Covid-19 in care homes

We want covid-19 to stay out of all homes, but especially care homes because the elderly are at high risk of death. A case was identified on 28 February 2020 at such a facility in Washington State, US. There followed a rigorous intervention by the Centers for Disease Control and Prevention (CDC), with an investigation, contact tracing, quarantine, isolation, enhanced infection control measures, the works. By 18 March, 101 residents, 50 staff, and 16 visitors had confirmed covid-19 across 30 facilities in the region (staff and residents transferred between facilities). What does this report tell us that we didn’t already know? Of the 101 diagnosed residents, 55 were admitted to hospital and 34 died. One visitor died, but none of the staff had died. Care home residents are very vulnerable. Where it gets hairy, though, are the answers regarding intent to discriminate against individuals of East Asian ethnicity. Over a quarter of respondents answered yes to the following “Do you think it would be prudent for you to not eat at Chinese restaurants for the next few weeks to reduce the risk of getting infected with the new coronavirus?” Sigh. Still, not as bad as when Trump says things like, “You can call it a flu.” No, you really can’t.

Masks unmasked

Do you know your surgical mask from your N95? Or your FFP2 from your EHMR? Or your FFP3 from your C-3PO? Okay, that last one is a Star Wars character. But, other than C-3PO, which is the odd one out? It’s the EHMR (elastomeric half-mask respirator) because it’s reusable whereas the other masks are disposable. The threat of personal protective equipment (PPE) shortage makes this a reusable option of interest. Pompeii et al happened to carry out an emergency outbreak simulation in 2019 in which they compared fit testing and training between the N95 and EHMR. They randomised almost 200 staff to one of the two masks. They showed that staff were able to be rapidly fit tested and trained to use the EHMR compared with the standard N95. This study was not testing the efficacy of the mask for reducing transmission of covid-19 (prior data show it provides the same level of respiratory protection as an N95). But it would be worth some expert consideration to see if EHMRs are a viable alternative in a state of PPE shortage.

Covid-19 in newborns

If you are pregnant right now, you probably have quite a lot to worry about. Will there be enough healthy staff to take care of you and your newborn? But, importantly, if you get covid-19, will your newborn get it? And I would suggest you don’t expect the answers any time soon. In China, they have closely studied samples from a very small number of babies with covid-19 positive mothers and found the murky waters only murkier. Initial study (January 2020) showed no evidence of the virus in nine newborns. Testing was with PCR, which looks for SARS-CoV-2 nucleic acid. Now (March 2020) there are antibody tests. Dong and colleagues present data on one newborn whose mother developed symptoms a month before delivery, was hospitalised, and who tested positive by PCR at that time. PCR on the mother’s vaginal secretions at birth and on the newborn’s nasopharyngeal swabs (and later the mother’s breast milk) were negative. However, SARS-CoV-2 IgG and IgM were present in the newborn at 2 hours of age, along with a raised white cell count, IL-6, LDH, ALT, and CK, but normal CRP. Zeng and colleagues examined six newborns from mothers who had had mild symptoms. All six had negative PCR test results, but two had raised SARS-CoV-2 IgG and IgM. It is very difficult to interpret these findings with no other newborn data to reference or a “gold standard” for defining an infection in a newborn. However, the presence of IgM suggests in utero (rather than postnatal) transmission because IgM antibodies take days to appear and do not cross the placenta. Could these antibody results be false positives though?
COVID-19 REVIEWS

Richard Lehman

Venting uncertainty
Until a month or two ago, few of us ever troubled to think about what it might be like to lie ventilated for days, or even weeks. I still don’t have a clear idea, which is probably a good thing. There are now many covid-19 survivors who are in a position to tell us, but they are greatly outnumbered by covid-19 non-survivors who can’t. We need the figures, and perhaps we need the stories too, to decide what we would like done to us if the time arrives. Initial outcomes data from Wuhan were not encouraging: just one ventilated patient survived of 32 in one series, while 20% survived in another (https://www.nejm.org/doi/full/10.1056/NEJMoa2002032). Now we have British figures from the Intensive Care National Audit and Research Centre (https://www.icnarc.org/About/Latest-News/2020/03/27/Report-On-775-Patients-Critically-Ill-With-Covid-19) which look more favourable at first glance, with an overall survival rate of 34% following advanced respiratory support. Unfortunately there are many reasons why this may be too optimistic an estimate, and we need daily global as well as national tracking.

Anticipatory anguish
Many of us have wept in the past week. I sent out a tweet that caused some tears, though it wasn’t meant to. It was a call for action rather than a cry of imminent death or despair: “Many of us oldies accept we’re going to die and for some of us #COVID19 will be a short cut. What we’re really scared of is dying without connection & saying proper goodbyes.” The heart rending scenes we see daily from Italy and France must not be repeated here. Working flat out, we have time to ensure that no person with covid-19 from various unorthodox sources, including the Oxford paper (https://www.medrxiv.org/content/10.1101/2020.03.25.20043745v1). I think that practising the use of Excel without swearing could be an excellent spiritual exercise for lockdown time, and will benefit everybody in your office when you return.

Covid fix for amateur modellers
Heinkels, Mosquitoes, and Hurricanes dangled from my bedroom ceiling 60 years ago, before all desire to build models left me at the onset of puberty. Friends have lately been sending me modelling papers about covid-19 from various unorthodox sources, in the hope of provoking a response. I’m sorry: an accident with the Airfix glue while creating a Messerschmidt 109 damaged my brain in its formative years. There is no hope of me judging the efforts of sceptics such as the Oxford paper (https://www.medrxiv.org/content/10.1101/2020.03.2 4.20042291v1) or the Swiss Propaganda Research (https://swprs.org/covid-19- hinweis-ii/). There are several guides to becoming your own modeller in a time of pandemic (http://theconversation.com/how-to-model-a-pandemic-134187), and one article describes in detail how to do it using Excel at home (https://www.medrxiv.org/content/10.1101/2020.03.25.20043745v1). I think that practising the use of Excel without swearing could be an excellent spiritual exercise for lockdown time, and will benefit everybody in your office when you return.

Silver lining
“Our findings show that interventions to contain the covid-19 outbreak led to air quality improvements that brought health benefits which outnumbered the confirmed deaths due to covid-19 in China” (https://www.medrxiv.org/content/ 10.1101/2020.03.23.20039842v1). This study is a simple extrapolation based on levels of atmospheric nitrogen dioxide measured across China. Do we dare to believe that the net effect of covid-19 could be a saving of lives through a permanent change in our polluting habits? Look at those beautiful new images of New York, Tehran, Beijing, and London in unsullied air, and think about what sort of post-viral future we need to create.

The non-smell of fear
Just as the Algerian townsfolk in Camus’ The Plague feared the plop of dead rats falling on their heads, many citizens now fear the onset of anosmia. According to urban myth, if you are unable to smell your socks at the end of the day, you are about to get covid-19. Investigators claim to have established a link between the sudden onset of anosmia and aguesia and the later development of covid-19 in people across all 31 provinces of Iran (https://www. medrxiv.org/content/10.1101/2020.03.23.2 0041889v1), but it really is difficult to scent a trail through the methodology and language of their preprint paper.

Coronal gestation
“There were no mortalities among pregnant women or newborns” states the introduction of a Chinese preprint on the clinical features and the maternal and neonatal outcomes of pregnant women with covid-19 (https:// www.medrxiv.org/content/10.1101/2020.0 3.22.20041061v1). This gloomy reflection can easily be brightened by the addition of a letter T to mortalities. New strains of flu often take a terrible toll on mothers and newborns, as have some previous novel coronaviruses, but covid-19 does not. But this study covers only 33 women and 29 neonates, and the data cut-off is 20 February. Since then, countries such as Switzerland have started carrying out complete surveillance of their gravid populations, and much better information is flowing in (https://chuv.ch/ covi-preg). Although we may breathe more easily for the moment, it is too early to know what the real immediate and long term effects of covid-19 may turn out to be in pregnant women and their babies.

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the bmj | 4 April 2020
Covid-19: a remote assessment in primary care

Trisha Greenhalgh, Gerald Choon Huat Koh, Josip Car

A 37 year old healthcare assistant develops a cough. Next day, she wakes with a fever (which she measures at 37.4°C) and shortness of breath. She manages her condition at home for several days, experiencing increasing tiredness, loss of appetite, and a persistent dry cough. On the fifth day of her illness, she develops mild diarrhoea, and her chest feels quite tight. Her temperature has gone up to 38.1°C. She contacts her GP surgery for advice. The receptionist tells her not to come to the surgery and offers her the choice of a telephone or video consultation.

Novel coronavirus disease 2019 (covid-19) is an urgent and spreading threat whose clinical and epidemiological characteristics are still being documented. With a view to containing covid-19, a shift from in-person to remote consulting is occurring. Clinicians are thus faced with a new disease and a new way of interacting with patients.

This article will present some guiding principles on how to choose between telephone and video appointments, how to conduct a “query covid” consultation remotely, and considerations when arranging follow-up and next steps. It should be read alongside national and local guidance, which are being urgently produced. Aspects of assessment and management will change as our understanding of the illness improve.

**WHAT YOU NEED TO KNOW**

- Most patients with covid-19 can be managed remotely with advice on symptomatic management and self-isolation
- Although such consultations can be done by telephone in many cases, video provides additional visual cues and therapeutic presence
- Breathlessness is a concerning symptom, though there is currently no validated tool for assessing it remotely
- Safety netting advice is crucial because some patients deteriorate in week 2, most commonly with pneumonia

**What you should cover**

**Telephone or video?**

The telephone is a familiar and dependable technology, which is adequate for many covid-19 related conversations. Video can provide additional visual information, diagnostic clues, and therapeutic presence. Hence, video may be appropriate for sicker patients, those with comorbidities, those whose social circumstances have a bearing on the illness, and those who are very anxious. Patients who are hard of hearing may prefer video to telephone.

**Before you connect**

Open the patient’s medical record, preferably on a second screen if using video. Check for risk factors for poor outcome in covid-19, including immunocompromised states (such as frailty, diabetes, chronic kidney or liver disease, pregnancy, or taking chemotherapy, steroids, or other immunosuppressants), smoking, cardiovascular disease, asthma, or chronic obstructive pulmonary disease (COPD). Enter a code for a video or telephone consultation and perhaps also “in the context of covid-19 pandemic.” Have your current “stay at home” covid-19 guidance to hand.

**Establishing a technical connection for a video consultation**

Research shows that if the technical connection is high quality, clinicians and patients tend to communicate by video in much the same way as in an in-person consultation. When you are ready to connect, follow your local procedure (in some cases, for example, the link will be via a fixed URL and in others, a new URL will be generated for each appointment). When connected, check video and audio (“Can you hear/see me?”) and ask the patient to do the same. Make sure you have a record of their phone number in case you need to call them.

**Beginning the consultation**

Check the patient’s identity. Speak to the patient if possible rather than their carer or family member. Ask where they are right now (most patients will be at home, but they may be staying somewhere else). Then, begin with a ballpark assessment (very sick or not so sick?). What are they currently doing (lying in bed or up and about)? Do they seem distressed? Too breathless to talk? If you are using video, do they look sick? If the patient seems sick, go straight to key clinical questions as appropriate. Otherwise, take time to establish why the patient has chosen to consult now (for example, are they or a family member very anxious, or are they concerned about a comorbidity?). Find out what the patient wants out of the consultation (for example, clinical assessment, certification, referral, advice on self-isolation, reassurance).
This graphic, intended for use in a primary care setting, is based on data available in March 2020, much of which is from hospital settings in China. It will be revised as more relevant data emerges.

**Clinical characteristics**
Based on 1099 hospitalised patients in Wuhan, China

- **69%** Cough
- **22%** Temperature 37.5-38°C
- **22%** Temperature >38°C
- **38%** Fatigue
- **34%** Sputum
- **19%** Shortness of breath
- **15%** Muscle aches
- **14%** Headache
- **14%** Sore throat
- **12%** Chills
- **5%** Nasal congestion
- **5%** Nausea or vomiting
- **4%** Diarrhoea

**Red flags**
- Severe shortness of breath at rest
- Difficulty breathing
- Pain or pressure in the chest
- Cold, clammy, or pale and mottled skin
- New confusion
- Becoming difficult to rouse
- Blue lips or face
- Little or no urine output
- Coughing up blood

**Adapt questions to patient’s own medical history**
- Close contact with known covid-19 case
- Immediate family member unwell
- Occupational risk group

**Rapid assessment**
- If they sound or look very sick, such as too breathless to talk, go directly to key clinical questions

**Establish what the patient wants out of the consultation, such as:**
- Clinical assessment
- Referral
- Certificate
- Reassurance
- Advice on self-isolation

**Patient may be able to take their own measurements if they have instruments at home**
- Temperature
- Pulse
- Peak flow
- Blood pressure
- Oxygen saturation

**Interpret self-monitoring results with caution and in the context of your wider assessment**
- Temperature
- Pulse
- Peak flow
- Blood pressure
- Oxygen saturation

**Safety netting**
- If living alone, someone to check on them
- Maintain fluid intake - 6 to 8 glasses per day
- Seek immediate medical help for red flag symptoms

**Likely covid-19 but well, with mild symptoms**
- Self management: fluids, paracetamol

**Likely covid-19, unwell, deteriorating**
- Arrange follow-up by video. Monitor closely if you suspect pneumonia

**With caution and in the context of your wider assessment**
- Face masks
- Face masks

**Disclaimer:** This infographic is not a validated clinical decision aid. This information is provided without any representations, conditions, or warranties that it is accurate or up to date. BMJ and its licensors assume no responsibility for any aspect of treatment administered with the aid of this information. Any reliance placed on this information is strictly at the user's own risk. For the full disclaimer wording see BMJ's terms and conditions: http://www.bmj.com/company/legal-information/
Remote assessment of breathlessness

There are no validated tests for the remote assessment of breathlessness in an acute primary care setting. A rapid survey of 50 clinicians who regularly assess patients by telephone revealed some differences of opinion. However, there was consensus among respondents around the following advice:

1 Ask the patient to describe the problem with their breathing in their own words, and assess the ease and comfort of their speech. Ask open ended questions and listen to whether the patient can complete their sentences:
   “How is your breathing today?”

2 Align with the NHS 111 symptom checker, which asks three questions (developed through user testing but not evaluated in formal research):
   “Are you so breathless that you are unable to speak more than a few words?”
   “Are you breathing harder or faster than usual when doing nothing at all?”
   “Are you so ill that you’ve stopped doing all of your usual daily activities?”

3 Focus on change. A clear story of deterioration is more important than whether the patient currently feels short of breath. Ask questions such as:
   “Is your breathing faster, slower, or the same as normal?”
   “What could you do yesterday that you can’t do today?”
   “What makes you breathless now that didn’t make you breathless yesterday?”

4 Interpret the breathlessness in the context of the wider history and physical signs. For example, a new, audible wheeze and a verbal report of blueness of the lips in a breathless patient are concerning.

There is no evidence that attempts to measure a patient’s respiratory rate over the phone would give an accurate reading, and experts do not use such tests. It is possible, however, to measure the respiratory rate via a good video connection.

Taking a history

Note the approximate incidence of key symptoms and signs listed in the infographic, with the caveat that this list was generated in a different population and may not reflect your own case mix. The infographic guidance should be used flexibly to take account of the patient’s medical history and issues that emerge during the conversation. The vignette describes a typical mild to moderate case of this disease; more serious cases typically develop worsening respiratory symptoms, which may indicate pneumonia. Elderly and immunocompromised patients may present atypically.

Note the date of first symptom to date-stamp the onset of disease. Many patients will have a thermometer at home. Ask how high their temperature is currently, how long the fever has lasted, and what the highest temperature was. The fever in covid-19 is often not always >38.0°C and tends to persist beyond five days. Note that up to half of all patients with covid-19 have no fever at initial presentation.

Most patients with covid-19 have a cough. It is usually dry and typically persists for more than five days. Fewer than half of patients with covid-19 have shortness of breath or difficulty in breathing, but if they do this tends to indicate more serious disease (especially pneumonia). It is therefore important to assess respiratory symptoms carefully, though the evidence base on how to do this is weak and expert opinion divided (see box). Systemic symptoms include fatigue and muscle pain, though many patients have neither.

Ask about a history of contact with a case of covid-19 (laboratory confirmed or clinically suspected), especially one who had been closer than 1 metre for 30 minutes or more. The incubation period for covid-19 is 2-14 days, on average 5-6 days. Ask if anyone else in the immediate family is unwell. Other risk groups include healthcare workers, others working in a healthcare environment (such as cleaners), and transport workers. Travel to a known hotspot is less relevant as the virus is now widespread.

Features that generally indicate a condition other than covid-19 include nasal congestion (present in only 5% of cases), conjunctival congestion (1%), and other allergic symptoms such as itchy eyes. A preliminary report suggests that, although conjunctival involvement is rare in covid-19, it is a poor prognostic sign if present.9 Distinguishing seasonal influenza from covid-19 can be difficult, but, as a rule of thumb, the former is more likely to produce body aches and the latter shortness of breath. Gastrointestinal symptoms such as diarrhoea were initially said to be rare in covid-19, but there is emerging evidence that they may be commoner than previously thought.10 Loss of appetite occurs in many patients, and there are widespread anecdotal reports that anosmia (loss of sense of smell) is a common and early symptom.

Red flag symptoms which indicate that the patient needs urgent assessment are outlined in the infographic.

Remote physical examination

A physical examination will be almost impossible by phone and difficult by video, so you will have to make compromises. In a video consultation, assess the patient’s demeanour, whether they are lying in bed or up and about, skin features (such as flushing, pallor, cyanosis—though note that if lighting is suboptimal this can be difficult to assess), and oropharynx. Congestion of the throat and tonsillar swelling are both rare (present in about 2% of covid-19 cases’). When making records, note what you can and cannot see. You may or may not get a view of the patient’s throat, for example. Assess respiratory function as best you can (see box).

It may be possible to get the patient to take readings from instruments they have at home—for example, temperature, pulse, blood pressure, blood glucose, peak expiratory flow rate, and oxygen saturation. If you are using video, you can check whether the patient is using their equipment correctly (they may have purchased it only recently). Note your confidence in the device’s accuracy, especially if it seems out of line with your wider assessment.

Assess pre-existing conditions and medications taken. Asthma and cardiovascular disease are particularly relevant. Attend to mental health. Does the patient sound or appear upset or distressed? Formal mental health assessment instruments are unlikely to be useful in this setting. Are there relevant family issues (which may be within earshot or camera view) such as small children whose care will be affected if the patient becomes more unwell?
Safety net advice
Covid-19 can produce rapid deterioration in respiratory function, especially in the second week, so safety-netting advice is important for all patients, even if they are currently well (document that you have done this). Those living alone should identify someone to check in on them regularly. They should maintain a high fluid intake (see infographic), and seek medical help if they deteriorate. In particular, if they have difficulty breathing, feel faint, stop passing urine, or are unable to keep down fluids, they should call their GP or out of hours service as appropriate (or follow your local protocol). Ask them to write this advice down or send a patient information leaflet electronically.

The sick patient
Patients who are very unwell, and especially those with possible pneumonia, need to be urgently assessed either by video or in person, depending on the clinical circumstances. Not all acutely sick patients have covid-19.

The clinical criteria for hospital admission in covid-19 pneumonia are the same as for any other pneumonia, but in the current crisis there may be additional restrictions. The best clinical signs to predict community acquired pneumonia in an adult are a temperature above 38°C, respiratory rate above 20 breaths/minute, and heart rate above 100 beats/minute with new confusion; low urine output is also a concerning symptom. 13  Anecdotal reports from UK secondary care suggest that hypoxia is often used as a cut-off for admission. Both the World Health Organization and a guide based on the China experience recommend a cut-off level of 93% for classifying pneumonia as severe. 14   15  Current UK NHS guidance recommends hospital admission if saturation on air is below 94%. 16

We recommend that, in the case of patients with a very poor prognosis (for example, multimorbidity and other risk factors), a “ceiling of treatment” conversation is considered. 17  If the patient is very sick and death almost inevitable whether ventilated or not, some people may prefer to stay home and opt for palliative management. Many such patients will already have an advance care plan and DNACPR (do not attempt cardiopulmonary resuscitation) flag, and in those who do not, urgent efforts should be made to put these in place to avert unwanted emergency intervention.

Competing interests: None declared.
Cite this as: BMJ 2020;368:m1182
Find the full version with references at http://dx.doi.org/10.1136/bmj.m1182

EDUCATION INTO PRACTICE
• How would you feel if you or a close relative were unwell with suspected covid-19 and wanted to see a doctor, but you were offered a phone call instead?
• There are many available tools for video consulting, which are not difficult to set up. What will you need (hardware and software) to get one up and running in your surgery now?
• Do you know your local protocol for arranging emergency admission of a patient with covid-19?
Quality improvement into practice

Adam Backhouse, Fatai Ogunlayi

The benefits to front line clinicians of participating in quality improvement (QI) activity are promoted in many health systems. QI can represent a valuable opportunity for individuals to be involved in leading and delivering change, from improving individual patient care to transforming services across complex health and care systems.

However, it is not clear that this promotion of QI has created greater understanding of QI or widespread adoption. QI largely remains an activity undertaken by experts and early adopters, often in isolation from their peers.

This article will make it easier for those new to QI to understand what it is, where it fits with other approaches to improving care (such as audit or research), and when best to use a QI approach.

How is quality improvement defined?

Rather than viewing QI as a single method or set of tools, it can be more helpful to think of QI as based on a set of principles: a systematic continuous approach that aims to solve problems in healthcare, improve service provision, and ultimately provide better outcomes for patients.

In this article we discuss QI as an approach to improving healthcare that follows the principles outlined in the box on p 38; this may be a useful reference to consider how particular methods or tools could be used as part of a QI approach.

WHAT YOU NEED TO KNOW

- Thinking of quality improvement (QI) as a principle based approach to change provides greater clarity about (a) the contribution QI offers to staff and patients, (b) how to differentiate it from other approaches, (c) the benefits of using QI together with other change approaches
- QI is not a silver bullet for all changes required in healthcare: it has great potential to be used together with other change approaches, either concurrently (using audit to inform iterative tests of change) or consecutively (using QI to adapt published research to local context)
- As QI becomes established, opportunities for these collaborations will grow, to the benefit of patients.

What other approaches to improving healthcare are there?

A non-systematic literature scan identified the following other approaches for making changes in healthcare: research, clinical audit, service evaluation, and clinical transformation. We also identified innovation as an important catalyst for change, but we did not consider it an approach to evaluating and changing healthcare services so much as a catch-all term for describing the development and introduction of new ideas into the system.

What is the relation between QI and other approaches?

To make it easier for people to use QI approaches effectively and appropriately, we summarise the similarities, differences, and crossover between QI and other approaches to tackling healthcare challenges (figure).

QI and research

Overview

Research aims to generate new generalisable knowledge, while QI typically involves a combination of generating new knowledge or implementing existing knowledge within a specific setting. In common with QI, research requires a consistent methodology. This method is typically used, however, to prove or disprove a fixed hypothesis rather than the adaptive hypotheses developed in QI. Both research and QI are interested in the environment where work is conducted, though with different intentions: research aims to eliminate or at least reduce the impact of many variables to create generalisable knowledge, whereas QI seeks to understand what works best in a given context. The rigour of data collection and analysis required for research is much higher; in QI a criterion of “good enough” is often applied.

Relation to QI

Much has been written on the lag time between publication of research evidence and system-wide adoption. QI offers a way to iteratively test the conditions required to adapt published research findings to the local context, generating new knowledge in the process. Areas with little existing knowledge requiring further research may be identified during improvement activities, which in turn can form research questions for further study. QI and research also intersect in the field of improvement science, the academic study of QI methods which seeks to ensure QI is carried out as effectively as possible.
QI and clinical audit

Overview
Clinical audit is closely related to QI: it is often used with the intention of iteratively improving the standard of healthcare, albeit in relation to a pre-determined standard of best practice. However, in practice clinical audit is often used by healthcare organisations as an assurance function, making it less likely to be carried out with a focus on empowering staff and service users to make changes to practice. Furthermore, reviews have shown audit to be an ineffective approach to improving quality owing to a focus on data collection and analysis without a well developed approach to the action section of the audit cycle. Clinical audits often focus on the management of specific clinical conditions. QI can focus on any part of service delivery and can take a more cross-cutting view which may identify issues and solutions that benefit multiple patient groups and pathways.

Relation to QI
Audit is often the first step in a QI process and is used to identify improvement opportunities. Audit can be used to establish a baseline and to analyse the impact of tests of change against the baseline. Also, once an improvement project is under way, audit may form part of rapid cycle evaluation, during the iterative testing phase.

How quality improvement interacts with other approaches to improving healthcare
to understand the impact of the idea being tested. Regular clinical audit may be a useful assurance tool to help track whether improvements have been sustained over time.

QI and service evaluation

Overview

In practice, service evaluation is not subject to the same rigorous definition or governance as research or clinical audit, meaning that there are inconsistencies in the methodology for carrying it out. While the primary intent for QI is to make changes that will drive improvement, the primary intent for evaluation is to assess the performance of current patient care. Service evaluation may be carried out proactively to assess a service against its stated aims or to review the quality of patient care, or may be commissioned in response to serious patient harm or red flags about service performance. The purpose of service evaluation is to help local decision makers determine whether a service is fit for purpose.

Relation to QI

Service evaluation may be used to initiate QI activity by identifying opportunities for change that would benefit from a QI approach. It may also evaluate the impact of changes made using QI, either during the work or after completion to assess sustainability of improvements made. Service evaluation and QI may overlap and inform each other as they both develop. Service evaluation may also make a judgment about a service’s readiness for change and identify any barriers to, or prerequisites for, carrying out QI.

QI and clinical transformation

Overview

Clinical transformation involves radical, dramatic, and irreversible change—the sort of change that cannot be achieved through continuous improvement alone. As with service evaluation, there is no consensus on what clinical transformation entails, and it may be best thought of as an umbrella term for the large scale reform or redesign of clinical services and the non-clinical services that support them. While it is possible to carry out transformation activity that uses elements of QI approach, such as effective engagement of the staff and patients involved, QI which rests on iterative test of change cannot have a transformational approach.

Relation to QI

There is opportunity to use QI to identify and test ideas before full scale clinical transformation is implemented. Transformation activity, once completed, could be followed up with QI activity to drive continuous improvement of the new process or allow adoption of new ways of working. As interventions made using QI are scaled up and spread, the line between QI and transformation may seem to blur. The shift from QI to transformation occurs when the intention of the work shifts away from continuous testing and adaptation into the wholesale implementation of an agreed solution.

Competing interests: None declared.

Cite this as: BMJ 2020;368:m865

Find the full version with references at http://dx.doi.org/10.1136/bmj.m865

Principles of QI

Primary intent—To bring about measurable improvement to a specific aspect of healthcare delivery, often with evidence or theory of what might work but requiring local iterative testing to find the best solution.7

Employing an iterative process of testing change ideas—Adopting a theory of change which emphasises a continuous process of planning and testing changes, studying and learning from comparing the results to a predicted outcome, and adapting hypotheses in response to results of previous tests.19

Consistent use of an agreed methodology—Many different QI methodologies are available. The choice of tools or methodologies has little impact on the success of QI provided that the chosen methodology is followed consistently.10 Though there is no formal agreement on what constitutes a QI tool, it would include activities such as process mapping that can be used within a range of QI methodological approaches. NHS Scotland’s Quality Improvement Hub has a glossary of commonly used tools in QI.11

Empowerment of front line staff and service users—QI work should engage staff and patients by providing them with the opportunity and skills to contribute to improvement work. Recognition of this need often manifests in drives from senior leadership or management to build QI capability in healthcare organisations, but it also requires that front line staff and service users feel able to make use of these skills and take ownership of improvement work.12

Using data to drive improvement—To drive decision making by measuring the impact of tests of change over time and understanding variation in processes and outcomes. Measurement for improvement typically prioritises this narrative approach over concerns around exactness and completeness of data.13 14

Scale-up and spread, with adaptation to context—As interventions tested using a QI approach are scaled up and belief in their efficacy increases, it is desirable that they spread outward and be adopted by others. Key to successful diffusion of improvement is the adaption of interventions to new environments, patient and staff groups, and available resources, again using an iterative testing approach.15 16

EDUCATION INTO PRACTICE

Next time when faced with what looks like a quality improvement (QI) opportunity, consider asking:

- How do you know that QI is the best approach to this situation?
- What else might be appropriate?
- Have you considered how to ensure you implement QI according to the principles described above?
- Is there opportunity to use other approaches in tandem with QI for a more effective result?

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

This article was conceived and developed in response to conversations with clinicians and patients working together on co-produced quality improvement and research projects in a large UK hospital. The first iteration of the article was reviewed by an expert patient, and, in response to their feedback, we have sought to make clearer the link between understanding the issues raised and better patient care.
**MINERVA**

**Fungal endophthalmitis after lithotripsy**

This is a funduscopic image of *Candida albicans* endogenous endophthalmitis (CAEE) in the left eye. The patient was a man in his 30s who presented in hospital with a one month history of blurred vision and floaters in his left eye.

His best corrected visual acuity was 20/20 (right) and 20/200 (left). Funduscopy showed unilateral white striped and patchy vitreous opacities.

He had received extracorporeal shockwave lithotripsy (ESWL) for renal calculi nine days before his visual symptoms started. Two days after treatment he developed a fever, and after one week he had blurred vision in his left eye.

The diagnosis of CAEE was confirmed by vitreous fluid culture.

CAEE is a rare ocular infection, and having had a recent procedure (such as ESWL) is a risk factor. Predisposing factors that can increase risk include steroid use, immunosuppression, chemotherapy, and antibiotic use. CAEE originates from the haematogenous spread of an extraocular pathology, and can result in blindness if not treated promptly.

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

**Faecal transplants for obesity**

Although the underlying mechanisms are a matter for speculation, variations in gut microbiota are credited with several effects on systemic metabolism, including a propensity to obesity. A trial examined the idea directly by randomising 24 adults with obesity and insulin resistance either to weekly oral faecal microbiota transplantation from healthy lean donors or to placebo (PLoS Med doi: 10.1371/journal.pmed.1003051).

At 12 weeks, most participants in the active group showed shifts in faecal microbial composition, suggesting that microbiota engraftment had occurred. However, none showed an increase in insulin sensitivity or a reduction in body weight.

**Nurse led care for gout**

A trial in the UK a few years ago showed that a nurse led package of care for patients with gout was both more effective and more cost effective than usual care from general practitioners (Lancet doi: 10.1016/S0140-6736(18)32158-5).

A questionnaire survey undertaken more than a year after the trial ended found that the benefits persist. Patients who received nurse led care understood more about their condition and were more likely to have continued with urate lowering treatment and to have had fewer flares. What’s more, patient satisfaction with treatment was better in those receiving nurse led care (Rheumatology doi: 10.1093/rheumatology/kez333).

**Time trends in cardiovascular disease**

Mortality from cardiovascular disease has been falling in high income countries for at least 50 years. But the rate of decline is slowing down almost everywhere, according to an analysis of the World Health Organization mortality database (Int J Epidemiol doi: 10.1093/ije/dyz143).

The slowdown is most striking in 35–74 year olds, and in the US and Canada there’s evidence that cardiovascular disease might actually be increasing in this age group. The investigators blame high and rising levels of obesity and the diminishing gains from reducing an already low prevalence of smoking.

**Gender and authorship**

In the US, about half the senior epidemiologists in tenured positions are women. Even so, an analysis of the authorship of editorials published in five leading journals in the field finds that they are still struggling to achieve equality (Am J Epidemiol doi: 10.1093/aje/kwz094). Between 2010 and 2017, only 31% of editorials in these journals were written by women. Women were sole authors of 24% of editorials and, where authorship was shared, were less likely than men to be first authors. Minerva notes that the editors-in-chief of all these journals were men.

**Nuts for the brain**

Walnuts are rich in α-linolenic acid and polyphenols and have antioxidant properties that ought to be good for brain health. The Walnuts and Healthy Ageing study tested the theory in a two year trial of dietary supplementation (Am J Clin Nutr doi: 10.1093/ajcn/nqz328). Participants, who were all older people living in the community, were given a substantial quantity of walnuts to eat every day—equivalent to 15% of their total calorie intake—but they derived no cognitive benefit. The primary outcome, changes from baseline in a score of global cognitive function, was similar in both supplemented and non-supplemented groups.