chow and colleagues present the findings of interviews with 48 healthcare professionals in King County in the US state of Washington who tested positive for SARS-CoV-2 following symptoms. Half of them presented with cough; fever was the next most common initial symptom, occurring in 20 (42%) of them; 17 (35%) had myalgia; and one individual’s only symptoms were coryza and headache. However, we have to bear in mind that these data are likely to be affected by recall bias and that this sample wasn’t rigorously selected to be representative of any particular population. However, it is clear that this is a heterogenous condition and that screening by symptoms seems a haphazard approach.

Have you heard the one about covid-19 and the Canadian model?
Giannakeas and colleagues made an interactive web app in which you input the number of acute care beds, critical care beds, and mechanical ventilators available for patients with covid-19 in your local healthcare system, and it outputs the maximum number of covid-19 cases that could be cared for in that system. The tool uses data on the local distribution of covid-19 cases by age and the distribution of severity to estimate lengths of stay. This output can highlight the need for more of a particular resource, such as ventilators, in that healthcare system. Neat. The app can only be as good as the data that went into it—currently based on figures from Canada, US, Italy, and China—but the authors have committed to updating the tool. For example, the number of cases of covid-19 will increase as testing increases, but many of these will be people who will not require hospitalisation.

Is pregnancy a risk factor for severe covid-19?
Of the 118 pregnant women in this study, nine (8%) had severe covid-19 whereas 15.7% of the general population in China got severe disease. The authors conclude that pregnant women do not have an increased risk of severe disease. I’m not convinced: this comparison is very crude, and I would say we just don’t know. And next time, include a comparator group, please. Why weren’t they compared with matched non-pregnant women for example? Sure, there would be plenty of confounders, but better than nothing. Rates of miscarriage (3%), ectopic pregnancy (2%), premature delivery (21%), and caesarean section (93%) in pregnant women with covid-19 are interesting, but the impact of covid-19 on these rates is unknown.

News from New York
Two hospitals in Manhattan describe the characteristics of their first 393 consecutive patients. A third had “respiratory failure leading to invasive mechanical ventilation”—10 times higher than reports from China. These hospitals had what they call an “early intubation strategy with limited use of high-flow nasal cannulae during this period.” This has a responsible, scientific-sounding ring to it, as if anyone knows whether this is a good idea. This report indicates that early intubation leads to . . . well, lots of people being intubated, and not a lot of people being able to be extubated. And lo and behold, demand for mechanical ventilation is set to outweigh the supply. Does anyone remember this thing for comparing two interventions of unknown benefit called a randomised controlled trial?

Iceland on the ball
Not football. Football’s off, remember? Iceland has done a good job of trying to understand how covid-19 spreads in a population. People were tested if they were “high-risk”—which usually meant they were symptomatic, had contact with an infected person, or had recently travelled to a high risk country. The researchers also screened the population using two strategies, (a) an online invitation open to any resident of Iceland who was symptom-free or who had mild symptoms of the common cold and (b) direct invitations to a random sample of the population. A total of 13.3% of the high risk group tested positive for the virus, compared with 0.8% in the open-invite group and 0.6% in the random sample group. The latter numbers are probably indicative of the true prevalence in Iceland at the time. The incidence of infection was lower in women and children. The virus’s predilection for age and gender may be the key to a profound pathological insight—can we get that worked out in time for next week’s column please? Many thanks.

Alex Nowbar is a clinical research fellow at Imperial College London
COVID-19 REVIEWS

Richard Lehman

Try this at home?

“Home care of covid-19: a descriptive review” is the paper I’m most keenly awaiting. At present this wish would have to be filed under “Pending: no articles found.”

You may say that patients with covid-19 who stay at home can’t be properly ill, or they would be in hospital. Think about it, and you’ll see this isn’t necessarily true. These people still need kind and careful care: they may be dying of covid-19, or something else, or they may be too frightened to go in, or simply have decided that if it comes to it, they would like to take their chances and die in their own bed. They may have been turned away by some triage system.

NHS England has been trying to issue guidance without committing to any set model (www.england.nhs.uk/coronavirus/publication/novel-coronavirus-covid-19-standard-operating-procedure-community-health-services/). For a week or two there was talk of “virtual wards” at home. There are lots of suggestions about palliative care and models of communication. There is even talk of training families and carers to maintain syringe drivers (https://helixcentre.com/project-end-of-life-toolkit). Much of this sounds like improvisation driven by lack of staff and resources, but I would love to hear from readers about achieved solutions.

ACE news

Even before covid-19 came along, I lived in a state of permanent irritability that resulted from hypertension. No, you fool, not due to a disease called hypertension! There is no such disease! Can’t you see it’s a continuous physiological variable that is only relevant in the context of total cardiovascular risk?

Then along came covid-19, which seems to enjoy killing people with elevated blood pressure. Why? Perhaps because so many of them take angiotensin converting enzyme (ACE) inhibitor and angiotensin receptor blocker (ARB) drugs that increase the number of ACE receptor sites, which the coronavirus uses to gain entry to human cells of many kinds. You can read all about this—and almost everything else you need to know about covid-19 as a systemic illness—in a terrific summary just published in Circulation (www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.120.047549).

The presumption, therefore, has been that people continuing to take ACE inhibitors or ARBs to lower blood pressure in hospital might have a higher mortality than those taking other blood pressure-lowering drugs. But in the biggest observational series published so far (www.ahajournals.org/doi/10.1161/CIRCRESAHA.120.317134) from nine hospitals in Hubei province, China, the opposite is true. Those taking these drugs had a mortality rate of less than half of those who did not (hazard ratio 0.37).

Now you could do a whole graduate class on this observational study and its potential sources of confounding and bias, but my conclusion would still be that these drugs are safe in severe covid.

Aunty bodies

In the north of England in the 1950s, every child was surrounded with several orbital rings of bodies who came to tea, called anties (people from the south using the long “a” will not understand this). As with electrons surrounding an atomic nucleus, anties were quantum objects: any knowledge about their exact position was gained at the expense of ignorance about their momentum, so that some anties were real relatives, whereas others existed in a state of quantum uncertainty. Some came often, some came seldom, and others just wrote at Christmas.

I got a similar feeling of childlike consternation when I read a truly masterly review of coronavirus antibodies (www.medrxiv.org/content/10.1101/2020.04.14.20065771v1). The questions it poses are all the ones you most need answers to: for example, Do people who have more severe disease mount stronger antibody responses after infection? Will infection protect you from future infection? How long will immunity last? This review provides a solid scholarly foundation for answering these questions, but only once the wave function of uncertainty has collapsed. I hope this article is the beginning of a cumulative real-time review that will give us all the emerging photons the moment they are emitted.

Richard Lehman is professor of the shared understanding of medicine at the University of Birmingham.
Managing covid-19 symptoms in the community (including at the end of life)

Although much focus has been on assessing the severity of covid-19, general practitioners and other community based clinicians also need a working knowledge of symptom management. Symptoms of cough, fever, and breathlessness can be highly distressing even in those who do not have severe disease. Also, treatments for symptoms in severe covid-19 will be needed for patients whose advance care plan or advance decision to refuse treatment includes a decision not to escalate treatment beyond home based care.

This article summarises key points from the National Institute for Health and Care Excellence covid-19 rapid guideline on managing symptoms (including at the end of life) in the community. The guideline is part of a series of rapid guidelines on covid-19, developed in collaboration with NHS England and NHS Improvement using interim process and methods. Recommendations are based on evidence and expert opinion and have been verified as far as possible by NICE.

WHAT YOU NEED TO KNOW

- Put treatment escalation plans in place for patients with covid-19, because they may deteriorate rapidly and need urgent hospital admission
- Encourage patients with cough to avoid lying on their back and, for those with a cough that is distressing, to consider short term use of codeine linctus, codeine phosphate tablets, or morphine sulfate oral solution
- Controlled breathing techniques include positioning, pursed-lip breathing, breathing exercises, and coordinated breathing training

Recommendations

Communicating with patients and minimising risk

- For patients with covid-19 symptoms, explain:
  - That the key symptoms are cough, fever, breathlessness, anxiety, delirium, and agitation, but they may also have fatigue, muscle aches, and headache
  - That they and people caring for them should follow the UK guidance on self-isolation and the UK guidance on protecting vulnerable people
  - That if the symptoms are mild they are likely to feel much better in a week
  - Who to contact if their symptoms get worse, such as NHS 111 online.
- Minimise face-to-face contact by:
  - Offering telephone or video consultations
  - Cutting non-essential face-to-face follow up
  - Using electronic prescriptions rather than paper
  - Using different methods to deliver medicines to patients; for example, pharmacy deliveries, postal services, NHS volunteers, or introducing drive-through pick-up points for medicines.

Treatment and care planning

- When possible, discuss the risks, benefits, and possible likely outcomes of the treatment options with patients with covid-19, and their families and carers, so that they can express their preferences about their treatment and escalation plans.
- Put treatment escalation plans in place because patients with covid-19 may deteriorate rapidly and need urgent hospital admission.
- For patients with pre-existing advanced comorbidities, find out if they have advance care plans or advance decisions to refuse treatment, including do not attempt resuscitation decisions. Document this clearly and take account of these in planning care.

Managing cough

- Be aware that older patients or those with comorbidities, frailty, impaired immunity, or a reduced ability to cough and clear secretions are more likely to develop severe pneumonia. This could lead to respiratory failure and death.
- If possible, encourage patients with cough to avoid lying on their back because this makes coughing ineffective.
Use simple measures first, including getting patients with cough to take honey (for patients aged over 1 year).

See the table for treatments for managing cough.

For patients with covid-19, consider short term use of codeine linctus, codeine phosphate tablets, or morphine sulfate oral solution to suppress coughing if it is distressing.

**Box 1 | Techniques to help manage breathlessness**

- Controlled breathing techniques include positioning, pursed-lip breathing, breathing exercises, and coordinated breathing training.
- In pursed-lip breathing, people inhale through their nose for several seconds with their mouth closed, then exhale slowly through pursed lips for 4-6 seconds. This can help to relieve the perception of breathlessness during exercise or when it is triggered.
- Relaxing and dropping the shoulders reduces the hunched posture that comes with anxiety.
- Sitting upright increases peak ventilation and reduces airway obstruction.
- Leaning forward with arms bracing a chair or knees and the upper body supported has been shown to improve ventilatory capacity.
- Breathing retraining aims to help a person regain a sense of control and improve respiratory muscle strength. Physiotherapists and clinical nurse specialists can help patients learn how to do this (bearing in mind that this support may need to be done remotely).
- Use simple measures first, including getting patients with cough to take honey (for patients aged over 1 year). See the table for treatments for managing cough.
- For patients with covid-19, consider short term use of codeine linctus, codeine phosphate tablets, or morphine sulfate oral solution to suppress coughing if it is distressing.

**GUIDELINES INTO PRACTICE**

- How would you provide written information about self management and breathing techniques to a patient with covid-19 whom you have assessed remotely?
- How do you ensure that a treatment escalation plan is discussed and documented with patients and their carers, and made available to other healthcare providers?

**HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE**

The NICE rapid guideline process included “targeted peer review” involving patient groups.

**Managing fever**

- Be aware that, on average, fever is most common five days after exposure to the infection.
- Advise patients to drink fluids regularly to avoid dehydration (no more than 2 litres per day).
- Do not use antipyretics with the sole aim of reducing body temperature.
- Advise patients to take paracetamol if they have fever and other symptoms that antipyretics would help treat. Tell them to continue only while the symptoms of fever and the other symptoms are present. Until there is more evidence, paracetamol is preferred to non-steroidal anti-inflammatory drugs (NSAIDs) for patients with covid-19.

**Managing breathlessness**

The guidance offers a range of techniques to help manage breathlessness (box 1) and encourages clinicians to be aware that severe breathlessness often causes anxiety, which can then increase breathlessness further.

For patients with covid-19 who are at the end of life and have moderate to severe breathlessness and are distressed, consider concomitant use of an antiemetic and a regular stimulant laxative (box 2). Note that opioids and benzodiazepines do not currently have a UK marketing authorisation for moderate to severe breathlessness.
### Box 2 | End-of-life treatments for managing breathlessness in patients aged 18 years and over. (Check the online NICE guidelines for the most up-to-date advice before prescribing)

**Opioid naive (not currently taking opioids) and able to swallow**

**Oral treatment:**
- Morphine sulfate immediate-release 2.5-5 mg every 2-4 hours as required or
- Morphine sulfate modified-release 5 mg twice a day, increased as necessary (maximum 30 mg daily)

**Already taking regular opioids for other reasons (such as pain relief)**

**Oral treatment:**
- Morphine sulfate immediate-release 5-10 mg every 2-4 hours as required or
- One twelfth of the 24 hour dose for pain, whichever is greater

**Unable to swallow**

**Parenteral treatment:**
- Morphine sulfate 1-2 mg subcutaneously every 2-4 hours as required, increasing the dose as necessary
- If needed frequently (more than twice daily), a subcutaneous infusion via a syringe driver may be considered (if available), starting with morphine sulfate 10 mg over 24 hours

**Special considerations**
- If breathlessness is not continuous, intermittent opioid dosing may be appropriate
- If estimated glomerular filtration rate (eGFR) is <30 mL per minute, use equivalent doses of oxycodone instead of morphine sulfate
- Consider concomitant use of an antiemetic (such as haloperidol) and a regular stimulant laxative (such as senna)
- Continue with non-pharmacological strategies for managing breathlessness when starting an opioid
- Opioid patches should not routinely be used in patients who are opioid naive because of the time it takes for the medicine to get to steady state for clinical effect and the high morphine equivalence (see “Prescribing in palliative care” in the BNF for more details)

**Add a benzodiazepine if required**
- For breathlessness and anxiety, use lorazepam 0.5 mg sublingually when required (maximum 4 mg daily)
- Reduce the dose to 0.25-0.5 mg in elderly or debilitated patients (maximum 2 mg in 24 hours)
- For associated agitation or distress, use midazolam 2.5-5 mg subcutaneously when required (see BNF for more details on dose)
- Sedation and opioid use should not be withheld because of fear of causing respiratory depression

### Box 3 | Treatments for managing anxiety, delirium, and agitation in patients aged 18 years and over. (Check the online NICE guidelines for the most up-to-date advice before prescribing)

**Anxiety or agitation, able to swallow**
- Lorazepam 0.5-1 mg orally four times a day as required (maximum 4 mg in 24 hours)
- Reduce the dose to 0.25-0.5 mg in elderly or debilitated patients (maximum 2 mg in 24 hours)
- Oral tablets can be used sublingually (off-label use)

**Anxiety or agitation, unable to swallow**
- Midazolam 2.5-5 mg subcutaneously every 2-4 hours as required
- If needed frequently (more than twice daily), a subcutaneous infusion via a syringe driver may be considered (if available) starting with midazolam 10 mg over 24 hours
- Reduce dose to 5 mg over 24 hours if estimated glomerular filtration rate (eGFR) is <30 mL per minute

**Delirium, able to swallow**
- Haloperidol 0.5-1 mg orally at night and every 2 hours when required
- Increase dose in 0.5-1 mg increments as required (maximum 10 mg daily, or 5 mg daily in elderly patients)
- The same dose of haloperidol may be administered subcutaneously as required rather than orally, or a subcutaneous infusion of 2.5-10 mg over 24 hours
- Consider a higher starting oral dose (1.5-3 mg) if the patient is severely distressed or causing immediate danger to others
- Consider adding a benzodiazepine such as lorazepam or midazolam if the patient remains agitated (see doses above)

**Delirium, unable to swallow**
- Levomepromazine 12.5-25 mg subcutaneously as a starting dose and then hourly as required (use 6.25-12.5 mg in elderly patients)
- Maintain with subcutaneous infusion of 50-200 mg over 24 hours, increased according to response (doses >100 mg over 24 hours should be given under specialist supervision)
- Consider midazolam alone or in combination with levomepromazine if the patient also has anxiety (see doses above)

Managing anxiety, delirium, and agitation
- Address reversible causes of anxiety, delirium, and agitation first by:
  - Exploring the patient's concerns and anxieties
  - Ensuring effective communication and orientation (for example, explaining where the person is, who they are, and what your role is)
  - Ensuring adequate lighting
  - Explaining to those providing care how they can help.
- Treat reversible causes of anxiety or delirium, with or without agitation: for example, hypoxia, urinary retention, and constipation.
- Consider trying a benzodiazepine to manage anxiety or agitation (see box 3).

**HOW THIS GUIDELINE SUMMARY WAS PREPARED**

This summary is based on the version of the guidance published on 3 April 2020 and has been prepared by The BMJ’s clinical editors. Readers should refer to the full guideline on the NICE website for the latest version of the guidance (https://www.nice.org.uk/guidance/ng163) because recommendations will be reviewed and updated by NICE as the knowledge base and expert experience develops.

Please see the NICE coronavirus page (https://www.nice.org.uk/covid-19) for additional NICE rapid guidelines on covid-19.

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For years I had experienced complex, unexplained symptoms. Symptoms such as frequent episodes of dizziness and vertigo, and trembling and pain that was concentrated in the legs. I had many tests, but none supplied answers. Often the symptoms were blamed on anxiety, or they were “all in my head.”

Eventually I was given a diagnosis of functional neurological disorder. Functional symptoms cover medical symptoms when no physical cause is apparent. Although there is no physical evidence of the disorder, the symptoms are no less real and can be just as debilitating as symptoms with a known cause. I have tried anxiety management courses, deep breathing, and relaxation exercises—none had any effect.

What makes this condition so hard is living with symptoms that can’t be seen, yet they are real to me. People’s responses often make me feel that I am imagining the symptoms or making them up, which makes me think that I am failing or have done something to cause these symptoms.

Unpredictable symptoms
I perceive my symptoms as scary monsters lurking in dark shadows. I am constantly aware of their presence, but I do not know how or when they will strike. Every day I am reminded about the unpredictability of my condition. Each new day I do not know which symptoms will occur or whether I will be able to get out of bed and function at all.

Functional neurological disorder can present in many ways. The symptoms I experience include pain and constant trembling in my legs. As my legs are often weak and give way with no warning, I rarely go out alone. I also experience continuous dizziness and regular episodes of vertigo and poor balance, which result in falls. Other symptoms include visual disturbances, such as double vision, and occasionally complete loss of sight. Some days I might only experience one or two of these symptoms. Other days I get the whole set.

Incredibly frustrating
I have yet to establish the triggers that bring on the symptoms, the things that make them worse, or what eases their severity. It is incredibly frustrating. One of the most difficult aspects of living with functional symptoms is the unknowns. Why did it start? How should it be treated? Will I ever feel better? Sometimes I think of my condition as a jigsaw puzzle with a missing piece that I can’t find. If only I could complete the puzzle I might find some answers.

It has been hard to get my head around having a formal diagnosis of functional neurological disorder. It is a condition about which much is still unknown. Online resources have helped me to understand the condition a little, but information is often conflicting, which can be confusing.

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It has been hard to get my head around having a formal diagnosis of functional neurological disorder. It is a condition about which much is still unknown. Online resources have helped me to understand the condition a little, but the main thing I have learnt is that even though my symptoms cannot be seen or detected they are real to me and are life changing.

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More information on functional neurological disorder can be found at neurosymptoms.org
Integrated care is a healthcare approach focused around the patient perspective, which aims to promote better coordination and continuity of care across organisational boundaries. However, structural and cultural differences between physical and mental health services and across the primary and secondary care divide can impede its delivery. Perverse financial incentives and outdated expectations of doctor and patient roles are further barriers to improving care across boundaries. Changes in service commissioning and organisational culture may promote integrated care, but its delivery ultimately depends on the skills, behaviour, and engagement of healthcare workers. This article will explore the rationale and evidence base for integrated care and highlight salient examples of quality improvement (QI) across organisational boundaries in the UK and beyond.

Why is it important to improve care across boundaries?

Siloed and fragmented health systems encourage professionals to treat clinical problems in isolation; patients’ wider health and social and spiritual needs may remain unmet. Integrated care moves beyond reductive and compartmentalised approaches towards cross-boundary, coordinated, and person-centred care.

In the UK, many primary and secondary care organisations are working at maximum capacity. Finding new ways of working that bridge traditional divides can improve patient experience without overburdening professionals. Clinicians can learn new skills from their colleagues, and, by engaging in genuine co-production, discover what really matters to patients and carers. This is especially pertinent to patients living with long term conditions, who require regular contact with healthcare services.

WHAT YOU NEED TO KNOW
- Integrated care aims to improve coordination and continuity of care for patients across organisational boundaries
- There are many different approaches to improving care across boundaries
- Improving care calls for effective and accountable leadership, agreement on a shared vision of improvement, and sustained patient involvement

What is the evidence for integrated care?

Integrated care models have largely focused on adults with long term conditions. Interventions are often complex and multifaceted. They include the introduction of joint clinics, multidisciplinary team meetings, staff education, and new financial models. Outcomes of interest include patient and staff satisfaction, health and social care resource utilisation, and cost. High quality systematic reviews suggest that integrated care can deliver improvements in patient experience and access to healthcare. Evidence for economic benefits and improvements in staff satisfaction is more equivocal. Most integrated care studies are small and descriptive and fail to account for the effects of local contextual factors on outcomes. The absence of well matched control groups in many interventional studies has frustrated efforts to ascertain precisely what caused an intervention to succeed or fail, limiting generalisability and spread of best practice. Successful implementation of change across boundaries seems to be context-dependent. Emerging evidence has identified organisational culture, motivation of front line professionals, and funding as key factors influencing the delivery of integrated care.

Box 1 | General principles supporting improvement across whole systems

Stakeholder engagement
- Identify and engage stakeholders affected by changes—patients and staff
- Identify and engage people who are central to the success of the project—senior clinicians, managers, and commissioners

Agree coordinated strategy
- Develop shared objectives
- Clearly assign professional responsibility for clinical and administrative tasks
- Establish provisional timeframe for interventions, analysis, and feedback

Effective and accountable leadership
- Flatten hierarchies to encourage staff feedback during periods of change
- Advocate for patient involvement

Maintain staff and patient involvement and momentum
- Inter-professional and patient education
- Building relationships within and between clinical teams
- Training and up-skilling healthcare professionals

Meaningful patient engagement
- Involve patients in all stages of QI from design to dissemination
- Measure outcomes that matter to patients
- Assign clear roles and responsibilities and manage expectations
What are the challenges and impediments to improving quality across whole systems?

Quality improvement (QI) across boundaries may form part of a wider strategy supporting integration of care at local, regional, or national levels, or stem from grassroots initiatives conducted by small clinician and patient networks. These “top-down” and “bottom-up” approaches illustrate that there is no “one size fits all” method to achieve integrated care. None the less, several factors consistently promote (box 1) and impede improvement work.

Improving quality across organisational boundaries requires dedicated leadership from clinicians, managers, commissioners, and patients and carers. NHS Improvement estimates that 5% of an organisation’s workforce must receive formal training in QI methodology to foster a culture of continuous improvement, but providing time and space for QI is challenging in the current climate. Working across boundaries calls for cultivation of a shared vision between groups with potentially competing interests. Stakeholders must invest time and effort in building relationships, and larger organisations must convince smaller providers that integrated care will provide mutual benefits rather than one-sided financial returns. Top-down approaches may necessitate changes in commissioning practices to provide financial incentives for collaboration.

Separate computer systems in primary and secondary care frustrate clinicians’ efforts to form a holistic impression of a patient’s health needs and institute optimal treatment. Robust information governance frameworks and data sharing agreements are needed to promote confidence in using electronic shared records and other tools. The patient perspective is central to all integrated care programmes. Where possible, patients should be involved in planning, conducting, and evaluating improvement work, with sufficient support to avoid tokenistic engagement. Efforts must be made to reach vulnerable and disadvantaged patient groups to avoid the unintended consequence of building inequality into integrated care models.

How to do it well

Current evidence suggests that there is no universal method to improve care across boundaries. Strategic and grassroots approaches are not mutually exclusive and can be synergistic in driving change. Commissioning for improvement can remove financial barriers to collaboration, but commissioning alone may be insufficient to generate sustainable change. Patient populations exhibit different behaviours and health beliefs, so we must canvass professionals and patients to identify locally relevant and tractable change ideas. The perspectives of general practitioners (GPs)—a group with substantial social capital and a rounded understanding of patient problems—are therefore invaluable. Professionals must show leadership to build networks and give patients a voice; these skills can be honed through participation in QI forums and formal training programmes.

As those most affected by changes to health systems, patients should be placed at the centre of service redesign. Co-production allows professionals to see and learn from the patient’s perspective, but patient involvement will be meaningful and sustainable only if patients are involved from the outset, clear on their responsibilities, and receive support from senior clinicians and managers. Careful thought should be given to involving vulnerable patients or their advocates to avoid exacerbating existing health inequalities.

In our experience, building relationships, maintaining patient involvement, and developing clinical leadership are essential (figure). The following examples highlight approaches that clinical teams have taken to address these challenges in the UK and beyond.
Building relationships
Connecting Care for Adults (CCA), a team of hospital specialists based at Imperial College Healthcare NHS Trust, has developed a model that up-skills GPs caring for adults with long term conditions. Specialists and GPs conducted joint virtual registry reviews for patients living with chronic illnesses such as heart failure. Clinicians used a digital shared care record integrating primary, secondary, and social care data from eight London boroughs to create personalised care plans. GPs felt more confident in supporting their patients; specialists received detailed feedback on their correspondence with primary care; and patients had their care optimised by a specialist physician without attending in person.21

The sustained success of this approach rests on the strength of the relationships built between GPs and specialists, rational use of digital tools, and inter-professional feedback and education. Box 2 contains a patient’s account of the impact of this intervention on his experience of living with long term conditions.

Patient involvement
Several prominent examples of patient involvement in QI come from the Swedish region of Jönköping, which boasts a dedicated centre for innovation and improvement known as the Qulturum. This provides patients and healthcare professionals with training to enhance the patient voice and incorporate it into QI. Patients are invited to explore their experiences with clinicians at informal coffee mornings and contribute to simulations that seek to redesign clinical pathways around the patient experience.22

For example, one group of patients has worked with specialist nurses to develop a new method of dialysis that maximises patient autonomy and increases system capacity in an area with rising demand. Dialysis-dependent patients attending the county’s Ryhov Hospital are trained to use and maintain dialysis equipment independently. In the words of Goran Henriks, chief executive of the Qulturum: “[Patients] no longer think of themselves as sick people, but as healthy people with a need for dialysis.”23

Leadership
Several organisations now seek to provide clinicians with formal training in leadership and improvement science, while others promote collaboration between QI leaders to hasten the spread of ideas and best practice.

The adoption of “Big Rooms” across the UK represents a paradigm shift in the field of QI. These QI forums, which bring frontline staff together in structured weekly meetings, provide an environment in which QI can thrive. Trained “flow coaches” work with colleagues to develop a systematic plan for improvement of a patient pathway using QI techniques and tools including stakeholder engagement, logic models, and process mapping. Staff use plan-do-study-act (PDSA) cycles to evaluate small tests of change, and clinical data are displayed in statistical process control charts to monitor progress.24

The team behind the UK’s first Big Room has now established a national Flow Coaching Academy in Sheffield. Frontline staff from across the UK undertake a 12 month programme that trains them to coach Big Rooms in their workplace. Big Rooms have already produced impressive results, such as a reduction in time to surgery in patients with acute cholecystitis and a reduction in sepsis related mortality among hospital inpatients.25 The success of this model stems from multidisciplinary team working, strong leadership from coaches and clinicians, and sustained engagement of frontline staff, who can suggest and test locally relevant change ideas.

In primary care, emerging leadership initiatives such as “Next Generation GP” aim to provide trainees with the skills needed to shape the system around them. Trainees participate in regular workshops that empower them to enact change and provide a forum to share leaders’ personal stories. This helps them to understand the opportunities and challenges faced by leaders in primary, secondary, and social care.26 For those with more experience, the Health Foundation has established the Q Community, which aims to connect over 3000 QI leaders across the UK. This initiative allows clinicians to pool resources and expertise and promotes collaboration to extend the scope and reach of improvement work.27

Competing interests: NM is co-founder of Next Generation GP
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Box 2 | Patient perspective on remote registry reviews for chronic disease
I am fortunate to be under the care of a clinic which has the benefit of virtual specialist support; many of my conditions are long term and require a high level of monitoring and care. My team at the clinic are [now] able to coordinate this so much better… leaving me to lead a healthier life with fewer outpatient appointments. I much prefer this to the standard approach in either the NHS or my private appointments, where it can take many months to find solutions and clearly my health would be at risk of deterioration.

A particular benefit is that I get specialist opinions about my conditions and treatment not only from the specialist consultants, whom I sometimes see privately, but also from the clinic’s NHS consultants who see the results of my pathology and other tests and can discuss them with my team at the clinic. I would say that it has improved my relationship with my primary care team, and this can only be a good thing—the patient experience is much improved.

EDUCATION INTO PRACTICE
- Does your trust or general practice offer training in quality improvement (QI) methodology to staff?
- How can you empower your patient population to become involved in QI?
- What would you like to learn from your colleagues in primary or secondary care?

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE
We asked a parent volunteer with experience of leading community based QI work for her views. She said that sustained support from clinical staff was crucial in driving patient-led improvement efforts. A second patient provided a written account summarising the benefits he had experienced as a result of improved coordination of care for his long term conditions. He also commented on the final draft of this article.
which more than 100 000 people died, from the Black Death in the 14th century through to the H1N1 flu of 2009. They found a consistent pattern of a prolonged depression in economic activity and a reduction in return on investment. Wages, however, tended to rise because of the increased bargaining power of survivors. The investigators warn that pandemics are not like wars. Buildings and machines are not destroyed and there is nothing to rebuild. People hoping for a strong economic bounce after covid-19 are likely to be disappointed (http://ssingh.ucdavis.edu/uploads/1/2/3/2/123250431/pandemics_jst_mar2020_.pdf).

Guillain-Barré syndrome after flu vaccination
In 1976, there was a striking increase in the incidence of Guillain-Barré syndrome in the US in the wake of a flu vaccination campaign. Subsequent flu vaccines seem to have been free of this adverse effect. A self-controlled case series investigated 4000 cases of Guillain-Barré syndrome that occurred in metropolitan France between 2010 and 2014 (Neurology doi:10.1212/WNL.0000000000009180). Risk of developing the disease was no higher in the six weeks following vaccination than in other time periods. By contrast, risk of Guillain-Barré syndrome in the six weeks following an acute respiratory tract or gastrointestinal infection was increased nearly fourfold.

Isotonic saline or Ringer’s solution?
Sidney Ringer invented the solution that bears his name during experiments he conducted on isolated frog hearts. He found that regular heart beats were better sustained when potassium and calcium were added to the isotonic saline solution in the organ bath. The current version of Ringer’s solution also contains lactate, which in theory ought to make hyperchloreaemic acidosis less likely when given intravenously to patients. A trial among adults having colorectal or orthopaedic surgery finds that in practice the benefits are nugatory (Anesthesiology doi:10.1097/ALN.0000000000003130). There were no differences in risk of any postoperative complications between those given saline and those who received Ringer’s solution.

The Plague
Albert Camus’s novel, La Peste, about an outbreak of bubonic plague in the Algerian port of Oran is a best seller again. A while ago, Jerome Kassirer, sometime editor of the New England Journal of Medicine wrote about the book for a BMJ series on medical classics (BMJ doi:10.1136/bmj.39317.641146.4E). He was sceptical that, in similar circumstances, modern doctors would display the same unsellish behaviour of Dr Bernard Rieux, the central character, who disregards personal risk to offer support to dying and highly infectious patients. Recent events show that Kassirer need not have worried.

Appendicitis
Appendicitis is missed in around 5% of people who present with the condition to an emergency department. A retrospective analysis of 120 000 patients in the US finds that underdiagnosis was most frequent in women, in people with comorbidities, and in those whose abdominal pain was accompanied by constipation (JAMA Netw Open doi:10.1001/jamanetworkopen.2020.0612). The message for clinicians is that they should be reluctant to attribute abdominal pain solely to constipation and that an abdominal radiograph which shows constipation shouldn’t be taken as evidence that appendicitis is absent. 

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