
CARe QI: A Handbook for Improving Quality through Resilient Systems



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1. Welcome To The CARE QI Handbook

1. Welcome To The CARE Qi Handbook

We are delighted to present the first CARE QI Handbook for improving quality through resilient systems. The Handbook is based on our research in a range of healthcare organisations and settings, including acute care, primary care, care homes, oral health and community settings. Feedback from the many workshops and masterclasses we have convened nationally and internationally has helped to shape the Handbook. It was designed to provide practical tools to apply ideas from resilient healthcare to quality improvement. We hope you will find it useful.

1. Welcome To The CArE Qi Handbook cont.



Dr. Janet Anderson is Reader of Healthcare Improvement at King's College London and an adjunct professor at the University of Stavanger SHARE resilience centre in Norway. She has qualifications in psychology and Human Factors and has researched the quality and safety of healthcare since 2004. Her work on resilient systems was the first to apply the ideas to quality improvement and she has developed practical tools and methods by working in a range of settings, including care homes, oral health, emergency departments, care of older people in hospital, and outpatient clinics. Recent work has investigated teamwork and resilience in hospital settings and mental healthcare. She is a member of the Chartered Institute of Ergonomics and Human Factors, a member of the Resilient Healthcare Network, an advocate for the Clinical Human Factors Group and adviser to the Healthcare Safety Investigation Board.



Dr. Al Ross is a Senior Lecturer in Human Factors in Healthcare at Glasgow Dental School. Al has worked on resilient systems for quality and safety across a range of Primary, Secondary and Community care settings. Al is a member of the National Advisory Board on Human Factors in Dentistry (NABHF), a Scientific Advisor on Patient Safety and Quality Improvement to NHS Education for Scotland (NES), Co-Chair of the Human Factors Special Interest Group for the Association for Simulated Practice in Healthcare (ASPiH), and Human Factors Advisor to Nottingham University Hospitals NHS Trust. He has previously worked as a Human Factors researcher and consultant across a range of settings including military and defence, nuclear power, police, and the railways. His books include 'Beyond Human Error' (CRC Press) and 'Safety Management: A Qualitative Systems Approach' (Taylor and Francis).

1. Welcome To The CARE QI Handbook cont.

1.1 Background To The CARE QI Handbook

Initial funding for the Centre for Applied Resilience in Healthcare (CARE) was obtained from the Guy's and St. Thomas's Charity (2013-2017). Further funding from the Health Foundation (2015-2017), the Dunhill Medical Trust (2015-2017), the Scottish Government (2016-2019) and Health Education England (2016; 2019) allowed us to continue the programme of work.

This resource is based on the methods we developed in our empirical work. Resilient Healthcare has been a developing area of interest in the academic community since 2013, but it grew from discussions that emerged in the safety science and engineering communities in the early 2000's which in turn drew on ideas from broader academic discussions in the last decades of the end of the 20th century. Despite this long period of emergence there was until recently little guidance about applying the ideas in practice. Developing tools and guidance has always been the aim of our work in CARE. We initially developed the CARE QI method during research in the emergency department and older person's unit of a major London teaching hospital, with clinicians and senior managers as members of the team.

We have presented many workshops to clinical and academic audiences nationally and internationally, including three resilience masterclasses. These were helpful for testing our ideas and identifying what type of guidance people required to implement it themselves. We are aware that this is a new way of thinking about QI. Like any new approach it requires time, reflection and practice to become familiar with it and be confident in applying it. The handbook is the first step towards this. We are keen to further develop and improve this resource based on the experience of users of the handbook. We welcome any feedback of your experience with the handbook or other resources via our website. We expect to produce updated versions of the handbook based on user experience and our ongoing work.

We are also keen to support the further implementation of these ideas in healthcare. We are available on a consultancy basis to help develop and guide your CARE QI project. Different levels of assistance are available and can be provided for each stage of the project. Please get in touch to discuss options.



Dr. Janet Anderson



Dr. Al Ross

2. Introduction To CARE QI

2. Introduction To CARE QI

Ideas about resilient systems are now becoming better known in the healthcare community, but the most common question we are asked is "this is great but how do I put it into practice?" CARE QI provides the answers. The aim of CARE QI is to help people to apply the insights of resilient systems and 'Safety II' to the design, implementation and evaluation of quality improvement interventions. We think this approach has a lot of value for improving quality and safety, and we have been developing practical methods so that system resilience can become an important component of every healthcare organisations' quality improvement strategy. CARE QI is the result. It is a structured collection of information, tools, guidance and documents that helps you to develop interventions to strengthen system resilience and in turn improve quality and safety.

In the handbook you will find an overview of the arguments for improving quality through resilience, followed by step by step guidance in applying

the method and downloadable worksheets to help you to document your own project. There are four main steps to CARE QI – setting up the project, capturing work as done, describing resilience in everyday work and choosing resilience interventions and outcome measures. The foundation of CARE QI is that you understand your clinical system in depth before starting to design and implement interventions. It therefore requires a little more investment of time and resources than some other more familiar QI methods, but we believe that superficial approaches are likely to yield superficial solutions.

We also provide some information about implementation and evaluation of interventions, but at this stage of a QI project standard QI methods can be used. The focus of CARE QI and its strength is in the development of interventions to increase system resilience, based on a deep understanding of the system.

2. Introduction To CARE QI cont.

2.1 What Kind Of Problem Is CARE QI Designed To Address?

CARE QI is likely to result in better designed, more effective and more sustainable solutions to a range of quality problems, but it is important to think about whether the problem you want to address is suited to this approach. Implementing a CARE QI project requires time and resources and it is recommended that you consider carefully the type of problem that you want to improve and whether this is the most suitable approach. In general, CARE QI is suited to complex problems for which solutions are not clear or previous interventions have been ineffective. There is further guidance about this in section 3.1.

2.2 Who Should Use The CARE QI Handbook?

CARE QI is for anyone with an interest in quality and safety: a) clinical staff involved in improvement or implementation activities; b) managers and others involved in governance or safety; c) health services researchers with an interest in quality improvement, implementation, or resilient systems. The empirical work that has led to this handbook was mostly carried out in the acute hospital setting, but we have included examples from our work in primary care, medical education, and care homes. We believe it is applicable to any sector in which there is a need for a new approach to quality improvement.

3. Overview Of Resilient Systems Philosophy

3. Overview Of Resilient Systems Philosophy

3.1 We Need To Change The Way We Think About QI

After twenty years of focused attention on patient safety and the quality of care we continue to have widespread system failures such as those documented in the Mid Staffordshire NHS Foundation Trust Public Inquiry, and there is frustration that the pace of improvement is so slow. Regulators and policy makers have introduced many initiatives to improve care quality, including national incident reporting and patient safety agencies, investigation boards, a professional Duty of Candour and various requirements to report extensive quality assurance data and key performance indicators. There is a plethora of guides and resources for improving quality through first reporting and identifying adverse events or outcomes, then implementing initiatives to address their causes.

This general model has been labelled as 'Safety I', indicating that the approaches above belong to the first generation of thinking about how to improve quality. Although they have had some success, we argue here that for a step change in the rate of improvement a new approach is needed -Resilient Systems, which has also been termed 'Safety II'.

Safety I is reactive – we respond to problems that have already occurred. It is also characterised by direct causal reasoning. A problem in a process is seen as leading directly to a change in outcomes,

which can be measured and quantified. For example, non-completion of a falls risk assessment is seen as causing a rise in falls. Or absence of medication alerts on a prescribing system is seen as causing medication errors. Therefore, Safety I is often called a 'linear' approach.

Such linear thinking is evident in many incident investigations and Root Cause Analysis reports. Linear thinking is sometimes appropriate, but healthcare systems are complex. They are composed of many interlinked processes and tasks carried out by people from different professional backgrounds, often working in different places and using different technological devices and systems. These complexities mean that linear thinking - attributing causes of outcomes in a somewhat simplistic way - is not suited to deeper understanding of problems and their solutions.

Learning from incidents and investigations can only ever be partial and retrospective. To prevent harm, we need to move beyond identifying adverse events, analysing causes, and responding to these one by one. We need to develop proactive approaches, based on preventing harm and strengthening processes proactively to improve care, reduce risk, and increase satisfaction.

Key Points

- *Healthcare is characterised by complexity and non-linearity*
- *It involves the need to co-ordinate many different people, teams, processes and organisational units*
- *Current approaches to QI are linear, reactive and there is a limit to their effectiveness*
- *New proactive approaches to QI are needed*
- *These should be based on the complexity of healthcare work*

3. Overview Of Resilient Systems Philosophy cont.

3.2 A Different Perspective – Resilient Systems

We can't fully understand how to improve quality without fully understanding healthcare work. There is now clear evidence that work is complex, difficult and rarely follows a linear sequential pattern. This complexity means that protocols and procedures cannot fully capture or describe work-in-context. As well as paying attention to relevant guidelines, clinicians must respond to the problems they encounter and devise solutions when they are faced with unanticipated situations. Adapting and responding flexibly to unanticipated problems is a skill and contributes greatly to the high quality and safety of care. Without adaptability, healthcare cannot respond appropriately to demand on its services and keep patients safe. Resilient systems thinking is characterised by recognising that complexity requires adaptation by healthcare workers and teams to deliver good care.

These adaptive responses characterise what we call everyday 'work-as-done' and are very difficult or impossible to standardise. It is not possible to write a policy or procedure on how to solve the problems people routinely encounter in socio-technical system

like healthcare, and even less feasible for clinicians to consult such policies even if they could be produced. We must rely on their knowledge, skills and expertise to adapt safely. The core idea of CARE QI is to recognise that this is the key to high quality care. However, it should not be left to individual professionals to find a way to adapt. We must also design the work system to support them to do this by creating the conditions under which work can be done. It should not be left to individual professionals to find a way to adapt. Systems must be designed to support them to do it.

If we don't design our QI interventions with complexity in mind, we are likely to:

- waste time and resources on improvement projects that don't improve outcomes
- create time wasting procedures that add to the pressures for staff
- remove staff autonomy and create stress and burnout
- create interventions that have potentially negative unintended consequences for patients, staff or organisations
- miss opportunities to learn from successful adaptation and innovation

3. Overview Of Resilient Systems Philosophy cont.

Resilient work systems have environments, structures, technology and procedures that are designed to support flexible, adaptive responses within safe limits. The exact nature of the pressures and demands at play, and what is therefore needed to support adaptive capacity, are likely to vary, depending on each clinical setting and organisation. Understanding these pressures and demands is the key to improving quality based on resilient systems. The goal of CARE QI is to understand the work system in depth, in a practical and timely way, and then to design ways to support successful outcomes.

We have only briefly outlined the philosophical basis of resilient systems here, but there are suggestions for further reading towards the end of the handbook. We believe that the justification for this new philosophy of safety and quality has now been firmly established. However, methods for its application in practice are lacking. The rest of the handbook focuses on providing such a method.

In the step by step guidance that follows we will describe how to apply these ideas to create resilient systems.

Key Points

- *There has been slow progress in improving quality and safety despite nearly two decades of focused efforts*
- *Improvement efforts to date have used a Safety I perspective and focused on reporting adverse incidents, investigating causes and implementing measures to prevent them happening again*
- *Safety I only works where there is a linear relationship between cause and effect, which is not always the case in the complex environment of healthcare*
- *Safety I is mostly reactive – responding to events that have already occurred*
- *Complexity means that it is impossible to map out all the actions that workers must take to achieve outcomes, difficult to fully standardise care-in-context, and difficult to anticipate the effect of interventions to improve care unless these are designed with the complex system in mind*
- *There is a need for a different approach that considers complexity and supports the need for flexible adaptation*

3. Overview Of Resilient Systems Philosophy cont.

3.3 What Is A Resilient System?

Resilience is a word that is used in many different fields including environmental management, disaster recovery, psychology, and business supply chains. It means different things in each of these areas, so it is important to be clear about what it means in this context. In healthcare quality improvement resilience is an organisational characteristic. We are not concerned here with individual coping skills or resistance to stress and burnout (although these are important issues) but rather how work systems can flex and adapt to cope with pressures. Resilient systems have the capacity to adapt to both unforeseen and anticipated disturbances. They continue to deliver safe, high quality care even when under pressure from, for example, complications in a patient's care, a sudden increase in patient numbers, short staffing, or lack of equipment or other resources. Resilient work systems have processes in place to support workers to adapt to such problems.

What do we mean by adaptation? Thinking about everyday clinical work, an adaptation is any change to a process that is necessary for success, for example to work around a problem or difficulty. Adaptation may save time, preserve resources, allow others to function well, or deliver the best care available when

difficult priority decisions are needed. For example, on a ward day shift nurses might administer the evening medication before they leave, even though the night shift usually does this task. This adaptation could happen if the day shift nurses anticipate a sudden influx of patients that will create pressure for the incoming shift, with the adaptation freeing up resources to enable the night shift staff to manage this demand better. Adaptations also occur when staff deliver patient-centred care. Patients' preferences for their treatment can sometimes mean that processes have to be adapted to meet their needs. For example, a procedure, usually performed the night before it is required because staff are less busy than first thing in the morning, may be deferred until the next morning at the request of a patient. Planned changes to care processes as part of an improvement initiative are not defined as adaptations. This is not the type of adaptation we are concerned with here, rather we are trying to study and understand the adaptation that takes place every day within the current procedures, rules, guidelines, and dedicated pathways.

Adaptations occur at every interface in everyday clinical work. However, not all adaptations are of equal importance. For example, a workaround to hold a faulty door open may be in place in lieu of

fixing the door. This may be deemed efficient and to have minimal risk but is unlikely to be of importance for overall system functioning or for designing interventions. The question, when deciding on how to identify adaptations and decide which ones to study, is what insights are gained into emergent outcomes and possibilities for interventions.

3. Overview Of Resilient Systems Philosophy cont.

Choosing which adaptations are important of course involves some subjective judgement. For example, nurses making notes on scraps of paper as a reminder to update digital records later when the computer is free (or during an IT glitch) may appear relatively trivial, but we know this 'bridging' adaptation between paper and e-systems is very common and an important one to maintain information flow. It is often the route to success round a problem such as availability of e-systems but can have the unintended consequence of time lags or gaps in documentation and staff not being sure if records are complete. This is the type of adaptation that people working in resilient systems are keen to study and specify, because exploring when, where, why, how and by whom this flexible working happens can reveal much about systems and how to maintain their functioning.

Adaptation is seen as a strength in resilience thinking because it enables the system to cope with pressures and challenges in a safe way. Healthcare worker adaptation within safe limits is supported in resilient systems. Understanding how to support safe adaptation is the key to improving quality based on CARE QI methods. The goal is to understand the work system in depth by identifying its pressures and implementing processes that will support adaptative capacity and successful care. The rest of the guide focuses on how to do this.

Key Points

- *Resilience in healthcare quality improvement is distinct from resilience in other fields and does not refer to psychological resilience to stress*
- *Resilience refers to a work system's capacity to adapt to challenges and problems and still deliver safe and high-quality care*
- *Adaptations occur at the level of everyday clinical work and are designed to overcome problems, save time or resources, or deliver patient-centred care*
- *The challenges and adaptations are likely to be different in each clinical setting and organisation*
- *Not all adaptations are equally important – it is necessary to establish the importance and relevance of adaptations for improving quality*
- *The goal of quality improvement through resilient systems is to understand in depth the challenges and adaptations and implement processes to help workers to adapt safely.*

3. Overview Of Resilient Systems Philosophy cont.

3.4 The CARE Resilience Model

We have developed the CARE resilience model (Figure 1) to visualise how these concepts are related and to help guide our improvement work.

The model makes the key distinction between work-as-imagined and work-as-done. Work as imagined by policy makers, managers, and others is often used to develop policies and procedures. It describes an optimal situation where demand and capacity are aligned (or in theory can be aligned). Demands generate things that need to be done (delivering direct care, contacting patients, coordinating staff, reporting metrics, completing documentation etc.) and the organisation provides capacity to achieve these things based on previous experience. For example, staffing level (capacity) is determined based on quantified demand such as seasonal expectations. Equipment is provided based on estimates of usage demand. Capacity can also refer to skills and knowledge (e.g. provided through training) or other resources (such as time, or physical space) needed to achieve goals. Alignment between demand and capacity is the organisation's best guess of what is required day to day, based on previous experience and anticipated demand.

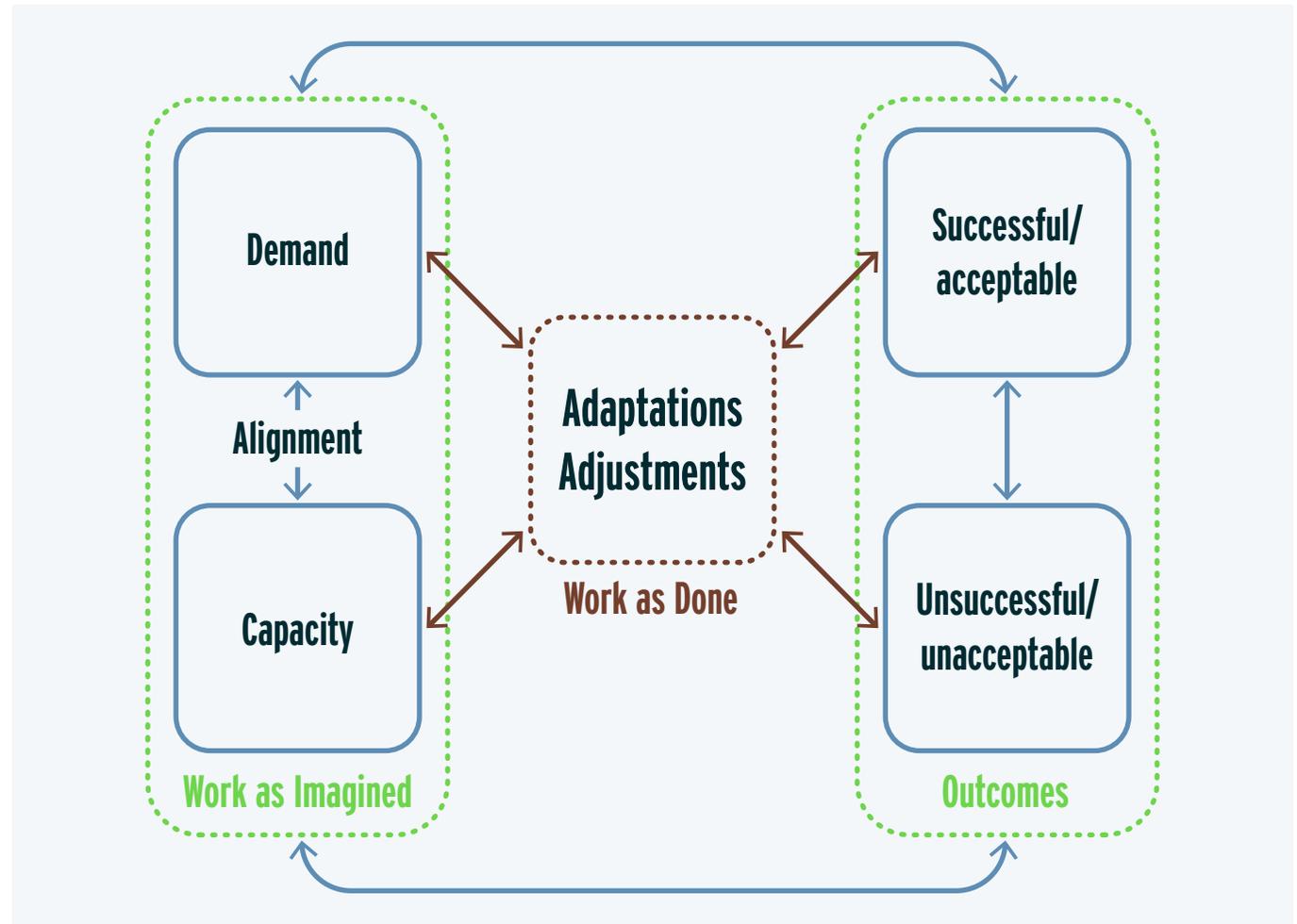


Figure 1. Concepts for Applying Resilient Engineering (CARE) model

3. Overview Of Resilient Systems Philosophy cont.

However, in a complex system unanticipated demand, and/or shortfall in capacity, is inevitable. For example, the sudden arrival of several ambulances at the Emergency Department may mean there is not enough staff to receive them and patients are left waiting for admission. Staff shortages may mean there are not enough staff with the required skills and so specialist procedures may not be provided. We have termed mismatch between demand and capacity misalignment. Misalignments are so common that they are not often reported or even acknowledged by staff who adapt and work around them, because it's just everyday work. But the entire functioning of healthcare rests on this dynamic between misaligned demand and capacity and adaptation in order to achieve goals.

The actions taken by staff to cope with misalignments are termed work-as-done. This is the day to day reality of clinical work. To go back to the example of ambulance arrivals, insufficient staff to triage patients arriving simultaneously can be managed in a number of ways – staff from other areas can assist, the process may be shortened to enable more patients to be seen, or the process may be skipped entirely if enough

capacity exists for all patients to be immediately seen by doctors. How decisions are made to cope with misalignments is important for resilient systems. Ideally, such adaptations will be discussed and made openly with benefits and risks assessed, but our experience is that it is often left to staff to figure out how to manage, and 'no one wants to know' how process blocks, difficulties and interruptions are overcome as long as things end up OK. Staff members devise their own solutions and the underlying problems are not solved.

According to the CARE model outcomes are the direct result of the interplay between misalignments and adaptations and so both need to be understood to drive improvement. If we simply rely on understanding work as it is imagined in protocols and procedures this won't generate interventions that are matched to what happens day to day, making it hard to design them appropriately. Similarly, focusing only on adaptations may lead us to miss the work system problems that create difficulties for staff and which might also be an appropriate target for intervention. Only by understanding how and why the adaptations occurred, and in relation to what context, can we understand how to support flexible care to improve outcomes.

Key Points

- *Work as imagined is always different to work as done in a complex system*
- *There will always be misalignments between demand and capacity*
- *Work is adapted in response to misalignments*
- *Outcomes are a result of both misalignments and adaptations*
- *QI interventions can be designed to reduce misalignments and/or to support adaptations*
- *Improving quality through resilient systems relies on a deep understanding of demand, capacity, misalignments and adaptations*

3. Overview Of Resilient Systems Philosophy cont.

3.5 The Five Resilience Activities That Underpin A Resilient System

Recent thinking has considered what activities are needed for a work system to function in a resilient manner. A resilient work system requires five activities to enable the system to adapt and adjust:

1. Anticipating...

...refers to the ability of the system to understand what is likely to happen in the future. This might refer to looking ahead to the next shift and anticipating what help may be required if patient acuity is high, or preparing rotas based on forecasts of how busy it will be at certain times of the year. It also involves understanding future patterns of demand for healthcare services to ensure future capacity. For example, understanding the implications of increases in diabetes for the organisation and resourcing of services is important and may involve longer timescales of months and years.

3. Overview Of Resilient Systems Philosophy cont.

3.5 The Five Resilience Activities That Underpin A Resilient System

Recent thinking has considered what activities are needed for a work system to function in a resilient manner. A resilient work system requires five activities to enable the system to adapt and adjust:

2. Responding...

...to problems and challenges. Responding requires the ability to distinguish when a response is required, what response is required, when it should occur and who should provide it, where, and by what means. For example, responding to a deteriorating patient is more complex than following a protocol – it involves multiple different protocols, family wishes and preferences, knowledge of the individual patient, consideration of other patients, and making many interacting judgements about the optimal time to trigger various response choices and in which order. This type of resilient response is often learned on the job through front line experience, rather than codified simply in guidelines or algorithms. Healthcare staff are adept at responding and most clinical work involves responding in some way to what is happening, whether it is expected or unexpected.

3. Overview Of Resilient Systems Philosophy cont.

3.5 The Five Resilience Activities That Underpin A Resilient System

Recent thinking has considered what activities are needed for a work system to function in a resilient manner. A resilient work system requires five activities to enable the system to adapt and adjust:

3. Monitoring...

...is the ability to oversee and keep track of the work system to identify developments that may require a response. For example, monitoring the number of patients in the waiting room to identify potential bottle necks may lead to actions that can decrease the waiting time. Monitoring requires decisions about what to monitor, how often, at what level of detail, and the availability of systems to provide the data that are required. For example, it may not be as important to know the number of people in the waiting room as it is to know something about the types of patients in the waiting room such as their primary presenting complaints. If many of them are older, are re-presenting from a previous visit, or have co-morbidities that require multiple specialist input, then that may place demand on the system throughput capacity.

3. Overview Of Resilient Systems Philosophy cont.

3.5 The Five Resilience Activities That Underpin A Resilient System

Recent thinking has considered what activities are needed for a work system to function in a resilient manner. A resilient work system requires five activities to enable the system to adapt and adjust:

4. Co-ordinating...

...the activities required for the successful functioning of the system is a vital activity, the importance of which is often underestimated. Co-ordinating refers to the activities that are required to connect and synchronise activities between people, teams and organisational units. For example, co-ordinating patient flow requires the ability to synchronise admissions and discharges to avoid patients having to wait for a bed. Co-ordination and communication between multiple teams is a vital function that relies on activities such as planned meetings and handovers. Informal processes such as huddles, face to face communication, instant messaging and written notes are often just as important as these formal mechanisms for co-ordination.

3. Overview Of Resilient Systems Philosophy *cont.*

3.5 The Five Resilience Activities That Underpin A Resilient System

Recent thinking has considered what activities are needed for a work system to function in a resilient manner. A resilient work system requires five activities to enable the system to adapt and adjust:

5. Learning...

...refers to the ability to continuously reflect on experience and apply that learning to improve how the work system operates. As in Safety I, learning should result from adverse incidents and near misses, but should also include learning from events that went well despite problems and difficulties. For example, reviewing the successful response to an MRSA outbreak should involve identifying unplanned actions (or adaptations) that were taken that contributed to the good outcome, perhaps because the existing policy didn't work well. These adaptations might otherwise go unnoticed, depriving the system of an opportunity to improve its response in the future. Using a resilient systems approach means there will be many more opportunities for learning rather than it simply being an outcome of adverse incidents.

3. Overview Of Resilient Systems Philosophy cont.

Clearly, these five activities are all linked and depend on one another. For example, responding effectively cannot happen without the ability to anticipate what may happen, monitor the work system to identify when a response is required, co-ordinate the actions of different teams and units, and learn from whether the response was effective. These activities also happen at different levels of the organisation—they mean something different for a junior nurse, a ward manager, a patient safety manager and a senior executive—but the basic model is the same.

Key Points

- *Five resilience activities are needed for a resilient system – anticipating, monitoring, responding, co-ordinating, and learning*
- *All the resilience abilities are vital to enable adaptive, flexible work and are linked*
- *Most healthcare systems are very good at responding and less able to anticipate, monitor, co-ordinate and learn*
- *The activities required will be different depending on the role and responsibilities of the clinician or staff member*
- *Improving the five abilities is the key to improving healthcare systems*

3. Overview Of Resilient Systems Philosophy cont.

3.6 Summary

The rate of progress in patient safety is slow – about 10% of patients experience an adverse event and this rate has hardly changed over time

The goal of quality improvement through resilient systems is to understand in depth the challenges encountered and the adaptations and implement processes to help workers to adapt

Healthcare is characterised by complexity, non-linearity and the need to co-ordinate many different people, teams, processes and organisational units

Improving quality through resilient systems relies on a deep understanding of demand, capacity, misalignments and adaptations as explained in the CARE model

Current approaches to QI are linear, reactive and have limited effectiveness

QI interventions could target misalignments and/or adaptations

New approaches to QI are needed that are based on the reality of healthcare work

Five resilience abilities are needed for a resilient system – responding, monitoring, co-ordinating, anticipating and learning

Resilience refers to a work system's capacity to adapt to challenges and problems and still deliver safe and high-quality care

Improving the five resilience abilities is the key to improving healthcare systems



4. CARE QI Step By Step Guidance

4. CARE QI Step By Step Guidance

In this chapter we provide detailed guidance for using this method based on our in-depth work in healthcare organisations. *Figure 2* shows an overview of the steps in the process.

The CARE QI process can be summarised as follows:

1. Set up project, define aims and establish project team
2. Capture work-as-done – methods and procedures for gathering data
3. Describe and understand resilience in everyday work – using the CARE model and resilient healthcare concepts to provide an overview of resilience in the system
4. Identify potential solutions – design interventions to better support individuals, teams and organisations to adapt flexibly to challenges and achieve desired outcomes

As suggested by the overview in *Figure 2*, this is unlikely to be a linear process through Steps 1-4. Initial observations at Step 2 might lead you to revise your project scope (*Step 1*) because it is too narrow or broad. Similarly, when you try and understand information you have collected at Step 3, you may realise you need to go back and speak to someone else (*Step 2*) to clarify something, and so on. You should however aim to have a very good description of work as done (*Step 3*) before proceeding to Step 4.

For each step in the process there are links to worksheets which you can use to document the development of your own project. Each worksheet provided includes example content to help you get started. Worksheets can be downloaded and saved so they can be developed and shared with project team members.

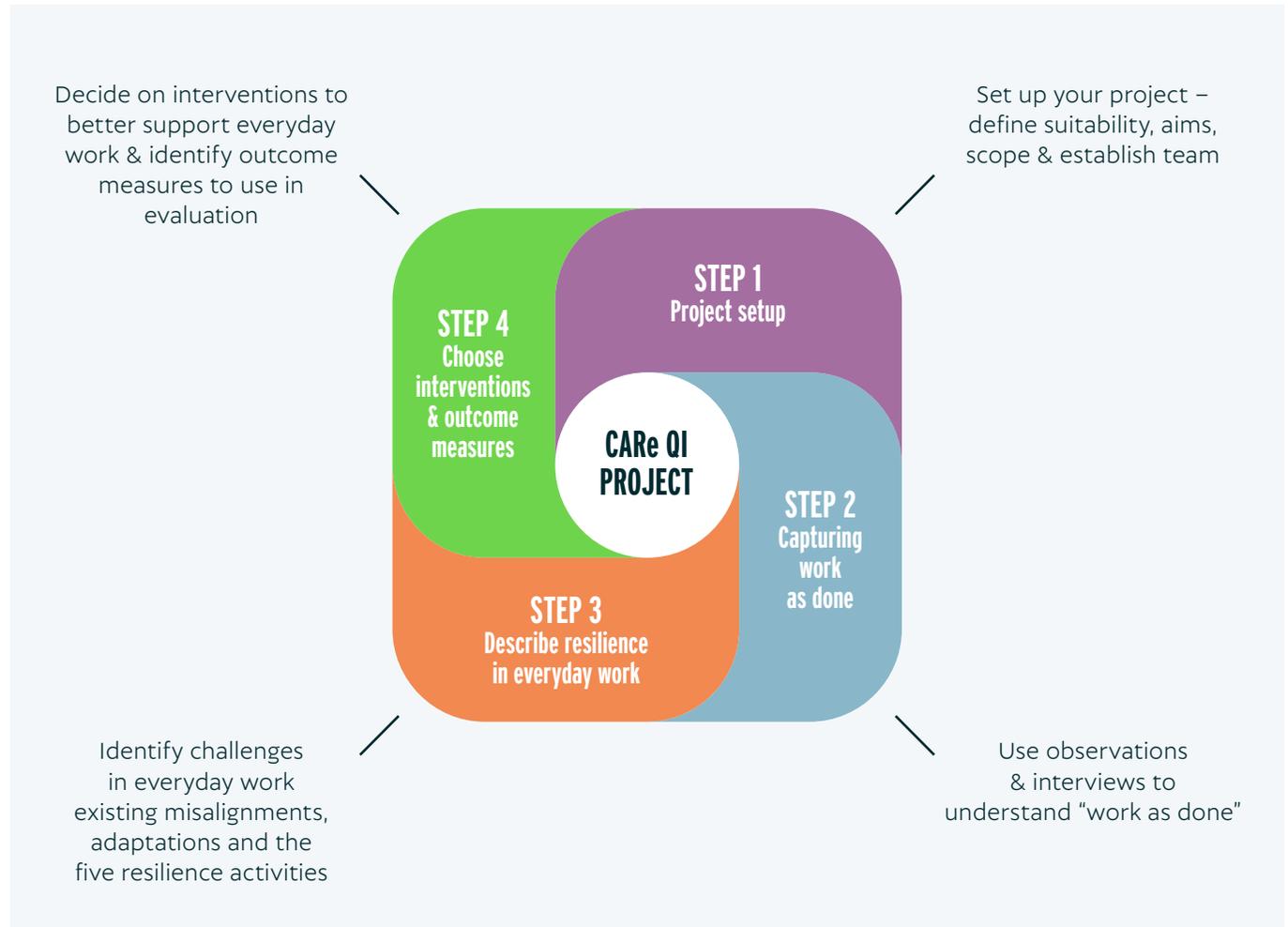
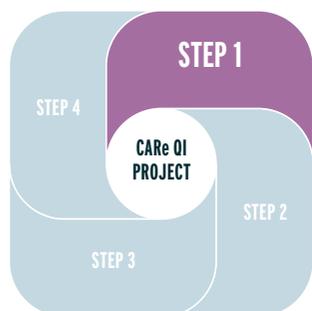


Figure 2. Overview of CARE QI method

4. CARE QI Step By Step Guidance cont. / STEP 1



4.1 Setting Up The Project

4.1.1 Determine Suitability Of CARE QI For The Problem

CARE QI is suitable for all problems that require deep understanding of the work system. Because CARE QI involves commitment of time and resources, you might want to consider whether some problems are more suited to traditional methods such as root cause analysis, audits or pdsa cycles.

Problems that are contained and have clear cause and effect links may be more suited to traditional methods such as root cause analysis, audits and pdsa cycles. Examples of such problems include:

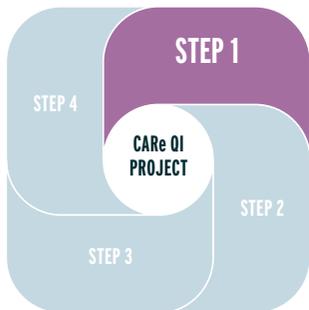
- A ward with fixed numbers of patients and relatively stable staff, especially senior staff. Procedures are working well, and QI aims to improve outcomes incrementally rather than deal with, for example, increasing demands.
- Missed information in nursing handovers in one ward.
- Improving the timing of medication administration on one ward.
- Organisation and documentation of ward rounds amongst junior doctors that does not involve other professional groups.
- Medication errors related to lack of allergy information in patient notes.
- Medication errors due to confusing labelling.

However, for problems that are difficult to solve, involve co-ordination across teams, organisational units and system boundaries, and are likely to require more complex solutions CARE QI is likely to be more successful than traditional methods. The following table contains questions to consider about the nature of your problem and examples.

Key Points

- *Think about the nature of the problem you want to tackle*
- *Consider whether it involves multiple processes, organisational units, staff groups, and behaviour and/or culture, and what has been tried in the past*
- *The more complex the problem the more likely it is to require CARE QI*
- *If it is a simple problem CARE QI can still be effective, but you should consider the resources required and whether it is warranted.*

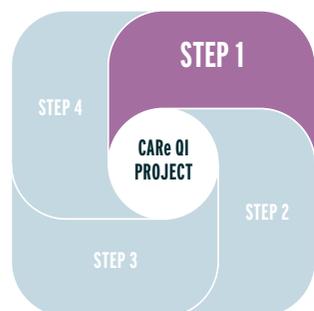
4. CARE QI Step By Step Guidance cont. / STEP 1



Nature of the problem	Points to consider	Examples of projects suitable for CARE QI
Is the care quality problem in an area under pressure or undergoing change?	A stable process will be easier to improve than one that is constantly in crisis or constantly changing. A system under pressure requires the CARE QI approach to accurately understand the demands.	A busy ED with fluctuating but steadily increasing patient numbers and increasing length of stay. A unit relocating to a different physical space.
Does the problem involve multiple interacting processes?	Although all processes in healthcare are linked with other processes, there are degrees of connectedness. If the problem is strongly linked to multiple areas and processes it is likely to require CARE QI.	Inefficient patient flow from ED to ward would involve multiple processes in the ED, wards and other hospital areas.
Are multiple organisational units or departments involved?	Most processes involve multiple units, but some are affected less by actions taken in other areas.	Problem involves the flow of patients or information between units or departments, such as referrals for specialist tests such as scans and radiology.
Are there multiple professional groups involved?	Co-ordination will be more challenging if it involves a multi-disciplinary team and competing priorities.	Improving the functioning of multi-disciplinary team meetings.
Is the relationship between cause and effect easy to understand?	This can be misleading as many seemingly simple problems turn out to be more complex than thought. However, for some problems it is less clear than for others.	Outcomes such as incomplete checklists or increased infection rates are likely to have multiple causes that are difficult to discern.
Does the problem involve staff behaviour and/or organisational culture?	All problems involve human behaviour and culture, but some are affected more than others.	Incomplete documentation or checklists. Failure to perform patient identification checks appropriately.
Have other solutions been tried and failed?	Complex problems may not have been tackled, or previous solutions have not been sustained or not resulted in improvement.	New handover protocol is in place and working or requires fine tuning. A huddle was introduced to improve co-ordination between MAU and the ED but it is no longer occurring and it is not clear why.

Use the worksheet and guidance to answer the CARE QI scoping questions about your project to help determine suitability for CARE QI.

4. CARE QI Step By Step Guidance cont. / STEP 1



4.1.2 Define Project Aims

It is important to set specific aims for a CARE QI project. In common with most QI projects, these will often involve quantifiable care quality outcomes. Perhaps the most common aims in QI are to reduce adverse events or increase adherence to guidelines. CARE QI can be used for these aims; the method will guide you to address these problems through insights into your system resilience. It is also possible to use CARE QI when your aims are less specific, such as analysing how resilient your system already is, or understanding data that you have already collected. We encourage you to think broadly about possible aims that could be fulfilled by CARE QI. The following table shows examples of CARE QI aims that you might want to consider.

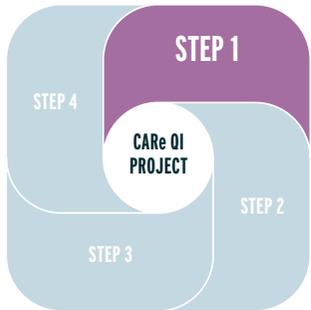
We do not recommend the use of goals and objectives, or SMART objectives during the CARE QI project. This is because CARE QI places emphasis on understanding the problem in depth before starting to think about solutions. It is therefore difficult to think about how you would develop SMART objectives when you don't already know what your intervention will be. When you have used CARE QI to identify your intervention you can then develop SMART objectives for the implementation and evaluation phases of your project. The following table contains potential project aims and a description of how CARE QI would proceed. We suggest that CARE QI aims be written by selecting one of these overarching aims and describing the clinical area that will be the focus, and other details about the project.

Use the [Project Aims Worksheet](#) > to define your aims and develop a description of what your project will achieve.

Key Points

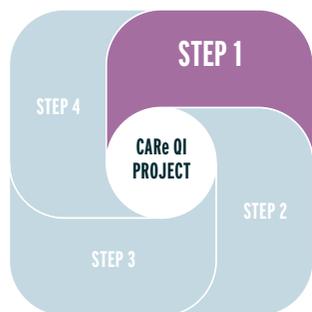
- CARE QI aims are usually broader than traditional QI aims
- CARE QI emphasises deep understanding of the work system before identifying solutions so avoid SMART aims and objectives at this stage
- SMART objectives will be relevant after using CARE QI to identify interventions

4. CARE QI Step By Step Guidance cont. / STEP 1



Possible project aims	Application of CARE QI
1. Reduce the frequency of some adverse or unwanted events such as medication errors	CARE QI approaches this problem by first understanding how the activity is normally undertaken, the work system misalignments involved and the adaptations that are involved in everyday work. These insights are combined to design interventions to better support the work.
2. Increase adherence or uptake of some standard process or desired behaviour, such as a checklist	Using CARE QI to map how work is done in practice will enable you to identify how adherence to the process is affected by demands and challenges, and to think about how to adapt the process to better fit everyday work. Understanding work as done and designing the process to fit is likely to increase adherence and sustainability.
3. Test a new protocol, device or IT system before, during and after implementation	You could design a CARE QI project to understand how a new protocol, device or IT system will be used and adapted in practice. Resilient principles show us that adaptations are a feature of everyday work and it is important to understand this. You could use CARE QI to understand in depth how an intervention will affect work as done and how it will be adapted during everyday practice. This will help to refine the design, inform ongoing implementation, understand the strengths and weaknesses of the intervention, and improve the chance of the intervention being successful.
4. Identify learning objectives for a staff training programme	Staff training programs should reflect the real work environment as much as possible so that staff can understand and practice responses to the real conditions and demands they will deal with on the job. CARE QI can be used to understand work as done in depth and generate insights in to key aspects of work that should be included in training.
5. Understand how resilient a system is – are the five resilience activities occurring, are they effective, are they being supported?	Although measuring resilience is not possible, the activities that underpin resilience can be observed in practice and analysed to reveal how much capacity for resilience is in the system. The five resilience activities provide the capacity for resilience to be put into action when required. A project to understand resilience in the system would focus on understanding how effectively these five activities are and identifying how they can be improved.
6. Understand how robust a system is – are there signs that the system is under pressure, is it operating beyond capacity and in a constant state of adaptation and therefore at risk of poor outcomes?	This aim is a variation of aim 5. The focus of this kind of project would be on the adaptations that are already occurring in response to demand-capacity mismatches. Understanding the drivers for adaptation is important because constant adaptation may be a sign that aspects of the work system need to be redesigned.
7. Better understand observations you have made or data you already have	It may be obvious that some processes are not working as they were imagined, or that staff are having trouble with a process even though there have been no associated adverse events. CARE QI can be used to examine work as done in more depth and provide further insights that can help to explain these observations.

4. CARE QI Step By Step Guidance cont. / STEP 1



4.1.3 Define Project Scope

Defining the scope of your project is important and requires some careful thought. CARE QI is a systems-based method and advocates deep understanding of the system you want to improve. But the first step to this understanding is to define the boundaries of your system. All tasks and processes in healthcare are influenced by the organisational and social systems in which people work and understanding these influences may be important for improving quality. However, it is neither possible or necessary to examine the whole system and all projects will be limited by time and resources in some way. Some preliminary scoping of which parts of the system your project will focus on is important.

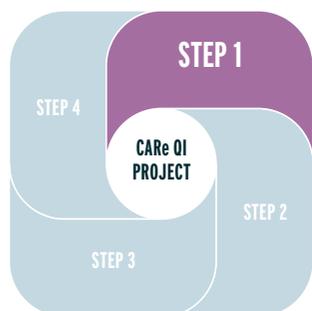
For example, consider a wrong dose medication error. It is likely to be linked to processes in pharmacy, medication ordering and storage, prescribing systems, documentation and checking to mention only a few. To strengthen the medication system, we need to understand this system context, but some of these aspects will be more important than others. Spend some time deciding which parts of this complex inter-related system you will focus on, which will be used to provide background context and which are not relevant. Your CARE QI project can be driven entirely by a local issue (e.g. from patient feedback or a recent adverse event) or a wider implementation goal (e.g. new Trust standards) or external drivers (e.g. electronic prescribing across the NHS). In any case you must decide on whether factors external to a unit, directorate, Trust or Service need to be included.

Use the questions in the [Project Scope Worksheet](#) > to help decide the scope of your project.

Key Points

- *Think about the whole system and how outcomes might be affected by wider influences. For example, if new standards are affecting direct care, then they are likely to be worth exploring. A study of Emergency Department flow would probably have to include an examination of demand from the community, and/or capacity in terms hospital bed occupancy, and so on*
- *Use the scoping questions to start to think about wider system influences*
- *Projects can start with a clearly defined system boundary but be open to including wider contextual factors if these emerge as important as the project progresses*
- *Starting with a narrow scope is often necessary but keep an open mind about the need to include wider contextual factors as the project progresses.*

4. CARE QI Step By Step Guidance cont. / STEP 1



4.1.4 Establish A Project Team

CARE QI projects often have a broader scope and focus than other QI projects, so it is essential to set up a project team with the expertise to support and guide the process. The project team should include diverse perspectives to ensure that all aspects of the problem are fully explored and considered. The group will also be essential at key points of the process such as interpreting findings and designing interventions. The group should meet before the start of the project and continue to meet regularly throughout to monitor progress, interpret emerging findings and consider the implications. Consider carefully who should be involved based on the aims and scope of the project.

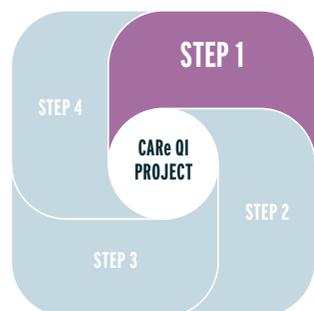
Project team guidelines

- ensure multiple perspectives are included, such as different disciplines, frontline workers, managers, quality improvement specialists
- representatives of all professional groups should be involved – medical, nursing, allied health, ancillary staff
- include senior clinicians, both medical and nursing if possible
- ensure there is a senior project champion who can garner support and co-operation from all those important to the project
- a project co-ordinator should be appointed to manage timelines and co-ordinate activities
- consider including patients/families in the project team
- an academic partner with specialist expertise in resilient systems should be included if possible, to ensure that maximum value is generated from the project.

It is now recommended to include patients in all improvement and research projects. We suggest this is a positive development but may not always be necessary. If the main focus is on understanding the work system or improving how work is organised it may not be necessary to include the patient perspective, especially if there is already a good understanding of what is important to patients but delivering it is challenging. Similarly, if the aim is to identify learning objectives for staff training it might not be necessary to involve patients. However, patient involvement should be carefully considered and is clearly necessary if the focus is, for example, improving patient experience or likely to lead to the design of an intervention for which patient input would be vital.

Consider carefully who will be involved in completing the work of the project, including gathering and analysing information, implementing and evaluating interventions. Clinical staff have the advantage of understanding the work but can sometimes have fixed ideas about what is important and/or feasible. Non clinical staff will need time to become familiar with the area and assistance in interpreting what they observe, but have the advantage of bringing a fresh perspective and noticing aspects of the work that are not seen as noteworthy by others who work within the system.

4. CARE QI Step By Step Guidance cont. / STEP 1



Clinicians may be overwhelmed by the number of improvement initiatives they are expected to engage with, and it is not unusual for intervention fatigue to occur, which limits engagement and therefore the value of the project. It can help to emphasise the following points

- the project is different to standard quality improvement in that it is not attempting to find and fix problems but strengthen the resilience of the system
- the aim is not to require staff to be personally resilient
- the aim is not to identify deficient work practices
- the aim is to understand the reality of clinical work and find ways to support it better

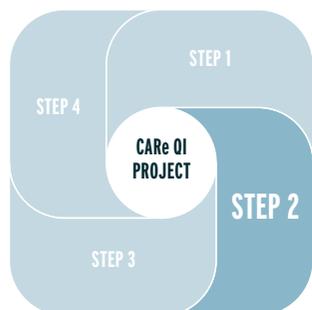
Such a framing can help to highlight how this approach is different and empower clinicians to contribute insights and share experiences with the observer.

The [Project Team Worksheet](#) > will help you to document who is involved in the project.

Key Points

- *Think broadly about what expertise you will need to guide the project*
- *Think about how to educate others about the CARE QI approach*
- *Set up a project team with a range of expertise, including academic input*
- *Ensure senior and clinical support*
- *Consider whether patient involvement is necessary depending on the project aims.*

4. CARE QI Step By Step Guidance cont. / STEP 2



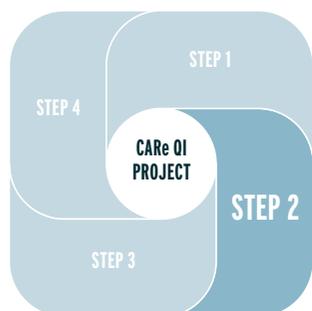
4.2 Capturing Work As Done

When you have a team in place, and have defined the project aims and scope, the next step is to capture work-as-done within the system of interest. This phase of CARE QI is crucial for ensuring that you develop a deep understanding of the work system on which to base improvement initiatives. This will always involve engaging with the staff working in the system to understand everyday clinical work as it is done in practice. The experts are always assumed to be people who are doing the work every day, and the emphasis is on understanding their clinical world. It is important to keep an open mind about potential solutions and appreciate that work-as-done will always be different to work-as-imagined.

There Are Two Aspects To Capturing Work-As-Done:

- 1. observe and record how work happens and...*
- 2. talk to people in more depth, probing what your observations have picked up or exploring areas where direct observation is impossible or unethical.*

4. CARE QI Step By Step Guidance cont. / STEP 2



4.2.1 Structured, Recorded Observations Of Work As Done

What is the aim?

To gain a detailed picture of the main tasks involved, the relevant staff and what their roles are (clinical and non-clinical), the challenges involved and the extent to which the 5 resilience activities are effective.

What should be observed?

All work as it occurs, including at the bedside, consulting room or theatre, and in team meetings, handovers, board rounds and huddles. You should include structured observations of direct care, but also times and places when team members co-ordinate their work.

What is the best place to start?

It is best to begin with the main co-ordinating activities such as multi-disciplinary team meetings, handovers, board rounds, huddles and team meetings. This will provide a broad picture of how the clinical area is structured and operates and will also allow you to identify and meet the key personnel.

What is the next step?

After obtaining a broad overview it is helpful to identify key people to shadow as they do their work. This will involve following them and observing what they do, and where appropriate asking them to explain. This can be relatively informal. Sometimes, what you observe will be self-evident, and sometimes it will be difficult to ascertain what is going on. Questions can be asked in real time

where this does not interfere with care, or briefly at the end of an observation. Remember that the aim of this step is to gather information for understanding resilience. Questions to consider when speaking to staff about their work might include:

- what are you doing/ trying to achieve?
- what would make things easier?
- why do you need to do this?
- would other people do this?
- does it always happen like this? Why or why not?
- what do you do then?
- what are the challenges and difficulties?
- how do you cope with them?
- what works and what doesn't?

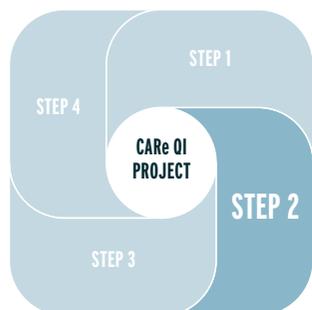
When should observations be done?

It is helpful to make sure that observations are conducted at different times (e.g. day and night shift; weekdays and weekends) of the day and week to capture variations in work, staffing and other challenges.

How long should observations last?

It is best to keep observation sessions short to avoid disrupting work and to reduce observer fatigue. We find that observation sessions of 2-3 hours are ideal and allow observers to capture detailed information.

4. CARE QI Step By Step Guidance cont. / STEP 2



How many observations are needed?

Observations will usually involve several cycles of observation in discussion with the project team, and after initial analysis (see following section) so that you can focus on the most important parts of the system. Following discussion and reflection, observations might be more focused on questions and areas that seem of interest, or which need more probing to understand better. There is no minimum number of observations – it is more important to be sure that you have captured a thorough understanding of the work. As a guide, we would suggest 10-20 hours of observation across different shifts, locations and with different staff.

How should observations be recorded?

Observers should make notes on paper or in digital format. Handheld devices such as phones or tablets can be used but are sometime difficult to manage if you are moving around. In either case it is best to type up notes in more detail straight after the observations before memory fades so that as much detail as possible is captured. Detailed notes are crucial to the success of the project. Although this takes time it is essential. Notes can include personal reflections and comments from the observer, clearly identified as such. These can be used to highlight questions to follow up in interview, anything that is unclear, or suggestions for improvements. Note taking will become easier as the observations progress and the observer becomes more familiar with the key issues. This is an example of notes made by an observer during a handover meeting. Note that the focus in this step is to simply describe what happens:

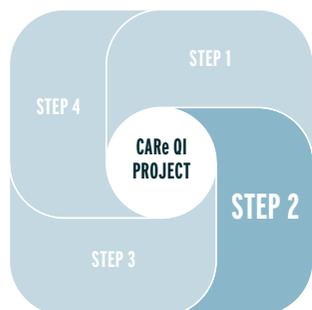
“ First job during handover (performed by outgoing Nurse in Charge) is to identify infections associated with patients. Four patients discussed, some of which have been allocated individual side-rooms. The order that patients are reviewed then proceeds from 1 through to 28, the whiteboard is referred to (bed 9 is free). Confirmation that what has been prescribed by Doctors overnight is not known by nurse leading the handover. This causes confusion over which patients were prescribed new drugs. ”

Use the [Observation Worksheet](#) > to help with documenting observations.

Key Points

- Focus on understanding work as it is done. Ask questions to understand the decisions that people make during their work and why
- Understand what creates challenges for staff
- Focus on activity, not non-compliance. Non-compliance with procedures may be observed but the focus is to understand why this occurred by understanding the context of the non compliance
- Begin by observing co-ordinating mechanisms such as meetings, handovers and ward rounds and then progress to shadowing key staff as they do their work
- When shadowing or observing, try and identify how staff are adapting their actions
- Look for success as well as lack of success to understand how successful outcomes are achieved despite challenges

4. CARe QI Step By Step Guidance cont. / STEP 2



4.2.2 Semi-Structured Interviews Using The CARe Model

Once observation has taken place it is almost always the case that you will want to carry out interviews with clinical staff, managers and/or patients.

What is the aim?

To extend the knowledge of work-as-done you have gained from observing. This will be an opportunity to ask about things that are still unclear and to probe more deeply about work-as-done.

Who should be interviewed?

This will depend on the scope you set out in the previous step. Front line staff, and those in supervisory roles who coordinate activity, are vital. Remember the aim is to gather information on how work is organised, what challenges staff experience, what work system misalignments occur, how staff adapt and how outcomes are achieved. In addition, there may be senior staff or managers that can help, if for example there are important organisational, financial, technical or cultural issues observed that they can inform on. Patients may also be central to the system you have scoped out and can help with vital information (for example a project focused on bedside care), or they may be somewhat removed (for example, a project to design a new e-prescribing system, or improve teamwork in a hospital pharmacy).

When should interviews occur?

We prefer to do interviews after observing and speaking to staff as they do their work. That means that you already have knowledge about the work-as-done and can direct questions better to clarify and deepen understanding.

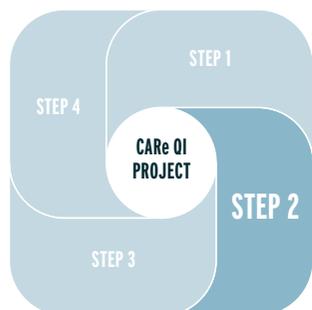
Where should interviews occur?

Interviews should not be done as part of the work process. A separate time and space are needed so that both parties can focus on the issues raised. The location can be agreed with the interviewee.

How long should interviews last?

Interviews can vary between 15 minutes and an hour, depending on the person, their knowledge and responsiveness and the time available. There is no set minimum time, but you should try and cover all the questions on your interview schedule.

4. CARE QI Step By Step Guidance cont. / STEP 2



How many interviews should be done?

Some of the case studies on our website give indications, but the scope of the project will need to be considered. The best answer is that you have done enough when the next step of the project (describing resilience in everyday work) is possible, that is you have enough information to describe challenges, pressures and adaptations, and how the work system anticipates, responds, co-ordinates, monitors, and learns. As a guide we would suggest 10-12 interviews with different groups of staff and/or patients.

How should interviews be recorded?

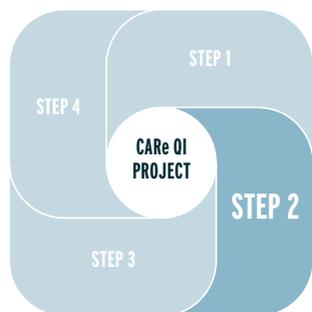
The best way to capture all the information is to record the interview, with permission from the person being interviewed. This means the interview must be typed or converted to digital format in some way for analysis. There is software for this but it is not error free. Professional transcription services can also be used to produce a written record of interviews. Taking notes quickly as the person speaks is also possible if the interviewer is good at dividing attention between talking and writing and avoids the problem of transcription.

Use the semi structured interview guide in the [Interviews Worksheet >](#) to design your interview questions.

Key Points

- Interview appropriate staff to gain further insight into work as done
- Ask questions about things you have observed and need to clarify
- Ask about things that are not possible to observe
- Decide how to capture interviews and consider audio recording to ensure accuracy

4. CARE QI Step By Step Guidance cont. / STEP 2



4.2.3 Document analysis and other ways to capture work-as-done

Finally, there are of course other ways to gather information for analysis and to decide on appropriate interventions which we mention for completeness.

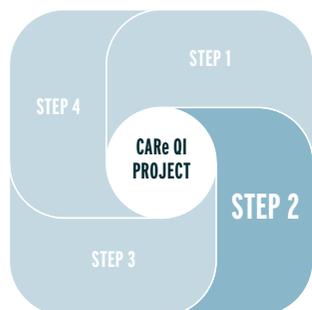
Whilst standard operating procedures and clinical guidelines are synonymous with 'work as imagined' and can be difficult to implement in complex frontline contexts, they often provide information on misalignments. For example, in one nursing home study staff told us about the demands that different protocols place on carers; difficult trade-off decisions between conflicting aims of documents (for example between tissue viability and falls risk, or oral care and nutritional intake); and questioned how realistic evidence-based care is in time and resource pressured environments.

Incident reports are similarly often associated with 'Safety I' due to the focus on what went wrong and a tendency to try and capture a definitive 'root cause' of events, which is an overly reductive way to learn for system improvement purposes. However, we have used incident reports as one source of information to identify aspects

of the context of work as done. Where investigations have, for example, involved interviews with staff, then these can provide sources of information to build a picture of the system and how it usually works, as well as how on some occasion it has faltered. Many incident reporting templates do come from human factors thinking and try and capture the various elements (e.g. people, task, and environmental factors), care processes and emergent outcomes involved in adverse events. Reading reports and extracting these can be useful for building up a picture of pressure on the system and prompting questions about resilience.

Healthcare simulations can be a useful way to explore systems and/or host meaningful discussions with staff, e.g. about adaptation and adjustment. Simulated conditions can be varied, and various complexities introduced, to examine the ways in which success might be flexibly achieved. Professionals are often, in reflecting on simulated events, able to go beyond the specific case or patient that has been involved to deeper probing of the resilience activities in everyday work, and the wide range of variation that they experience.

4. CARE QI Step By Step Guidance cont. / STEP 2



Routinely collected data can also help to understand how the system anticipates, monitors, co-ordinates and responds. Talking to staff about what they understand in data and patterns can be vital. We have used routinely collected data to explore aspects of system resilience under pressure in the ED.

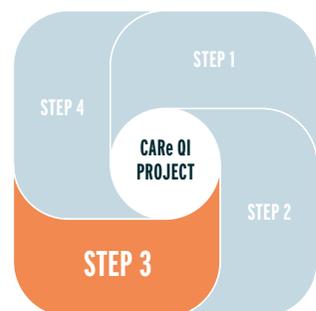
Finally, remember that the important thing here is the 'lens' of the CARE QI model. Information from **a range of sources** such as focus groups or other facilitated discussions, survey data, staff records, and even clinical audit data, can all provide 'pieces of the jigsaw' with respect to resilience. Our work in community oral health in fact used all these things to build an integrated system model.

Key Points

- Consider gathering data from procedures, event reports, and routine monitoring data
- Use existing data to add to your understanding of work as done from a resilience perspective

At the end of Step 2 you should have rich data illuminating work as done. There will be texts from observational notes, interviews, focus groups and other sources that describe the work system in detail. It is optimal to have fully transcribed interview recordings and methodically typed up notes, which makes Step 3 much easier.

4. CARE QI Step By Step Guidance cont. / STEP 3



4.3 Describing Resilience In Everyday Work

The next step before developing interventions is to synthesise the data you have gathered into a description of resilience in your defined system, focusing on the nature of misalignments and adaptations and the effectiveness of the five resilience activities. This is where you begin to make sense of all the information you collected at Step 2 and it will always require careful thought, time, and a willingness to engage in an iterative process as your description of the system develops. Step 3 is perhaps the most difficult but there are examples in the case studies on our website, worksheets to help, and with a few principles and examples you can certainly get started.

This step uses the CARE model to build an overview of resilience in the system. There are two steps involved in building a synthesised resilience description – **extracting resilience indicators** and identifying **how they are related to build resilience narratives**.

It may be helpful to review Sections 2.4 and 2.5 as these provide the basis for this step.

4.3.1 Extracting resilience indicators

What is the aim?

This step involves identifying indicators of resilience contained in your observations and interviews. Resilience indicators are the concepts in the CARE model – misalignments, adaptations, outcomes and the five resilience activities – anticipating, monitoring, responding, co-ordinating and learning.

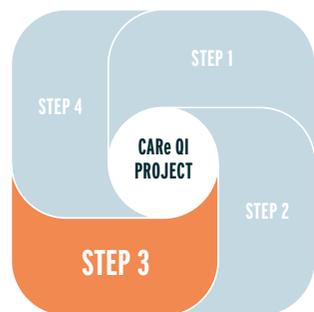
How do I start?

Begin by reading your observation and interview data carefully so that you are familiar with the information and have a good overview of what you found.

How to extract resilience indicators.

Use the worksheet to document indicators of resilience. These can be quite short, for example using a few words or a few sentences. For example, patient acuity could be described as a demand. Capacity could be described as a staffing pressure with high staff turnover resulting in high use of agency staff with less knowledge and experience. This makes clear the outcome of increased use of agency staff is reduced capacity. As you are reading the information you have collected think about the following examples and questions.

4. CARe QI Step By Step Guidance cont. / STEP 3



Demand and capacity.

The aim is to document demands that create pressure, and to identify where capacity is not sufficient, or is not available when needed, to meet demands. Patient load is clearly a demand and staffing level is clearly capacity. But you should think very broadly about demands and capacity. For example, responding to emergencies, liaising with family, ensuring medication supply and interfacing with social services could all be demands if they involve significant challenges and difficulties. Capacity refers to characteristics of people, tools, technology, the physical environment, organisations and teams that enable demands to be met. Capacity should also be defined broadly and could include, for example, staff knowledge and skills, the availability of senior support, availability or suitability of equipment, a helpful policy or flow chart, and physical space, amongst other things. It is not necessary to list all demands and capacity in the system, but focus on demand-capacity mismatches. For example, attendance outstripping ability to see patients in a reasonable time; staff working outside the original role they were trained for because of short staffing.

Adaptations.

Remember that this refers to actions taken to work around problems and pressures. These can be actions that are routinely taken because they are more efficient than the written procedure, they can be actions shared by everyone or several people or can be actions devised by one person. It can be hard to identify adaptations so it may not be possible to document them completely. Also remember that we are interested in adaptations that are important to quality and safety – trivial adjustments, such as propping open a door to improve airflow, or using an elastic band to hold something in place are probably not relevant here. Planned changes that are introduced as part of quality improvement initiatives are not classed as adaptations. Examples of adaptations include working around a protocol or

procedure because of patient preferences for how a procedure should be done; flexing staff from one area to another; using paper notes instead of e-notes because not all staff have access to e-notes.

Anticipating.

What kinds of events are anticipated by staff? These could include disruptions, new demands, new opportunities, and risks. Who does the anticipating, how is it done, are there examples of a failure to anticipate or successful anticipation? Examples include anticipating increased need for ophthalmology appointments as diabetes prevalence increases, or anticipating nursing shortages due to fewer nurse training places.

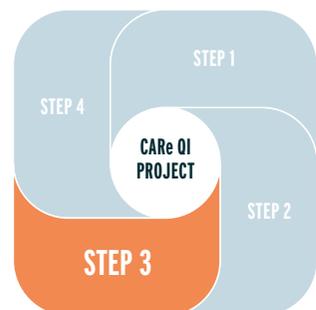
Monitoring.

What is monitored? For example, the progress of the work during a shift, whether performance is adequate and whether there will be a disruption in the near future. Who monitors this, how is it done, are there examples of a failure to monitor or successful monitoring? Examples include use of the ward patient status at a glance board to monitor patient progress; databases to keep track of bed capacity, acuity, or ED arrivals or the ward manager regularly keeping an eye on developments to make sure workload is manageable in all areas.

Responding.

Questions to consider here include what kind of events require a response (changes, disturbances), what kinds of responses are used, who responds, how, are there examples of a failure to respond or successful responding? Examples of responding include actions taken after an unwanted event such as a fall, calling for help or referring a deteriorating patient, implementing de-escalation procedures if a patient becomes aggressive.

4. CARE QI Step By Step Guidance cont. / STEP 3



Co-ordinating.

What kind of co-ordination is required, how is it done (meetings, handover, ward rounds), who is involved, are there examples of a failure to co-ordinate or successful co-ordination? Co-ordination is often a dedicated role like flow- co-ordinator or discharge co-ordinator, and often involves formal co-ordination activities such as meetings, handovers and ward rounds. Informal co-ordination also occurs by staff exchanging information, updating each other and referring patients to others. Examples of co-ordination include sharing information in formal meetings and during ad hoc interactions throughout the shift, handovers to update the incoming shift about developments.

Learning.

What kind of learning from experience occurs, who learns, are there examples of failure to learn or successful learning? Learning can occur after adverse events, from patient feedback or staff surveys and should include learning from successes. Is there evidence of failure to learn from the experience of others, or examples of successful learning.

What is the output of this step?

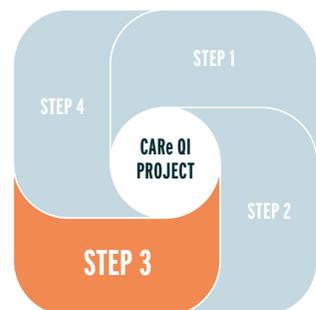
This step will result in a completed worksheet describing the status of each indicator of resilience in the system. This will provide a summary and overview that will then be used in the next step.

Use the [Extracting Resilience Indicators Worksheet](#) > provided.

Key Points

- Extract resilience indicators using concepts from the CARE model and the five resilience activities – these will show examples of misalignments, adaptations and how effectively the activities that support resilience are being carried out
- Indicators of resilience give a high-level summary of your findings
- Use the CARE model and the five resilience activities to describe the resilience in the system

4. CARE QI Step By Step Guidance cont. / STEP 3



4.3.2 Resilience narratives

What is the aim?

In this step you will use the resilience indicators to build resilience narratives that provide a comprehensive view of how the system works and its resilience. Narratives are stories of activity in the system and a resilience narrative is a description of the resilience in the system. Building the narratives from the resilience indicators identified in the previous step will help to focus on describing resilience.

How many narratives are needed?

Depending on your scope you may have one narrative or more. For example, if you have examined a small system such as medication administration in one ward you will probably only need one narrative. If you have a broad scope you may need to consider having several narratives focusing on different activities in the system. For example, in our work on the Older Persons' Unit we had 6 narratives for each area of clinical activity that we observed, such as clinical task co-ordination, care delivery, crisis response and liaising with social services. This is a judgement based on the scope of your project, the amount of information you have and what would be helpful for organising the information you have collected.

How do I get started?

The key is to use the resilience indicators worksheet to begin to relate the indicators to each other and develop a narrative story that describes activity. For example, relating misalignments to adaptations clearly shows the pressures and demands on the system and what people do in response to that. Other examples include the following –

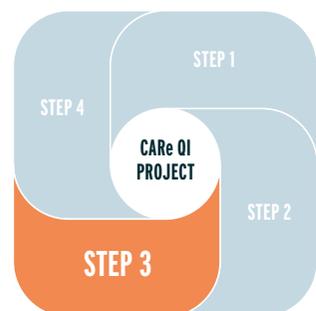
“ Attendance in the ED is fairly predictable but it’s just outstripping our ability to get people through. ”

This can be understood as a statement about how predicting ED attendance doesn't help as demand is still outstripping capacity. Anticipating does not offset the demand-capacity misalignment which gives rise to poor outcomes.

“ Staff are constantly being flexed from one area to another as patient numbers increase. This occurs all the time regardless of the policy. ”

This can be understood as a statement about the inability of the escalation policy to deal with an overstretched ED. Adapting by flexing staff is necessary due to misalignment between demand and capacity and misalignment between demand and the policies in place for dealing with increased numbers.

4. CARE QI Step By Step Guidance cont. / STEP 3



Examples of relationships between indicators of resilience.

Here is an example from our resilience narrative describing a misalignment between demand and capacity that leads to a potentially degraded outcome.

“ When a doctor has finished assessing a patient, they are often required to perform a case presentation to a registrar or consultant. Case presentations have been observed to be frequently interrupted and rushed. They are often performed in areas that are crowded with other members of staff who are often attempting to draw the attention of the registrar or consultant being presented to. The case presentation is central to decision making and when the department gets busier the quality of these presentations appear to degrade. ”

Here are other examples showing how monitoring of the work environment is important and how it can be degraded and affect outcomes.

“ One nurse confirmed that the computer display within triage filters out other ED areas, so they have no formal way of knowing how busy the rest of the ED is. It was suggested that knowing how busy each area is impacts on decision making because they want to send patients to the most appropriate place for treatment. ”

“ Staff allude to the importance of remaining vigilant with patients who are ‘known wanderers’ but are not necessarily able to do so when their workload becomes exceptionally busy. Thus, at present, wandering patients present a challenge as their occurrence not only negatively impacts on work but also presents a potential threat to patient safety. ”

Check accuracy as you develop your narrative/s.

As you are writing the resilience narrative/s you should engage the project team and relevant clinical staff in checking the accuracy of your interpretations. Often, they can add detail to the picture you are building and clarify any misunderstandings.

What is the output from this step?

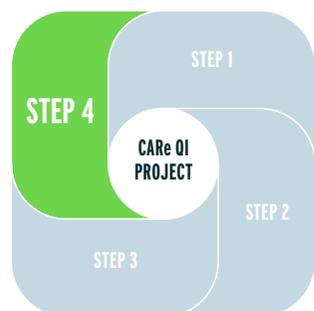
The output from this step should be a comprehensive overview or map of the resilience in the system you scoped in Step 1. This will include the concepts from the CARE model, and the five resilience activities.

Use the [Building Resilience Narratives Worksheet](#) > to develop your output from this step.

Key Points

- Aim for a comprehensive description of the resilience in everyday work
- Write descriptive narratives using the extracted resilience indicators to describe the resilience in the system
- Ensure you receive feedback throughout this step from the project team and clinical staff to ensure your emerging interpretations are accurate

4. CARE QI Step By Step Guidance cont. / **STEP 4**



4.4 Choosing Resilience Interventions And Outcome Measures

At this stage you should have a clearly documented and well-developed description of resilience in your system. The next step is to use this description to decide how to improve the system. Because interventions will be based on a detailed system description, the risk of unintended consequences is reduced, and the sustainability of interventions is increased.

What is the aim?

To generate a list of feasible interventions based on your system description. The list can then be discussed with stakeholders and interventions prioritised based on feasibility, cost, time and other factors.

How do I get started?

Keep an open mind and concentrate on generating ideas. Conceptualise interventions in terms of the CARE model and the five resilience activities. Start by reviewing your resilience indicators and resilience narratives and note any potential interventions that could reduce misalignments, or support adaptation by improving the ability to anticipate, monitor, respond, co-ordinate, and learn.

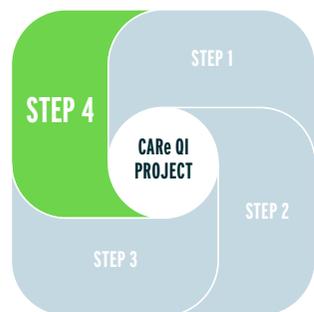
How to distinguish between intervention types?

As discussed in section 2, there are two types of potential interventions – those that are aimed at reducing misalignments and those that aim to support adaptation. Interventions to **reduce misalignments** are designed to address the pressures and

challenges experienced in everyday work and therefore reduce the need for workarounds and adaptations. They involve reducing demand and/or increasing capacity. Examples of interventions to increase capacity include provision of equipment, staff, expertise, or checklists and decision aids. Reducing demand can be achieved by, for example, improving patient scheduling, revising criteria for referral, developing new roles to handle demands such as liaising with social services or better provision of information which reduces the need for face to face communication.

Interventions to **support adaptation** usually address one or more of the five resilience activities – anticipating, monitoring, responding, co-ordinating, learning. These interventions aim to help staff to adapt when needed. For example, responding to a crisis can be supported through protocols and procedures or training programmes that ensure that staff know how to adapt when there is a crisis. For example, there may be no information systems that allow efficient monitoring of at risk patients. Therefore, a potential avenue for improvement would be to consider how the need to monitor these things can be better supported.

4. CARe QI Step By Step Guidance cont. / **STEP 4**



Do interventions have to be new?

Interventions can involve adopting more widely a local initiative that supports adaptation that you may have discovered in observations and interviews. For example, in some wards a senior nurse monitors workload across different areas. This is often something that an individual decides to do because they have found that it helps workflow so the degree to which it happens is likely to be variable. It is a vital role because the person who has a comprehensive overview can help the system to adapt by re-allocating resources. An intervention might, for example, better support this monitoring activity by making it a formal role, thereby ensuring that it continues to happen despite changes in staffing, workload, shift times, and patient numbers.

Other interventions to improve monitoring could involve mechanisms to share information amongst team members, such as huddles, information displays, team meetings. Improving the ability to respond will most likely involve increasing opportunities for team members to co-ordinate how they respond to challenges. Learning interventions will focus on how team members can learn from each other and be supported to reflect on how the work system is functioning.

How should interventions be described?

Interventions should have dual aims – patient outcomes and resilience aims. For instance, an intervention to reduce ED length of stay will likely also have resilience aims such as

- improving the ability to monitor length of stay
- improving the ability to respond to patients experiencing longer length of stay
- increasing bed capacity in the hospital.

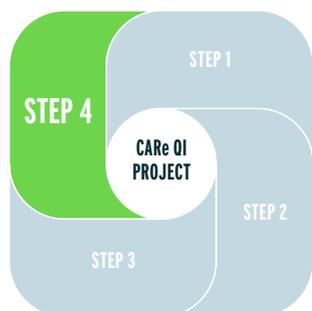
These resilience aims are the mechanism through which the outcome for reducing length of stay will be achieved.

It is important to describe the intervention according to how it increases resilience because resilience is a process that feeds into the outcome that you want to achieve. For example, one of our interventions in the OPU aimed to decrease adverse incidents through improving how staff responded to crises. The resilience narrative showed that common crises such as cardiac arrests and absconding often resulted in reduced surveillance of other patients on the ward, leaving them vulnerable to dangers such as falling or choking. The intervention used simulated crises to train teams to distribute their resources better so that they responded to the crisis and kept the rest of the ward safe. Using resilience concepts, this intervention involved

- increasing team capacity through training,
- improving team adaptation during crises,
- improving response to crises and
- improving monitoring of patients during a crisis.

This example illustrates how the resilience concepts and activities are interlinked. In your description of the intervention and its aims you should be as holistic as possible in your description.

4. CARE QI Step By Step Guidance cont. / STEP 4



How can outcome measures be identified?

Each intervention will have an overall care quality outcome, such as reduction in infections or falls, and resilience outcomes. Describing interventions using resilience terms enables you to identify outcome and process measures for evaluating the intervention. For example, in the previous example of team training to cope better with crises, there were dual aims of reducing patient falls, and resilience outcomes such as improved patient surveillance (monitoring) during a crisis.

How do I choose between interventions?

We recommend having your project team and clinical partners review the generated interventions for feasibility, likelihood of generating significant improvement, cost, resources etc. This is most helpful in a discussion group so that ideas can be critiqued and fully discussed.

Use the [Interventions and Outcome Measures Worksheet](#) > to generate options.

Key Points

- Start by keeping an open mind and generating a list of possible interventions
- Identify patient outcomes and resilience outcomes according to whether interventions target misalignments, adaptations or the five resilience abilities
- Remember that interventions are multi faceted and may have multiple targets
- Prioritise interventions based on feasibility, likely effect and resources required, involving the project team and clinical staff in the selection of interventions and their design

5. Implementation & Evaluation

5. Implementation & Evaluation

Once the intervention has been chosen, a more detailed description should be generated, together with an implementation and evaluation plan to guide the collection of evaluation data. At this stage you can use standard QI techniques. The value of CARE QI is in generating effective and sustainable interventions rather than implementation and evaluation. Nevertheless, we have some guidance.

How can an intervention be evaluated?

Specifying patient outcomes and resilience outcomes enables you to plan how you could evaluate the intervention. Patient outcomes are usually routinely captured and so can be easily accessed. Resilience outcomes will often be evaluated qualitatively using procedures like those used in capturing work as done – observations, interviews, staff and patient perceptions. For example, you could use observations and interviews to identify changes in the resilience of everyday work, or ask staff whether the intervention has changed their ability to anticipate, monitor, respond, co-ordinate or learn. Objective metrics can be obtained for some of these, for example, time to respond in each situation. Do not begin implementing the intervention until processes are in place to collect evaluation data, and these should be collected pre and post the intervention.

5. Implementation & Evaluation

Once the intervention has been chosen, a more detailed description should be generated, together with an implementation and evaluation plan to guide the collection of evaluation data. At this stage you can use standard QI techniques. The value of CArE QI is in generating effective and sustainable interventions rather than implementation and evaluation. Nevertheless, we have some guidance.

How can an intervention be implemented?

Standard quality improvement techniques can be used, depending on the type of problem addressed and the intervention you have chosen. An uncontrolled pre-post design means that it is difficult to demonstrate that changes are due to the intervention alone. If a more robust design is required a comparable control ward or unit could be used to compare outcomes after the intervention. Changes due to general organisational or regulatory change can be identified and taken into account in evaluating the intervention.

5. Implementation & Evaluation cont.

Sometimes an intervention is adapted during the implementation and PDSA cycles could be a useful way to manage this. According to resilience theory, adaptation is a normal and expected part of work so should not be discouraged. As the work system changes, so the intervention may need to change because it no longer supports the work effectively. Adaptations should be documented so that they can be evaluated.

Our evaluation handbook provides useful guidance on developing an evaluation strategy.

Key points

- *Once interventions have been decided upon, design the implementation and evaluation*
- *Make sure that the intervention doesn't begin until evaluation data are identified and can be collected*
- *Use a design appropriate to the intervention – eg. PDSA, pre-post intervention, RCT*
- *Make sure that you identify both patient and resilience outcomes and evaluate both*

6. Worksheets

6. Worksheets

The following pages feature a number of worksheets that we have put together to aid your progression through the CARE QI process. Some are pre-filled with information or examples to further guide you when filling them in. Please note that these areas will not be visible when printed.

6.1 Suitability For CARE QI Worksheet

Problem characteristics	Description of your problem	Suited to CARE QI	Suited to other approach
Stability of the system to be improved.	<i>How stable is the area you will be improving?</i>		
Involvement of multiple processes	<i>What other processes are likely to affect your problem?</i>		
Involvement of multiple organisational units	<i>What units or departments are involved?</i>		
Involvement of multiple professional groups	<i>What professional groups are likely to be involved?</i>		
Clarity of the link between cause and effect	<i>How obvious are the causes of this problem?</i>		
Involvement of behavioural and cultural factors	<i>Does this problem involve staff behaviour and/or culture?</i>		
History of previous attempts to improve	<i>What other solutions have been tried?</i>		

TIP: There is no algorithm for deciding which QI approach to take. This is a subjective decision depending on the problem you have, or the objective you wish to realise. You will need to decide on balance which approach to take. The answers to the suitability questions will help you to make that decision.

TIP: Remember that a problem can be viewed as simple or complex depending on how you frame it. For example, a problem could involve the use of wrong side replacement joints resulting in a surgical never event. If the problem is defined simply as a selection mistake, then separating and clearly labelling the different devices might be viewed as a solution. However, the problem could also be framed as resulting from non-completion of the surgical checklist due to professional opposition to checklists and incompatibility with surgical culture. This is clearly a more complex problem that would require further exploration using CARE QI.

6.2 Project Aims Worksheet

Overarching aims	Clinical area	Detailed description of what you want to achieve <i>e.g. which events do you want to reduce, which process do you want to increase adherence to.</i>
1. Reduce the frequency of some adverse or unwanted events such as medication errors		
2. Increase adherence or uptake of some standard process or desired behaviour, such as a checklist		
3. Test a new protocol, device or IT system before, during and after implementation		
4. Identify learning objectives for a staff training programme		
5. Understand how resilient a system is – are the five resilience activities occurring, are they effective, are they being supported?		
6. Understand how robust a system is – are there signs that the system is under pressure, is it operating beyond capacity and in a constant state of adaptation and therefore at risk of poor outcomes?		
7. Better understand observations you have made or data you already have		
8. Other		

6.3 Project Scope Worksheet

Questions to consider	Description of links to other tasks, functions, processes or organisational units
What is the task or function you are interested in examining and is it simple or multi-faceted?	
How interlinked is the task or function with other departments or units?	
How dependent is the task or function on inputs from other areas? For example, is timing crucial, or accuracy of information received?	
Do priorities differ between these areas and how does this affect the problem?	
How well understood and how dependable are the processes in these other areas?	
What other downstream processes are dependent on the task or function? In what way?	
Is the task or function affected by policy, finance or other directives? In what way?	
Is responsibility for outcomes shared with other organisational units?	
Will potential interventions have to involve multiple organisational units or factors external to the unit?	

TIP: The answers to these questions will help you to decide which aspects of care will be part of the system you examine. It is not necessary to define this completely before starting your project. For example, starting by examining a well-defined space, such as a unit or ward with a natural boundary, or a discrete task such as patient identification

procedures is possible when it is hard to answer the scoping questions. However, keep an open mind about other aspects of the system that might need to be included as the project progresses. Answering these questions now will help with initial setup and ongoing reflection on the scope of the project.

6.4 Project Team Worksheet

Use the project team worksheet to document the following roles.

Role	People
Project manager – responsible for the project	
Project co-ordinator – manages and co-ordinates project	
Medical	
Nursing	
Allied Health	
Ancillary Staff	
Frontline staff	
Senior manager	
Quality improvement specialist	
Research or QI staff who will collect and analyse data	
Patient representative	
Academic partner	
Other	

6.5 Observation Of Work As Done Worksheet

Researcher Initials:

Date:

Ward Setting:

Activity	Context	Goal <i>'work as imagined'</i>	Challenges/Pressures	Adaptations <i>'work as done'</i>	Impact
<i>Describe the activity under observation</i>	<i>Set the scene for the context within which this activity is taking place.</i>	<i>Describe the main goals of the activity under observation.</i>	<i>Describe anything that interferes with the activity proceeding as planned.</i>	<i>Describe the adaptations that individuals/teams make to manage the challenges/pressures.</i>	<i>Describe the impact that making the adaptations has had, this may be immediate or longer term.</i>

TIP: Remember the aim here is to understand work, not to find errors or noncompliance.

TIP: Aim for broad observations at the start, then narrow the focus as important aspects emerge. At this stage you might identify key people to shadow or difficult processes or areas that need further clarification

TIP: Dictaphones or hand-held recorders can be useful to capture simple short insights when asking staff about work as done

6.6 Semi Structured Interview Topic Guide

This is a suggested topic guide for interviews. Semi structured topic guides are designed to be used flexibly. There are likely to be some questions that are relevant to your project and some relevant questions that are not included in this guide, so you will need to adapt the questions to ensure you gain the information you need. You may have to add or leave out questions depending

on who you are speaking to. For example, there may be specific questions that you need to ask doctors that are not relevant to other professional groups and vice versa. The suggested wording of the questions can be adapted. The probes are suggestions for follow up questions, but how and whether these are used will depend on the project and the judgement of the interviewer.

1. Can you briefly describe your role and your main responsibilities?
How long have you been in this role? How many patients are you normally responsible for?
2. On a day-to-day basis, what are the main difficulties and pressures on the the unit/department? What creates difficulties for staff? Probe, for example, admissions, discharges, ambulances, challenging patient care, relatives, communication, staff shortages, MDT co-ordination
3. How do you know that the Unit/Department is under pressure? Do you have 'warnings'? If so, what do these look like/how would you describe them?
4. What do you personally do in response to pressures? For example, are you able to make adjustments to your workload/the workloads of your colleagues or take other action to reduce pressure? Prompts – ask for assistance, change the way tasks are done to get them done more quickly, ask senior staff what to do
5. Are there instances where several staff are required to manage a difficult situation? Eg patient deterioration, aggression, mental health problems. What happens then?
6. What actions do managers take to deal with pressure? Eg staffing changes, escalation, goal adjustment, is everyone informed?
7. Could more be done to anticipate pressures on the Unit/Department?
8. What would you define as a 'successful day' and why?
9. What would you define as an 'unsuccessful day' and why?
10. Do you know whether the unit/department is performing well at any particular time? How do you find out? What indicates that it is performing well?
11. Do you generally know about the status of all patients/workload on the unit? How do you find out? Probe, for example, whiteboard, verbal communication, ward rounds, MDT, two hourly meeting, board rounds. Do these ways of communicating work well or are there times when they don't? How can it be improved?
12. How do you interact with the multi-disciplinary team?
13. How do you learn about what is happening on the unit/department, for example, new ways of working, risks and problems that may occur during clinical work? Are there meetings where these things are discussed? Or is it more informal and you share experiences with colleagues and learn from each other? Which colleagues?
14. What initiatives have been taken recently to improve the working of the unit/department? How have they worked out? Do you receive information about initiatives and outcomes? What is planned for the near future in terms of improvements? What would you like to see happen?
15. Do you have any additional comments?

TIP: Deciding who you want to interview may be discussed while setting the scope and revised after initial observations.

6.7 Extracting Resilience Indicators Worksheet

You should refer to sections 2.4 and 2.5 of the handbook for indicators to look for, and 3.3.1 for questions to ask yourself. This is a two part worksheet. The example text is taken directly from our work in the Emergency Department and summarises our findings.

Themes	Summary of resilience indicators
Misalignments between demand and capacity	
Adaptations	
Anticipation	
Monitoring	

TIP: Aim for a comprehensive but high-level overview of the resilience in the system. Further detail can be added during the next step. It is important at this stage to focus on a high-level description of resilience.

TIP: The indicators are often interlinked, so you will usually have descriptions that overlap – e.g. adapting to a demand/capacity issue; co-ordination of a response; learning from a successful outcome. Try not to worry too much about which 'box' things go in – the description is the important thing.

TIP: For academic work with the aim of publication or for a thesis or dissertation, more extensive coding of the qualitative data can also be considered. Extracting the resilience indicators can be viewed as deductive coding, but you might want to use qualitative data management software to code inductively as well. This will yield more in-depth detailed descriptions of the data.

6.7 Extracting Resilience Indicators Worksheet cont.

Themes	Summary of resilience indicators
Responding	
Co-ordinating	
Learning	
Outcomes	

6.8 Resilience Narratives Worksheet

Use this worksheet to document your resilience narrative. Use a separate sheet for each narrative.
The example text is taken from our work in the Older Person's Unit and is an extract from a resilience narrative.

Resilience narrative <i>Title and description</i>	Resilience indicators extracted in previous step

TIP: It will be helpful to decide before you start how many narratives will be written. We suggest that narratives are based on areas of activity, such as discharge planning, liaising with social services, managing patient flow, or conducting ward rounds, depending on the focus of your project.

TIP: The success of CARE QI depends on you thinking in resilience terms. You can write your narrative using normal (e.g. clinical or technical) language - but make sure your narrative is built on what you found about the resilience indicators and documented in the previous worksheet. The resilience narrative should constitute a description of the resilience in your system.

6.9 Resilience Interventions And Outcome Measures Worksheet

Use this worksheet to develop your list of potential interventions for further discussion.
The example text details interventions we have used in our work.

Potential intervention	Will it aim to reduce misalignments or support resilience activities, or both?	Feasibility	Potential effect vs costs	Potential outcome measures

TIP: The aim at this stage is to think broadly and generate a list of potential interventions that can be reviewed by the project team and stakeholders before a final decision is made.



7. Further Information & Resources

7. Further Information & Resources

7.1 CARE QI Key Books And Papers

.....Anderson JE, Ross A, Jaye P. Resilience engineering in healthcare: Moving from epistemology to theory and practice. In Proceedings of the fifth resilience engineering symposium. Soesterberg, Netherlands: Resilience Engineering Association. 2013.

.....Anderson, J.E., Ross, A., Back, J., Duncan, M., Snell, P., Hopper, A. and Jaye, P. (2020) Beyond 'find and fix': Using resilience principles to improve quality and safety. International Journal for Quality in Health Care, 2020 Feb 28. pii: mzaa007

.....Anderson, J.E., Ross, A., & Jaye, P. (2016) Modelling resilience and researching the gap between work-as-imagined and work-as-done. In Braithwaite, J., Wears, R., & Hollnagel, E. (Eds.). Resilient Health Care Volume 3: Reconciling work-as-imagined and work-as-done. Farnham, UK: Ashgate. ISBN 9781498780568

.....Anderson, J.E., Ross, A., Back, J., Duncan, M., Snell, P., Walsh, K. & Jaye, P. (2016). Implementing resilience engineering for healthcare quality improvement using the CARE model: A feasibility study protocol. BMC Pilot and Feasibility Studies, 2, 61.

.....ANDERSON, J.E., Ross, A.J., Back, J., Duncan, M., & Jaye, P. (2018). Resilience engineering as a quality improvement method. In Wiig, S., & Fahlbruch, B. (Eds.) Exploring Resilience - A Scientific Journey from Practice to Theory. SpringerBriefs in Safety Management. E-book. ISBN 978-3-030-03189-3

.....ANDERSON, J.E., Ross, A.J., Back, J., Duncan, M., Hopper, A., Snell, P., & Jaye, P. (2019). Resilience engineering for quality improvement: Case study in a unit for the care of older people. In Hollnagel, E., Braithwaite, J., & Wears, R.L. (Eds.) Delivering Resilient Health Care. (pp. 32-43). Abingdon, Oxon: Routledge. ISBN 978-1-138-60225-0

.....Anderson, J.E., Ross, A.J., Macrae, C. & Wiig, S. (2020). Defining adaptive capacity in healthcare: A new framework for investigating the potential for resilient performance. Applied Ergonomics Special Issue on Resilience Engineering.

.....Back, J., Ross, A., Duncan, M., Jaye, P., Henderson, K., & Anderson, J.E. (2017). Emergency department escalation in theory and practice: A mixed-methods study using a model of organizational resilience. Annals of Emergency Medicine, 70. 659-671. [See also editorial discussing our findings by Wears, R. "The secret life of policies" in the same issue.]

.....Back, J., Ross, A., Jaye, P., Henderson, K. & ANDERSON, J.E. (2019). Patient Flow Management: Codified and Opportunistic Escalation Actions. Resilient Health Care Volume 5: Working across boundaries. CRC Press. ISBN 978-0-367-22457-8

.....Jackson, J., Iacovides, J., Duncan, M., Alders, M., Maben, J., & Anderson, JE (2020). Operationalizing resilience engineering concepts through a serious video game for healthcare professionals. Applied Ergonomics Special Issue on Resilience Engineering.

.....McNab, D., Bowie, P., Morrison, J. and Ross, A. (2016) Understanding patient safety performance and educational needs using the 'Safety-II' approach for complex systems. Education for Primary Care, 27(6), pp. 443-450.

.....Ross, A., Sherrif, A., Kidd, J., Gnich, W., Anderson, J.E., Deas, L., & Macpherson, L. (2018). A systems approach using the Functional Resonance Analysis Method to support fluoride varnish application for children attending general dental practice in Scotland. Applied Ergonomics. 68, April 2018, Pages 294-303

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7. Further Information & Resources cont.

7.2 Further Reading

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7. Further Information & Resources *cont.*

7.3 Websites For Professional Groups And Bodies

Centre for Applied Resilience in Healthcare >

Chartered Institute of Ergonomics and Human Factors >

Community of Practice in Human Factors (HF) & Quality Improvement (QI) >

The Functional Resonance Analysis Method (FRAM) >

The Resilient Healthcare Network >

Safety Differently – Innovative and critical safety thinking >

7. Further Information & Resources cont.

7.4 Care QI Case Studies and Frequently Asked Questions

The CARE QI website has a series of case studies of work we have done to date that should prove useful if you want to understand more about CARE QI. Hopefully these examples of CARE QI in action will help answer questions you may have. There is also an FAQ section on the website based on workshops with the handbook, and feedback from those applying it across health and social care.

7. Further Information & Resources cont.

7.5 Acknowledgements

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Thank you for engaging with the CARE QI Handbook for Improving Quality through Resilient Systems.

We do hope that the introduction and overview sections, the CARE model, and the step-by-step guide, will be useful for your Quality Improvement or Patient Safety project and for designing interventions to support resilient health care.

The CARE QI website contains case studies and examples of using the Handbook across a range of health and social care settings. These provide more detail about the examples we have provided in the Handbook.

There is also an opportunity to provide feedback about the Handbook for those applying CARE QI to allow us to improve the overall process. We are very keen to hear of your experiences using the Handbook and how CARE QI can provide more support.

We intend to develop the Handbook further based on experience using it in practice. If you would like to discuss collaborating on a project involving the Handbook, or require any further information or want to discuss anything further, please get in touch.

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