



# HQIP

Healthcare Quality  
Improvement Partnership

# Guide to Using Quality Improvement Tools to Drive Clinical Audits

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# 1 Introduction

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## 1.1 Who this guide is for

This guide is for the following people who are involved with managing, leading, facilitating or carrying out clinical audits in healthcare organisations:

- Clinical audit managers, practitioners, specialists and facilitators
- Clinical audit leads and clinical staff taking the lead for carrying out individual clinical audits
- Clinical audit committee chairs and members
- Junior doctors who are expected to take a quality improvement (QI) approach to the clinical audits they carry out, and their supervisors
- Quality improvement managers, leads and facilitators, in order to learn how to integrate clinical audits into QI programmes and projects being carried out in healthcare organisations.

## 1.2 How the guide is intended to help

Nearly ten years ago, the clinical audit process was re-defined by the National Institute for Health and Clinical Excellence (NICE) as a quality improvement process.<sup>1</sup> It is unclear if clinical audit committees and staff have understood fully the implications of the repositioning of clinical audit in the domain of quality improvement. Many clinical services and healthcare organisations have continued to carry out clinical audits using the same model described in the 1990s, a model that did not refer explicitly to the QI process. Therefore, QI approaches and tools are not always systematically used when they could be helpful to carry out stages in the clinical audit process.

The guide describes how QI approaches can be applied to clinical audit and specific QI tools that can contribute to the clinical audit process and when to use them. It includes:

- the traditional model of clinical audit
- a summary of selected evidence on the effectiveness of the traditional approach to clinical audit and the need for the QI approach
- how a QI process differs from the traditional model and the implications of the change in approach
- a summary of selected evidence on the importance of teamwork in QI
- stages in the clinical audit process where one or more QI tools can be used to:
  - reach agreement at various stages in the clinical audit process
  - test commitment to carrying out the audit or to change practice through the clinical audit process
  - search for best practice as a basis for standards to be used in a clinical audit
  - understand how care is delivered now before any change in a process of care is made
  - understand the type of variation that can be shown in clinical practice and the nature of actions needed for each type
  - identify the causes of problems that might be revealed by a clinical audit
  - make changes in practice to achieve improvement

- when a QI tool could be used instead of or in addition to a clinical audit
- what clinical audit staff and clinical audit leads may need to do to be sure that clinical audit works as a true QI process.

## 2 Clinical audit — the traditional and quality improvement (QI) models

### 2.1 Traditional clinical audit ‘cycles’

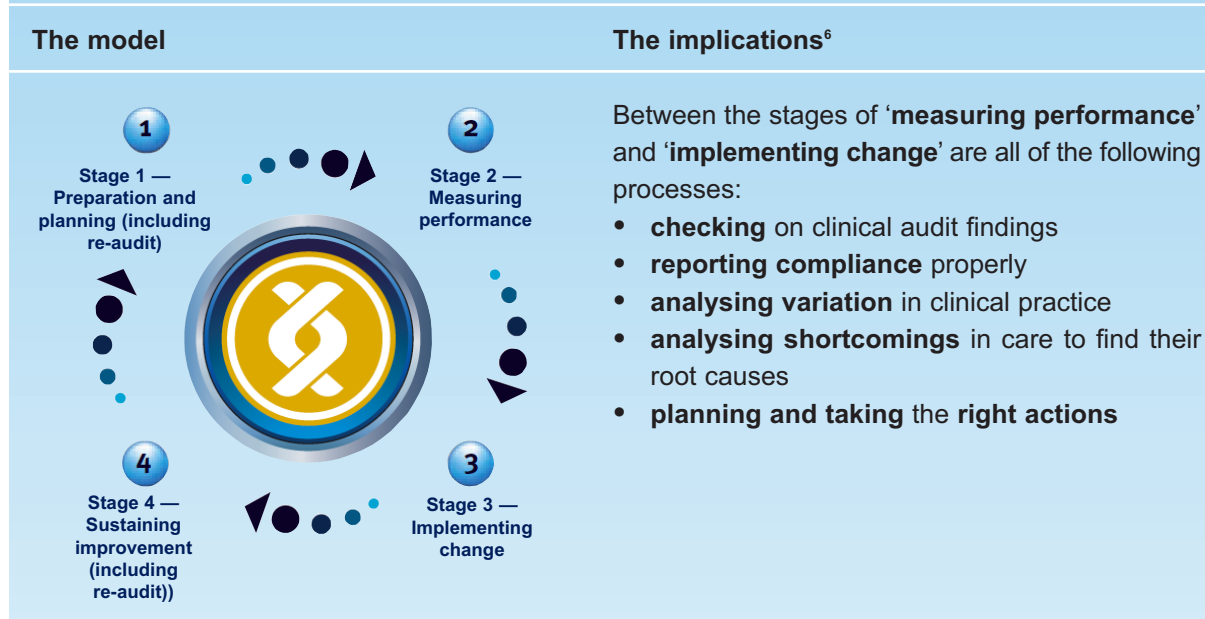
Clinical audit has traditionally been represented as a ‘cycle’, perhaps based on historic publications about the medical audit process. In the early 1970s, Brown and Fleisher described audit using a ‘bi-cycle’ concept.<sup>2</sup> According to this model, findings from the **first stage** of data collection for an audit are **used to change practice** and **another cycle** of data collection is undertaken **to see if the change** in practice has **resulted in improved findings**. Originally, Brown and Fleisher attributed improvements achieved to the continuing medical education process.

In the UK, the Department of Health has represented clinical audit as the ‘cycle’ shown in the diagram in the box.<sup>3</sup> This type of cycle represents the clinical audit process as a **quality assurance model** for clinical practice, and could be associated with potential shortcomings in the way the process is carried out as listed in the box.

Traditional model of clinical audit and its shortcomings	
The model	The implications <sup>4</sup>
<p>The diagram illustrates the traditional clinical audit cycle as a continuous loop of six stages: 1. Set (or adjust) standards, 2. Measure practice, 3. Compare current practice against standards, 4. Identify area for change, 5. Make changes, and 6. Re-evaluate practice. Each stage is connected to the next by a curved arrow pointing clockwise, forming a circle around the central text 'The clinical audit cycle'.</p>	<p>Starting the cycle with ‘<b>set standards</b>’ doesn’t provide for properly designing a clinical audit, including:</p> <ul style="list-style-type: none"> <li>• making decisions about the <b>objective</b> of the audit and the cases to be included</li> <li>• identifying and involving key <b>stakeholders</b> in the audit.</li> </ul> <p>The stage of ‘<b>make changes</b>’ provides little guidance on how to identify the <b>types of changes needed</b> and the need for the change to <b>result in improvement</b>.</p> <p>The stage of ‘<b>re-evaluate practice</b>’ does not make explicit that <b>data need to be collected again</b> in order to demonstrate the effect of the change that has been made.</p>

HQIP’s modification of the clinical audit cycle in the box on the next page places more emphasis on implementing change and sustaining improvement.<sup>5</sup> However, a number of stages needed to achieve change and improvement are assumed in the cycle as described in the box.

## Modification of the traditional model of the clinical audit cycle



Both models of clinical audit describe the second cycle of data collection as 're-evaluation' or 're-audit', which can be misleading. First, the term re-audit implies that repeating data collection is **another** (re-) **audit** and not the completion of the original audit; it suggests that a clinical audit is 'completed' when change is made. A **QI approach** to clinical audit makes it clear that the **second or successive stages of data collection are part of the original audit** and that **repeating data collection is essential to complete an audit**.

### 2.2 Evidence on the effectiveness of the traditional clinical audit models

The challenges of determining the effectiveness of clinical audit have been described.<sup>7</sup> The Cochrane systematic review **on the traditional concept of audit and feedback** concluded that the **effects of audit** are variable but are generally **small to moderate**.<sup>8</sup> The Cochrane review used a definition of clinical audit as 'any summary of clinical performance over a specified period of time',<sup>8</sup> which may explain in part the findings of the review.<sup>9</sup> Others have suggested that audit and feedback may continue to be an unreliable approach to QI until it is known how and when it works best.<sup>10</sup>

### 2.3 What's really involved in QI

The meaning of the **concept of QI** is in the box on the next page. The definition emphasises that **QI is a sequential, dynamic process involving cycles that measure** clinical practice compared with evidence-based benchmarks of best practice, **devise and try out strategies to improve** implementation of best practice and **measure the impact** of the strategies **until the intended improvement is achieved**.<sup>11</sup> It involves testing change on a small scale with rapid measurement to determine the effects of change and sustain improvements.<sup>12-14</sup> The defining element of QI is the use of measurement and feedback aimed at changing care practices; there is a deliberate aim to improve and the effects of change are measured.<sup>15</sup>

## The quality improvement process explained

### Quality improvement (QI) process

Systematic data-guided activities designed to bring about **immediate, positive changes** in the delivery of **health care** in particular settings;<sup>16-17</sup> the information produced by quality assessment is translated into systematic improvements in healthcare practices.<sup>18</sup>

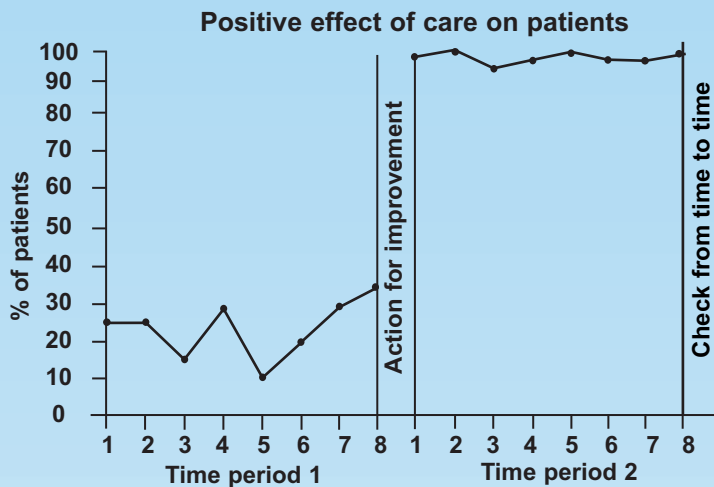
QI involves the application of knowledge, tools and techniques from several disciplines, including organisational leadership and development, systems analysis, statistics, group behaviour, psychology or marketing, for the purpose of accomplishing substantial improvements in patient care or service.<sup>19</sup>

## 2.4 The QI model of clinical audit

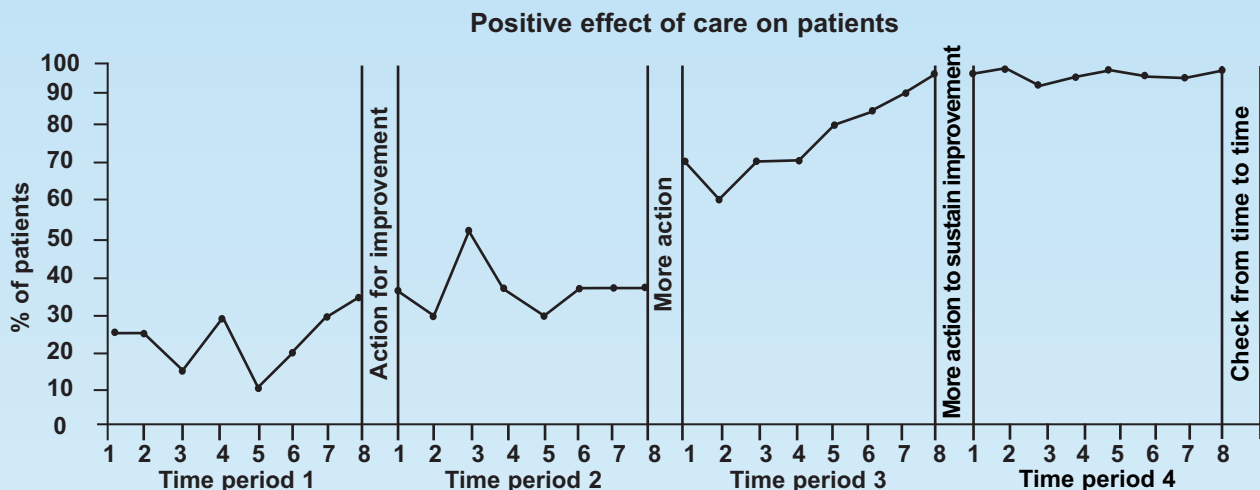
The shift in understanding of how clinical audit works as a QI process is illustrated in the diagram.<sup>20</sup> The diagram represents ONE audit, not a series of re-audits, and indicates, therefore, that an audit is not completed until action is implemented and data collected again as many times as needed to demonstrate that the quality of care is improved.

### A QI 'rapid-cycle' change model of clinical audit

#### An audit with one cycle of action and repeat measurement



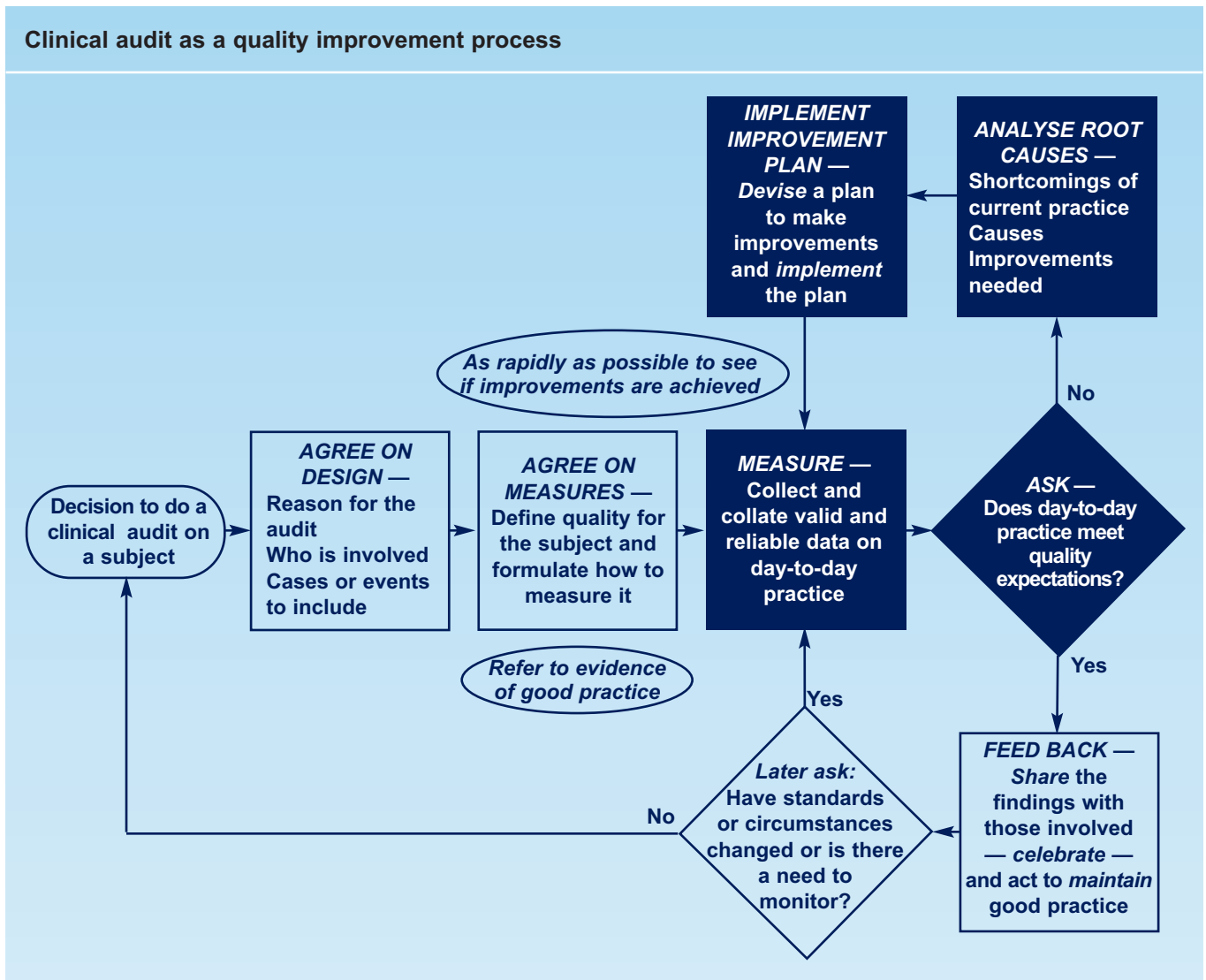
#### An audit with several cycles of action and repeat measurement





The QI model of clinical audit recognises the later stages in a clinical audit that are essential to demonstrate improvement. These stages are concerned with interpreting clinical audit findings, identifying shortcomings in care and their causes, and implementing the type of action needed to overcome the causes of identified shortcomings.

A more appropriate way to describe the clinical audit process as a QI process is in the box.<sup>20</sup> The dark shapes show the QI part of the process. The diagram is explicit about identifying specific problems revealed by a clinical audit, finding their causes and formulating the improvements needed—all before taking action.



## 2.5 Summary of the implications of the models for clinical audit

The differences between the models for clinical audit can be summed up as **differences between a quality assurance and a quality improvement approach**. Characteristics of quality assurance and quality improvement as processes are in the box on the next page.<sup>4</sup>

## Characteristics of quality assurance (QA) and quality improvement (QI) as processes

QA characteristics	QI characteristics
The purpose is to ensure that quality <b>requirements</b> are being <b>met</b> .	The purpose is to bring about <b>immediate, positive changes</b> in delivering quality.
The focus is on <b>compliance with standards</b> not necessarily proactively improving the way care is provided.	The focus is on <b>improving practice using standards</b> as a basis for defining quality.
Data are used to <b>compare actual practice with standards</b> .	Data are used to <b>drive improvements in practice to achieve best practice</b> .
Actions are intended to <b>'remedy' any variations from standards</b> .	Actions are likely to involve <b>changing processes or systems</b> to enable improved practice.
<b>Repeat data collection</b> is not necessarily emphasised.	<b>RAPID repeat data collection is required</b> to demonstrate the effectiveness of changes in practice intended to produce improvements.

### 3 The importance of teamwork in the QI approach to clinical audit

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#### 3.1 A summary of evidence relating to the impact of teamwork in QI

There has been a tendency in some healthcare organisations for clinical audits to be 'assigned' to individual people, often junior doctors, to design and carry out as 'projects'. However, individuals, particularly junior doctors, may not be able to influence other clinicians to implement a change in their clinical practice. Also, they are seldom in jobs that allow them to devote the time needed to achieve a significant improvement in the quality of patient care or to have access to the people who can direct or support a change in practice.

Individuals' clinical audit projects might provide assurance of the quality of care, if data collection reveals that practice is already consistent with agreed best practice. However, the individual project approach to clinical audit can be self-defeating in terms of achieving improvement in the provision of patient care, particularly when the individuals doing the audits have no authority to enact or to enforce change and have to influence others, often more senior staff, to agree to making change.

Some researchers have analysed the relationship between success in achieving and sustaining improvements in the quality of patient care and the use of teams facilitated for QI purposes. A summary of some of the studies is in the box on the next page.

## The contribution of facilitated teams to QI

Author	Nature of evidence	Findings
Boan and Funderburk <sup>21</sup>	Literature review on organisational culture	Creation of quality-oriented <b>teams</b> or microsystems is associated with quality. More effective <b>teams</b> are associated with higher quality care. <b>Teams and team leaders</b> are an effective unit of intervention for driving improvement.
Mills and Weeks <sup>22</sup>	Pre-post observational design of 5 projects involving 131 QI teams in the Veterans Health Administration (VHA) in the USA	<b>High-performing improvement teams:</b> <ul style="list-style-type: none"> <li>• work well as <b>teams</b></li> <li>• have the ongoing <b>support of their senior leaders</b></li> <li>• work in an organisation in which <b>improvement is part of the organisation's key strategic goals</b></li> <li>• have sufficient <b>time and useful information</b> systems to carry out the improvement work</li> <li>• have <b>support from the front-line staff</b></li> </ul>
O'Toole et al <sup>23</sup>	Longitudinal time series cohort study of 30 primary care providers in seven practices in the USA	<b>When feedback reports</b> on clinical performance were <b>linked to a team-based QI intervention</b> , the <b>results</b> were <b>more robust and were sustained for 12 months</b> following the intervention cycle.
Stetler et al <sup>24</sup>	Post-hoc evaluation of facilitation of improvement teams involving 7 locations in the VHA in the USA	<b>Facilitation of improvement teams</b> is a deliberate and <b>valued process</b> of interactive problem solving and support that occurs in the context of a recognised need for improvement and a supportive interpersonal relationship.
Thor et al <sup>25</sup>	Case study design involving 93 improvement projects in a Swedish university hospital	<b>Facilitation of improvement teams</b> provided a framework and support for the use of improvement methods. <b>Facilitators can help organisations manage change</b> by assuming responsibility for demanding tasks related to improvement work, developing specialised skill and extensive experience regarding improvement and transferring learning across the organisation.

### 3.2 How teamwork contributes to clinical audit as a QI process

Treating clinical audit as a QI process—and working through clinical teams rather than individuals—should contribute to shifting the clinical audit ‘culture’. The essence of a team is shared commitment; without it, groups perform as individuals.<sup>26</sup> **There is a need for clinical groups to have a shared sense of responsibility for maintaining and improving the quality of patient care.** If teamwork becomes the norm for carrying out clinical audits, audit is more likely to become a service or corporate commitment to measuring and improving the quality of patient care, rather than to supporting the conduct of individuals’ ‘projects’.

What enhances teamwork for QI purposes, as suggested by the selected evidence summarised in the box, is the **facilitated use of QI tools** to actively involve the members of a clinical team in each stage in the clinical audit process.

## 4 Where QI tools fit into the clinical audit process

### 4.1 Stages of a clinical audit and the desired outcomes of each stage

A QI approach to clinical audit is not simply about implementing action on clinical audit findings to achieve improvement in the quality of patient care. Implementing a **QI** approach to clinical audit is **embedded in all the stages in a clinical audit**. Stages in the clinical audit process and the outcomes needed at each stage are listed in the box.

Stages in a clinical audit and what needs to be achieved with stakeholders at each stage	
Clinical audit stage	Desired outcome of the stage
<p><b>Agreeing on and testing commitment to the design—</b></p> <p>Selecting a <b>subject</b> for the audit</p> <p>Formulating the <b>objective</b> for the audit</p> <p>Recognising and involving key <b>stakeholders</b></p> <p>Deciding on <b>cases</b> to include in and exclude from the audit, the number of cases and how they are selected</p> <p>Deciding on <b>how data</b> will be <b>collected</b>, that is, retrospective or concurrent</p>	<p>The <b>stakeholders</b> in the clinical audit explicitly <b>agree</b> to the following:</p> <ul style="list-style-type: none"> <li>the <b>subject</b> of the audit—<b>preferably through participating in selecting the subject</b></li> <li>the <b>objective—what is to be achieved</b> by the audit</li> <li>the <b>cases</b> for the audit and how they are selected—<b>to enhance the credibility</b> to the stakeholders</li> <li>the <b>strategy for data collection—to enhance the credibility</b> of the audit.</li> </ul> <p>The <b>stakeholders</b> in the clinical audit <b>express commitment</b> to the audit and to <b>act on the findings</b> of data collection.</p>
<p><b>Developing standards—</b></p> <p>Selecting the <b>standards</b> to be used as a basis for the audit and <b>how compliance</b> with the standards is to be <b>measured</b> exactly</p>	<p>The <b>stakeholders</b> in the clinical audit explicitly <b>reach consensus</b> on the following:</p> <ul style="list-style-type: none"> <li>the <b>evidence to be searched for</b> in data sources to demonstrate that quality expectations are being met</li> <li>the <b>percentage of cases</b> for which the evidence should be present (or absent)</li> <li>any <b>exceptions</b> to the evidence specified</li> <li>precise <b>definitions and instructions for collecting data</b>.</li> </ul>
<p><b>Developing the data collection protocol and tool—</b></p> <p>Developing a <b>protocol</b> that specifies how data collection is to be carried out</p>	<p>The <b>stakeholders</b> in the clinical audit explicitly <b>agree</b> to the following:</p> <ul style="list-style-type: none"> <li>the data collection <b>protocol</b> for the audit</li> <li>the data collection <b>form or system</b></li> </ul>

<p>Developing and testing a data collection <b>form</b> and system</p> <p>Preparing the <b>data collectors</b></p>	<ul style="list-style-type: none"> <li>• any <b>changes</b> to be made in the form or system <b>following testing, including inter-rater reliability testing</b> of data collection</li> <li>• the data collectors for the audit.</li> </ul>
<p><b>Collecting, collating, validating, analysing and reporting data—</b></p> <p>Checking on the <b>completeness and accuracy of data</b> collected</p> <p><b>Calculating</b> and presenting <b>compliance</b> with standards <b>properly</b></p> <p><b>Analysing variation</b> in clinical practice</p>	<p>The <b>clinical stakeholders</b> in the clinical audit:</p> <ul style="list-style-type: none"> <li>• <b>believe the data</b> are complete and accurate</li> <li>• <b>have reviewed any cases not complying with standards to find any that are clinically justified</b></li> <li>• <b>believe</b> the reported level of compliance with the standards</li> <li>• <b>understand the type of variation</b> in clinical practice <b>and</b> the nature of the <b>action to be taken.</b></li> </ul>
<p><b>Identifying shortcomings in care, if any, carrying out root cause analysis and identifying improvements needed—</b></p> <p>Identifying any <b>shortcomings</b> in patient care revealed by clinical audit findings</p> <p>Analysing the shortcomings in care</p> <p>Describing <b>improvements needed</b> in care</p>	<p>The <b>stakeholders</b> in the clinical audit or their representatives:</p> <ul style="list-style-type: none"> <li>• <b>identify specific shortcomings</b> in patient care revealed by an audit</li> <li>• <b>find the root causes</b> of the shortcomings through use of root cause analysis tools</li> <li>• agree on the <b>exact improvements</b> needed in patient care.</li> </ul>
<p><b>Planning and implementing action—</b></p> <p>Planning <b>action needed</b> to achieve the intended improvements in patient care</p> <p><b>Implementing</b> the action planned</p> <p><b>Monitoring</b> the action taken</p>	<p>The <b>stakeholders</b> in the clinical audit:</p> <ul style="list-style-type: none"> <li>• are <b>committed to act</b> on the audit findings</li> <li>• <b>select the right types of action</b> needed <b>given the causes of present shortcomings</b> in patient care</li> <li>• agree how and when the actions will be carried out and monitored</li> <li>• <b>implement</b> (or if necessary, recommend implementation to other stakeholders) the <b>actions</b> identified as needed.</li> </ul>
<p><b>Repeating data collection—</b> <b>Collecting data again</b></p>	<p>The <b>stakeholders</b> in the clinical audit:</p> <ul style="list-style-type: none"> <li>• <b>repeat data collection</b>, using the same data collection protocol and form or system with the same or similarly prepared data collectors</li> <li>• have the <b>same outcomes as stated above for data collection</b></li> <li>• <b>reach a decision about</b> whether or not the <b>level of improvement</b> is acceptable</li> <li>• agree on any further action and repeat data collection, if needed.</li> </ul>

## 4.2 Ways to achieve the desired outcomes for the stages in a clinical audit

Individuals carrying out clinical audits often make all the decisions involved. In some cases, an individual discusses the decisions with a clinical audit lead or with a clinical manager or supervisor. Therefore, it is unclear how much key stakeholders in an audit are involved and committed to the audit, and in particular, to acting on the findings.

QI approaches have the advantage of actively involving stakeholders in making decisions at several stages in a clinical audit. QI tools that can support clinical audit are described in detail in the following sections.

## 5 QI tools that can contribute to the clinical audit process

QI tools that can support clinical audit and what the tools do are described in the boxes in this section. The tools have been organised by the nature of what they do. For example, QI tools that help groups to agree on a decision are presented together. How each QI tool works in detail and when the tool could be used as part of a clinical audit are described in more detail in section 6.

### 5.1 Reaching agreement<sup>19, 27–28</sup>

#### Reaching agreement for a clinical audit—Tools and when to use them

<b>Brainstorming</b>	To <b>generate a list</b> of potential subjects for a clinical audit, issues related to a particular subject for a clinical audit, possible objectives for the clinical audit, possible causes of problems, or possible actions to resolve causes of any problems identified
<b>Nominal group process</b>	To <b>reach consensus by ranking items</b> on a list when decisions need to be made, for example, on the subject, objectives and/or other audit design elements, standards, data collection protocol elements, or actions for improvement for a clinical audit
<b>Delphi process</b>	To <b>reach consensus by rating items</b> on a list when decisions need to be made, for example, on the subject, objectives and/or other audit design elements, standards, data collection protocol elements, or actions for improvement
<b>Multivoting</b>	To <b>reach consensus by casting votes for items</b> on a list when decisions need to be made, for example, on the subject, objectives and/or other audit design elements, standards, data collection protocol elements, or actions for improvement
<b>Affinity diagram</b>	To <b>clarify the nature of issues</b> , for example, issues related to a clinical audit subject as a basis for setting objectives

### 5.2 Testing commitment to measuring practice and achieving improvement<sup>19, 28</sup>

It's useful for a team to discuss and confirm the team members' and others' commitment to decisions related to clinical audit. The discussion can be brief but it may serve the purpose of helping team members to:<sup>19</sup>

- anticipate experiences the team may encounter as it progresses with its work
- foresee others' potential reactions to the team's work
- consider possible difficulties the team may face
- identify benefits of the team's work, which the team members can explain to others, if needed
- develop strategies for key issues involved in the team's work.

#### Testing commitment for a clinical audit—Tools and when to use them

<b>Force-field analysis</b>	To identify <b>positive and negative forces</b> and the strength of the forces in relation to a clinical audit and/or actions for improvement
<b>Readiness-for-change rating</b>	To identify <b>factors that favour or disfavour</b> , for example, a clinical audit and/or actions for improvement, and the importance or strength of the factors
<b>Brainstorming</b>	To identify <b>barriers to and enablers of</b> a clinical audit and/or actions for improvement
<b>Delphi process</b>	To <b>rate commitment</b> to acting on barriers to a clinical audit and/or actions for improvement

### 5.3 Searching for best practice<sup>19, 27–29</sup>

When a team has defined and agreed on the objectives of a clinical audit and confirmed that there is commitment to the audit by the team members and other key individuals, the team may need to search for and appraise existing evidence of best practice in relation to the subject of the clinical audit. The team also may find it beneficial to see how 'the best' organisation or department or service provides care or service related to the team's audit objective. The evidence and 'best practice' examples will provide the basis for knowing what is important to measure.

#### Learning about best practice for a clinical audit—Tools and when to use them

<b>Critical appraisal</b>	To learn about <b>evidence relating to best practice</b> and decide if the evidence is reliable and valid and can be applied locally
<b>Benchmarking</b>	To learn about <b>practices</b> , usually processes and systems, <b>of 'the best'</b> that lead to superior performance in order to improve a process or outcome and related performance



## 5.4 Understanding how care is delivered now and for improvement

For many clinical audits, a team will end up taking action to improve how an existing process of care works. Before a team ‘meddles’ with a process, the team members can benefit from knowing exactly how it works, how people or functions or departments relate to each other in carrying out a process, and how patients or staff are being affected.

### 5.4.1 *Analysing processes and relationships*<sup>19, 27–28</sup>

#### Understanding how care is delivered by analysing processes and relationships—Tools and when to use them

<b>Top-down process map</b>	To: <ul style="list-style-type: none"><li>• agree on the <b>major activities</b> in a process</li><li>• identify steps embedded in each major activity</li></ul> <p>Can be the first stage to developing a detailed or cross-functional process map</p>
<b>Detailed process map</b>	To identify: <ul style="list-style-type: none"><li>• <b>value-added and non-value-added steps</b></li><li>• opportunities for processes that could run in parallel to save time</li><li>• the need for a work-flow or process layout map</li><li>• the impact of potential or actual changes</li></ul> <p>To calculate <b>cycle time</b>, ie, the time it really takes to get a process done from start to finish</p>
<b>Cross-functional process map</b>	To: <ul style="list-style-type: none"><li>• identify critical <b>interfaces</b></li><li>• clarify who performs each step</li><li>• consider reassigning and/or rearranging steps</li></ul>
<b>Work-flow, process layout or spaghetti map</b>	To identify <b>inefficient steps and physical layouts</b>
<b>Tree diagram</b>	To breakdown logically an objective or <b>outcome into</b> increasingly more <b>specific elements and</b> to show the <b>relationships</b> among the elements

### 5.4.2 *Using quantitative tools*<sup>19, 27–28</sup>

Quantitative tools can help teams to count or measure what is happening now. They also may help others to see potential and actual problems and their causes.



## Understanding how care is delivered by quantifying what is happening—Tools and when to use them

<b>Costing quality</b>	To quantify the <b>financial implications</b> of how a process works now and of a new or revised process
<b>Demand–capacity analysis</b>	To determine: <ul style="list-style-type: none"><li>• the <b>demand level</b> now and in the future for a process or service</li><li>• the <b>capacity</b>, that is, the capability of a process or service to achieve its purpose now and in the future</li></ul> To serve as the basis for decisions about actions to enable a balance of demand and capacity
<b>Statistics</b>	To <b>organize, present and summarize data</b> resulting from counting or measuring  To <b>express</b> the <b>likelihood</b> that <b>findings</b> of data collection were <b>due to chance</b> or the <b>confidence</b> that the <b>findings</b> of data collected on a sample <b>can be generalised</b> to a population
<b>Survey</b>	To provide <b>descriptive data</b> about a sample or population of the thing being measured and to enable analysis of relationships between or among things

### 5.5 Understanding the nature of variation in current practice<sup>19–20, 27–28</sup>

The percentage of cases that meet a clinical audit standard tells a team about day-to-day practice and if there is or isn't a problem with the overall quality of care. However, a team may want to know more, especially if there is a problem, including:<sup>19–20, 27</sup>

- Is there variation in the process or the outcome being measured?
- Is the amount of variation acceptable?
- What is the type of variation?
- What is the cause of the variation?
- What action should be taken to reduce or eliminate unwanted variation?
- If clinical practice is changed, will there be statistically significant improvements?
- Is the way care or service is delivered changing over time?

## Understanding the nature of variation in practice for a clinical audit—Tools and when to use them

<b>Run chart</b>	To identify <b>patterns</b> in data in order <b>to distinguish</b> between <b>common cause and special cause variation</b> in a process
<b>Control chart</b>	To identify <b>patterns</b> in data and any occurrences (data points) that occur outside control limits in order <b>to distinguish</b> between <b>common cause and special cause variation</b> in a process

## 5.6 Identifying the causes of shortcomings of current practice<sup>19–20, 27–29</sup>

The essence of clinical audit as a QI process is to make changes in current practices that remove or minimise causes of the problems that are standing in the way of providing the desired or intended level of quality. So achieving and sustaining actual improvements depends on successful use of tools to analyse data gathered in order to identify and resolve problems and their causes.

### Identifying the causes of problems that impede good practice for a clinical audit—Tools and when to use them

<b>Affinity diagram</b>	To identify and agree on <b>clusters of issues</b> related to current practice as revealed by the data collected
<b>Asking why five times</b>	To <b>go beyond the most obvious explanation</b> get to the root cause of a problem
<b>Benchmarking</b>	To identify the <b>differences</b> in how another organisation that enables benchmarking on practice carries out <b>a process</b>
<b>Fishbone diagram</b>	To identify in a structured way <b>types of causes of a problem</b> such as those related to materials or the work environment, how key processes function or the current procedures and systems in use, or the availability of appropriately skilled staff, or other types of causes.

## 5.7 Making changes in practice to achieve improvement<sup>19, 27–28</sup>

Achieving and maintaining change that results in improvement in service is the goal of a clinical audit. Change involves using QI tools to support both the planning and implementation of the changes to achieve improvement.

Teams need to decide carefully how to achieve the desired improvement. Key points about changing practice are:<sup>20, 27</sup>

- Select an **appropriate strategy for the types of change** involved.
- **Use as many strategies as needed** to handle all the types of change involved.
- **Plan** in detail **how to implement the strategy or strategies** selected.

## Making changes in practice for a clinical audit—Tools and when to use them

<b>Action plan table</b>	To <b>show</b> specific <b>activities, time frames</b> and <b>responsibilities</b> for the work to be done
<b>Benchmarking</b>	To learn <b>how a benchmarking partner achieved change</b>
<b>Brainstorming</b>	To <b>generate ideas</b> about how to achieve change and/or benefits, advantages or objections to change
<b>Contingency diagram</b>	To <b>map key steps in achieving change</b> and <b>anticipate what could go wrong</b> in order to plan in advance the alternative actions that could be taken
<b>Critical path chart</b>	To <b>show</b> the critical activities, the <b>interrelationships of the activities, time</b> needed to move from one activity to another and the <b>path with the longest time (critical path)</b> for the work to be done
<b>Delphi process</b>	To <b>agree on priorities</b> for change and actions to achieve change
<b>Force field analysis</b>	To <b>test commitment</b> to a change or to identify forces driving and restraining the change to be addressed in the action plan
<b>Gantt chart</b>	To <b>show</b> graphically the steps, timing of steps and key points and outcomes of an <b>action plan</b>
<b>Multivoting</b>	To <b>agree on priorities</b> for change and actions to achieve change
<b>Nominal group process</b>	To <b>agree on priorities</b> for change and actions to achieve change
<b>Programme evaluation and review technique (PERT) chart</b>	To <b>show</b> the <b>interrelationships of the activities</b> for the work to be done
<b>Process map —cross-functional</b>	To <b>describe</b> how a process works, including all steps and who does them, and the <b>critical interfaces</b> in the process when there are handovers built into the work
<b>Process map —detailed</b>	To describe how a process works, including <b>all steps, the nature of the steps and any decision points</b>
<b>Process map —top-down</b>	To agree on the <b>major activities</b> in a process and then the steps in each activity in preparation for developing a cross-functional or detailed process map
<b>Process map —work-flow, layout or spaghetti</b>	To provide a <b>‘bird’s-eye view’</b> of how patients, staff members, papers or communications move in a process in order to identify inefficient steps and physical layouts

<b>Readiness for change rating</b>	To <b>test commitment</b> to a change and to identify factors favouring and impeding change so that the factors can be addressed in an action plan
<b>Tree diagram</b>	To <b>develop</b> the <b>'branches' of work</b> needed to achieve an intended outcome

## 6 How the QI tools work in detail and when to use them

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### 6.1 How to decide what tool to use

The literature suggests that individual QI tools are best used in combination with one another, following a structured framework, usually by a project team and combining diagnostic, measurement, analysis and intervention tools.<sup>28</sup> Teams, therefore, should consider what tools could contribute to the effectiveness of their clinical audits.

An alphabetical list of QI tools and the key stages in the clinical audit process are in the box on the next page. For each tool, a tick (✓) indicates that the tool could contribute to that stage of a clinical audit. Use the box to decide which tools could help a team during a clinical audit.

The boxes that follow provide summaries of all of the QI tools described in section 5. The tools are organised by the main purposes they serve. Each includes:<sup>19, 27</sup>

- a brief description of the tool
- how the tool works
- what results from use of the tool.

## QI tools and stages in the clinical audit process

Tool	Agreeing on design	Testing commitment to the audit design	Developing standards	Developing data collection protocol, system and tools	Collecting, collating, validating analysing and presenting data	Identifying any problems and their causes	Planning and implementing change	Repeating data collection
Brainstorming	✓	✓		✓	✓		✓	
Delphi process	✓	✓	✓	✓			✓	
Multivoting	✓			✓			✓	
Nominal group process	✓		✓	✓			✓	
Affinity diagram	✓					✓		
Force-field analysis		✓					✓	
Readiness-for-change rating		✓					✓	
Critical appraisal			✓					
Benchmarking			✓			✓	✓	
Top-down process map						✓	✓	
Detailed process map						✓	✓	
Cross-functional process map						✓	✓	
Work-flow, process layout or spaghetti map						✓	✓	
Tree diagram						✓	✓	
Costing quality						✓		✓
Demand–capacity analysis						✓		✓
Statistics					✓			✓
Survey					✓			✓
Run chart					✓			✓
Control chart					✓			✓
Asking why five times						✓		
Fishbone diagram						✓		
Action plan table							✓	
Contingency diagram							✓	
Critical path chart							✓	
Gantt chart							✓	
PERT chart							✓	

## 6.2 Reaching agreement

### QI tool and its description, how it works and what you get

<b>Brainstorming</b>	<p><b>Description</b></p> <p>Brainstorming is a way of collecting the maximum number of ideas on a subject from members of a team without considering the validity or practicality of the ideas. The <b>purpose</b> of brainstorming is to <b>generate a list</b> of ideas when a team would benefit from having as broad a range of ideas or alternatives as possible.</p> <p><b>Key steps</b></p> <ol style="list-style-type: none"><li>1. Agree the exact subject or question to be brainstormed.</li><li>2. Give everybody a minute or two to think (or to make a note of ideas).</li><li>3. Ask everyone to call out ideas, in either a structured or unstructured way.</li><li>4. Record the ideas as they are stated, ideally on a flip chart.</li><li>5. When the team stops generating ideas, discuss how the team members want to process the ideas generated to make a decision.</li></ol> <p><b>What you get</b></p> <p>A list of ideas to which everyone in the team has been given the opportunity to contribute</p>
<b>Nominal group process</b>	<p><b>Description</b></p> <p>Nominal group process is a highly structured way to generate a list of ideas and then to narrow down the list by ranking ideas in the list. The <b>purpose</b> of the nominal group process is to generate and process ideas when the team members don't know each other; some controversy within the team is anticipated; a team cannot resolve disagreement easily; all ideas could be considered to be of equal importance; or <b>priorities must be set</b> because the entire list has too many ideas to work on at once.</p> <p><b>Key steps</b></p> <ol style="list-style-type: none"><li>1. Use responses to a questionnaire distributed in advance or at a meeting or use brainstorming to generate a list of ideas and record all the ideas on a flip chart.</li><li>2. Be sure that everyone understands each idea on the list and clarify ideas as needed.</li><li>3. Select priorities by having each person place the <b>ideas in rank order</b>, record all team members' ranks and add the ranks for each idea.</li><li>4. Identify the idea that is ranked as the highest priority.</li><li>5. Discuss the way forward for the idea that is the highest priority.</li></ol> <p><b>What you get</b></p> <p>Priorities among a list of ideas agreed by consensus by the team</p>
<b>Delphi process</b>	<p><b>Description</b></p> <p>Delphi process is a highly structured way to generate and achieve consensus on ideas and establish priorities using a rating process. The <b>purpose</b> of the delphi process is to <b>set priorities</b> among ideas by asking the team members to consider <b>how well each idea</b> in a list <b>meets a requirement</b>, that is, a criterion, set by the team.</p>

### Key steps

1. Use responses to a questionnaire distributed in advance or at a meeting or use brainstorming to generate a list of ideas and record all the ideas on a flip chart.
2. Be sure that everyone understands each idea on the list and clarify ideas as needed.
3. Decide on a **criterion for setting priorities and establish a rating scale** to be used in judging how the criterion applies to each idea on the list, then have each person rate each idea and add the ratings for each idea.
4. Identify the idea that is rated as the highest priority.
5. Discuss the way forward for the idea that is the highest priority.

### What you get

Priorities among a list of ideas agreed by consensus by the team

## Multivoting

### Description

Multivoting is a way of conducting a ballot to select items from a list, with limited discussion and difficulty. The **purpose** of multivoting is to **identify quickly** the **ideas** on which the **team members agree**.

### Key steps

1. Use brainstorming to generate a list of ideas and record all the ideas on a flip chart.
2. Be sure that everyone understands each idea on the list and clarify ideas as needed.
3. Decide on a **number of votes** to be given to each team member, usually one half of the number of ideas on the list, rounded up to a whole number and have the team members cast their votes for the ideas and add the team members' votes.
4. Identify the idea that received the most votes.
5. Discuss the way forward for the idea with the most votes.

### What you get

Priorities among a list of ideas agreed by consensus by the team

## Affinity diagram

### Description

An affinity diagram is a way to gather large numbers of ideas, organise the ideas into clusters based on the natural relationships among the ideas and label the clusters of ideas. Affinity diagramming can help a team to **identify and organise** in a creative way **issues** related to an area of practice or service and can **help** a team to **focus a project**.

### Key steps

1. Write down on a flip chart a very general description of the subject to be considered by the team.
2. Ask the team to brainstorm issues related to the subject and write down the ideas on a flip chart and/or on cards or post-it notes.
3. Ask the team members to consider all the ideas and, as a team, arrange them into related clusters or groupings.
4. Find the **major themes** of each grouping.
5. Discuss with the team how the team members want to act on the findings of their diagram and which theme the team wants to pursue.

### What you get

Clarity about key issues through collation of ideas generated by a team into clusters or groupings which are then labelled by the unifying theme or concept

## 6.3 Testing commitment

### QI tool and its description, how it works and what you get

#### Force-field analysis

##### Description

Force field analysis is a way to identify the **forces** that may **drive a situation** toward **or restrain a situation** from reaching an end-point, either a desired or an undesired end-point. A purpose of force field analysis is to help team members **anticipate potential positive and negative consequences** of their work and to plan action accordingly, if needed.

##### Key steps

1. Write a description of a decision, such as an audit to be carried out or an improvement to be achieved, made by the team on a flip chart.
2. Create a chart made up of two columns, one each for driving forces and restraining forces.
3. Ask the team to name examples of the forces, either driving or restraining, and write down what team members say.
4. Rate the strength of each of the forces named on a 10–point scale, using arrows from the outside to the inside of each column.
5. When the team members have named all their ideas and rated the ideas if desired, ask the team members if they need to act on any of the forces listed as they proceed with their work or if they need to modify their original decision in any way.

##### What you get

A list of the anticipated positive and negative forces and the strength of each force so that a team can:

- anticipate experiences the team may encounter as it progresses with its work
- foresee others' potential reactions to the team's work
- consider possible difficulties the team may face
- identify benefits of the team's work which the team members can explain to others, if needed
- develop strategies for key issues involved in the team's work.

#### Readiness-for-change rating

##### Description

The readiness for change rating is a way to identify **factors that favour or disfavour** the **changes** involved in making an improvement and to rate the importance of the factors.

##### Key steps

1. Write a description of a decision, such as an improvement to be achieved, made by the team on a flip chart.
2. Have the team members work together to come up with a list of the factors that might favour change and write down what the team members say.



3. Have the team develop a separate list of the factors that might impede change and write down what the team members say.
4. Ask the team members to rate the importance or strength of each factor listed with 1 meaning of low importance or strength and 3 meaning of high importance or strength.
5. Ask the team members to consider the significance of their factors and ratings and whether or not they need to act on any of the factors as they proceed with their work or if they need to modify their decision in any way.

**What you get**

A list of the anticipated factors that favour or disfavour change and the strength of each factor so a team can:

- anticipate experiences the team may encounter as it progresses with its work
- foresee others' potential reactions to the team's work
- consider possible difficulties the team may face
- identify benefits of the team's work which the team members can explain to others, if needed
- develop strategies for key issues involved in the team's work.

Teams can also use the tools listed in section 6.2 to identify and then rank or rate the factors that will promote or hold back progress of their work.

## 6.4 Searching for best practice

### QI tool and its description, how it works and what you get

**Critical appraisal of evidence**

**Description**

Critical appraisal is a process of **assessing the validity and usefulness of evidence** to determine the extent to which the evidence actually does what it purports to do and results of the evidence can or should be applied locally. Critical appraisal is about deciding **if the findings of research, guidelines or the opinions of experts should be applied to everyday practice.**

**Key steps**

1. Evaluate objectively reports on research studies or other evidence, not blindly accepting the findings or recommendations.
2. Determine the strengths and weaknesses of research designs and identify any bias in the designs that could affect the findings.
3. Examine the adequacy of the authors' interpretations of findings and consider if important findings have been overlooked or unfairly attributed.
4. Identify the need for further research.
5. Determine the validity and applicability of the research or other evidence.

**What you get**

A decision on the scientific value and relevance of existing evidence of good practice

## Benchmarking

### Description

Benchmarking is the process of **measuring and improving** products, services and practices **in comparison to** the toughest competitors or **those organisations** that are **recognised as industry leaders**. Benchmarking is about searching for industry best practices that lead to superior performance and analysing and learning from those practices.

### Key steps

1. Decide exactly what is to be benchmarked and the objectives for benchmarking.
2. Identify an organisation that is a performance leader for the process or activity to be benchmarked.
3. Analyse the current performance of the process or activity that is to be benchmarked.
4. Analyse the current performance for the same process or activity by the organisation that is recognised as a leader in the process or activity.
5. Identify the performance gap and the changes that would be required to improve performance, and develop and implement action plans to introduce the changes needed.

### What you get

The level of performance that can be achieved or how the 'best-in-class' carry out a work process so that an organisation can change in order to get improved performance

## 6.5 Understanding how care is delivered now

### QI tool and its description, how it works and what you get

#### Top-down process map

### Description

A top-down process map is a picture that is limited to the major activities in a process in order to provide an **overview** of the **essential activities and the flow** of the activities. In a top-down process map, detailed steps can be listed under each major activity and points in the process where decisions have to be made can be noted. Also, if alternative processes exist to carry out the same major activity, the alternatives can be noted.

### Key steps

1. Agree on the process to be mapped.
2. Write down in words a general description of the process.
3. Identify a start point and end point for the process.
4. Generate with the team a description of the process including:
  - the major activities in the process, usually no more than 3 to 5 activities
  - if desired, the steps for each major activity
  - the overall sequence.
5. Arrange with the team a way of verifying the process map.

### What you get

A diagram of the major steps in a process, the flow of the major steps and, if desired, lists of the detailed steps and activities

**Detailed process map**

**Description**

A detailed process map is a picture that shows **all or most of the steps** in a process **in detail**, including decision points and loops in which steps may have to be repeated. It makes use of symbols to denote the steps, decision points and sequence or flow of steps. The value of a detailed process map is that it may be more likely to help a team to identify areas for quality improvement. When a team understands the steps at which major delays can occur or at which loops involving repetitive steps occur, team members may question how the process can be simplified.

**Key steps**

1. Agree on the process to be mapped.
2. Write down in words a general description of the process.
3. Identify a start point and an end point for the process.
4. Generate with the team a diagram of the process using shapes to denote the nature of a step and including:
  - the detailed steps in the process
  - any decision points and alternate paths in the process.
5. Arrange with the team a way of verifying the process map.

**What you get**

A diagram of all the steps and decision points in a process, the sequence of the steps and decisions and specification of the types of steps in the process

**Cross-functional process map**

**Description**

A cross-functional process map is a **detailed process map with** bands (rows) added that list those who are involved in the process and show **who carries out each step** in the process. It shows the sequence of detailed steps in a process and the people, functions or roles performing each step.

**Key steps**

1. Agree on the process to be mapped.
2. Write down in words a general description of the process.
3. Identify a start point and an end point for the process.
4. Generate with the team a description of the process including:
  - steps in the process
  - the overall sequence
  - who is responsible for each step.
5. Arrange with the team a way of verifying the process map.

**What you get**

A diagram of a process that shows critical interfaces in the process, clarifies who performs each step and identifies any gaps in the process

**Work-flow, process layout or spaghetti map**

**Description**

A work-flow process map is a picture of the **movement of people or things**—patients, patient records, clinical information, documents, equipment, supplies or materials—in a process. Usually, a team begins to develop a work-flow process map by creating a map of the work place and then tracing movements of a typical transaction on the map.

### Key steps

1. Agree on the process to be mapped.
2. Write down in words a general description of the process.
3. Identify a start point and an end point for the process.
4. Draw a picture of the physical space in which the process takes place and generate a picture of the movement of people, things, or information within the space.
5. Arrange with the team a way of verifying the process map.

### What you get

A bird's eye view of a process that can reveal unnecessary repetitive steps and inefficient movements in a process

## Tree diagram

### Description

A tree diagram is a way of breaking down logically a large goal, problem, concept, task or question into increasingly more specific components or elements and showing the relationships among the components. Tree diagrams can be used to describe current processes or to identify how improvements could be achieved. Using a tree diagram **focuses** a team **on a desired** quality improvement objective or **outcome**. It involves a team in **systematically identifying sub-outcomes that must have been achieved** in order to achieve the objective.

### Key steps

1. Ask the team to describe the outcome to be achieved reasonably precisely.
2. Generate the major tree headings that may be sub-outcomes or intermediate outcomes.
3. For each heading, develop further statements that define more intermediate outcomes, results, processes or tasks.
4. Keep working backwards until each branch is described.
5. Arrange with the team a way of verifying the tree diagram.

### What you get

A diagram of the sub-outcomes or activities and paths required to achieve a desired outcome so a team can confirm that all branches needed to achieve the outcome are present, complete and will contribute to achieving the desired outcome

## Costing quality

### Description

Costing the quality of care or service is the **calculation and evaluation of the costs** associated with **providing—or failing to provide—a quality** service or product. Calculations usually focus on the costs associated with providing a non-quality service, for example, the costs of wasted resources associated with processes and outcomes that are ineffective, unreliable, inefficient and unacceptable.

### Key steps

1. Select an appropriate model for costing quality.
2. Identify the steps in a process and the outputs of the process that are to be included in the calculations and identify the staff, equipment and other resources to be costed.
3. Identify the costs associated with failing to provide quality such as reworking, wastage and financial claims, losses or penalties and the costs

associated with providing quality such as appropriate, effective service provision and monitoring.

4. Calculate the total and unit costs.
5. Compare and act on the findings.

#### **What you get**

The costs of providing and ensuring quality services and the costs of failing to provide quality services

### **Demand– capacity analysis**

#### **Description**

Demand–capacity analysis is a way to enable appropriate and effective management of the demand for a service and the resources available to provide the service. The analysis attempts to ensure that **resources are provided at the right time in the right amount and in the most efficient way**. The technique is used on a one-off basis to determine the current match between demand and capacity. It is more usually used to forecast demand and capacity requirements. If there is not a match between capacity and demand, alternative solutions to manage the demand and manage the capacity are identified, including development of contingency plans. The technique relies on a thorough understanding of the processes involved in providing a service to identify inefficient or non-value-added steps and points at which bottlenecks occur as well as the amount and type of variation in the processes.

#### **Key steps**

1. Identify the demand for one or more processes for a service, that is, the sources and volume of the demand, for example, GP referrals.
2. Identify the resources, including people, machines and facilities available at present to provide the service.
3. Determine the capacity that current resources are capable of providing.
4. Identify any sources of inefficiency in current processes and the amount and type of variation present.
5. Act to improve capacity, such as overcoming current bottlenecks and delays, controlling variation in processes, and increasing resources, and act to manage demand.

#### **What you get**

An estimation of the workload for a service and the capability of the service to meet the workload and action to improve capacity to meet demand or to manage demand in the future

### **Statistics**

#### **Description**

**Descriptive** statistics are techniques for **organising, presenting and summarising data**. **Inferential** statistics are techniques for **interpreting and analysing data** collected from a sample **so that conclusions can be generalised** to the entire population, that is, you can draw inferences about a population based on data gathered from a sample of that population. Inferential statistical techniques help to decide if results are significant statistically and therefore are unlikely to have occurred by chance.

#### **Key steps**

There are detailed processes for using each descriptive and inferential statistic.

For a description of specific statistical techniques, see *An Introduction to Statistics for Clinical Audit* and also *Guide for Patients in Understanding Clinical Audit Reports* at [www.hqip.org.uk](http://www.hqip.org.uk).

#### **What you get**

For descriptive: tables, bar charts, pie charts, histograms, pareto charts, frequency polygons, cumulative frequency polygons, box-and-whisker diagrams, scattergrams, funnel plots and measures of central tendency and dispersion

For inferential: the probability of the findings being due to chance and the degree of precision of a value derived from a sample serving as a value for the population

### **Survey**

#### **Description**

A survey is the systematic collection of information by means of self-completed questionnaires, interviews or observations from a large number of people, events, records, literature or other data sources. The purpose of a survey usually is to **identify trends or patterns**.

#### **Key steps**

1. Define the objectives for the survey.
2. Describe the population of people, events or things of relevance to the survey objectives.
3. Decide whether to use the population or a sample of the population to be surveyed and if a sample is to be drawn, how cases to be included will be selected.
4. Select the data collection method: self-completed questionnaire, interview or observation and develop and pilot test the data collection protocol and tool.
5. Collect and collate the findings and analyse the findings.

#### **What you get**

If open-ended questions are used, analysis, classification and synthesis of all the ideas in the responses

If closed questions are used, counting and statistical analyses of the responses

## **6.6 Understanding the nature of variation in practice**

### **QI tool and its description, how it works and what you get**

#### **Run chart**

#### **Description**

A run chart is a display of data points plotted in chronological order, that is, the data points are plotted in the order in which the events they represent occurred. It enables the examination of data over time for the purpose of **identifying patterns and data points that indicate the amount and nature of variation** in a process **and** therefore the **type of action** to take to manage the variation.

### Key steps

1. Decide what is to be plotted in a run chart to enable monitoring and controlling an aspect of care or service for the team's purposes.
2. Collect data on at **least 25 cases** and determine the mean or median of the data.
3. Create the chart by drawing vertical and horizontal axes labeling the vertical axis with the thing being plotted and the horizontal axis with the unit of observation to be tracked and drawing a line on the chart to represent the mean or median.
4. Plot the data points on the chart **in the order in which the things they represent occurred** and connect the data points.
5. Analyse the chart to find out if there is common cause variation or special cause variation, using rules to find a special cause, and decide on the type of action to take based on the analysis.

### What you get

A graph that enables analysis of patterns in data over time in order to identify the amount and type of variation occurring in a process so that appropriate, effective action can be taken

## Control chart

### Description

A control chart is a **run chart with statistically determined upper and lower process limits**, called control limits, which indicate the range of variation that exists in a process. Control limits are not the same as specification limits or thresholds for action. Rather, control limits are intended to prevent attributing observed variation in a process to a special cause when it is due to a common cause and vice versa. Control charts are useful for determining the stability and capability of a process. A control chart consists of three lines: The centre line represents the overall average value of the sample statistic. The upper and lower lines, the control limits, are set by establishing the confidence intervals for the sample statistic. In general, the control limits are set using the formula: Mean  $\pm$  confidence coefficient x standard deviation

### Key steps

1. Construct a run chart.
2. Calculate the mean of the sample statistic and draw the mean on the chart.
3. Calculate the upper and lower control limits and draw the limits on the chart.
4. The commonly used confidence coefficient is 3.00 for a 99.7% confidence interval. The justification for three standard deviation units is that it works well in practice; it is economical. When an observation falls outside the limits, look for a special cause.
5. Analyse the chart to identify the presence of variation and the type of variation.

### What you get

A graph that enables analysis of patterns in data over time in order to identify the amount and type of variation occurring in a process so that appropriate, effective action can be taken



## 6.7 Identifying the causes of shortcomings of current practice

### QI tool and its description, how it works and what you get

#### Asking why five times

##### Description

Asking why five times is a way to get past the symptoms of a problem to **identify** its **root cause** by systematically analysing a cause-and-effect chain backwards from the problem to what led to the problem. It encourages a team to think beyond the first obvious cause that may come to mind.

##### Key steps

1. Write down the problem and the question 'Why?' five times in sequence.
2. Name what is contributing to the situation as described. Write down one potential cause.
3. Consider the one potential cause that is written down and then name what is contributing to that one potential cause. Write down one explanation.
4. Consider the one explanation written down and name what is contributing to the situation contained in the explanation. Continue until the 'whys' are answered five times or until the team considers it has reached the explanation that it thinks is the 'true' one.
5. Use the conclusion to develop an action plan to address the true cause of the problem.

##### What you get

A true or root cause or causes of a problem identified by the team

#### Fishbone diagram

##### Description

The fishbone (or Ishikawa) diagram is a cause-and-effect diagram used to facilitate the identification of **factors** (causes) **contributing to an outcome or result** (effect). The diagram is useful for identifying and analysing multiple causes of a problem. The head of the fish is used to represent the effect and the spines of the fish represent causes. The main spines are the primary causes, such as patients, processes or systems, equipment or resources, staff or other appropriate causes such as communication or organisational culture.

##### Key steps

1. Draw a skeleton of the fish and write the problem to be analysed in the head of the fish.
2. Label each primary spine with the name of a primary cause or ask the team to name primary cause spines and label the spines accordingly.
3. Generate ideas on possible causes for each spine and record the ideas on the relevant spine.
4. Attach any tertiary causes to the relevant secondary spine.
5. When the team members have finished coming up with ideas, look for patterns or relationships of ideas in the diagram and decide which cause the team will investigate further or act on.

##### What you get

A list of possible causes of a problem, organised by primary cause, for consideration and further investigation and action by a team



## 6.8 Making changes in practice to achieve improvement

### QI tool and its description, how it works and what you get

#### Action plan table

##### Description

An action plan table is a list of the **activities to be carried out**, **who** is responsible for carrying out the activities **and when** the activities are to be completed.

##### Key steps

1. Agree on the title, the objectives for the action and the resources needed to carry out the work, that is, the people, budget and time needed.
2. Identify the milestones, that is, the key outcomes, involved in the work and the dates for the achievement of the milestones.
3. Identify and make a list of the activities needed to achieve each milestone.
4. For each activity listed, specify who needs to be notified or involved, the date for completion, who is responsible for doing or leading the activity, how successful completion will be monitored and the date by which it will be monitored and evaluated.
5. Monitor and revise the plan as needed.

##### What you get

A detailed plan for carrying out the work involved in implementing action needed as part of a clinical audit

#### Contingency diagram (process decision programme chart)

##### Description

The contingency diagram (also called process decision programme chart or PDPC) is a way of mapping conceivable events and contingencies that can occur in any implementation plan, which in turn enables feasible countermeasures to be developed to respond to the contingencies. The technique is used to plan a possible **chain of events that has to occur** when the goal, situation or problem is unfamiliar. The technique is valuable also **when team members think they can not put at risk the successful implementation of change**.

##### Key steps

1. Agree on the title and the objectives for the action.
2. Identify the major activities in sequence that will be required to achieve the objective.
3. For each major activity, identify what could go wrong in the implementation of the activity.
4. For each 'what if', generate ideas on possible countermeasures.
5. Evaluate the feasibility and necessity of each countermeasure and decide if the action plan should be adjusted and how.

##### What you get

A diagram that identifies key activities to achieve a goal, the vulnerable points among the activities and countermeasures for the vulnerable points

### Critical path chart

#### Description

The critical path chart shows the **activities critical to the implementation of change**, the **inter-relationships of the activities** and the **time required** to move from one related activity to another. The activities are shown as nodes, the relationships by lines that connect nodes and the time needed to move between nodes is shown on or near the lines. The total elapsed for each path can be identified. The path with the longest time is the shortest time in which a change can be accomplished. If activities along the critical path are delayed, the implementation of change will be delayed.

#### Key steps

1. Agree on the objectives for the action and the resources needed to carry out the work, that is, the people, budget and time needed.
2. Identify the milestones, that is, the key outcomes, involved in the work and the dates for the achievement of the milestones and the activities needed to achieve each milestone.
3. Decide on the sequence of the activities, who should lead completion of the activities and how long it will take to complete the activities, using consistent units of time such as days or weeks.
4. Draw a diagram showing the sequence of activities for the chains of sequential and parallel activities and, if desired, determine the critical path by calculating the time to complete each of the paths in the work and identifying the path that takes the longest time.
5. Monitor and revise the plan as activities are completed and actual times to complete activities are known.

#### What you get

A detailed plan for carrying out the work involved in implementing action needed as part of a clinical audit

### Gantt chart

#### Description

A Gantt chart is a graphic presentation of an action plan that shows a list of **activities in relation to the time scale in which they will be done**. Down the left side of the chart is a list of all the activities needed, preferably in the order in which they will be started. Across the top is an appropriate time scale, that is, days, weeks or months. For each activity, a line is drawn that indicates when an activity is to be started and when it is to be completed.

#### Key steps

1. Agree on the objectives for the action and the resources needed to carry out the work, that is, the people, budget and time needed.
2. Identify the milestones, that is, the key outcomes, involved in the work and the dates for the achievement of the milestones and identify and make a list of the activities needed to achieve each milestone.
3. Down the left side in the first column, list the project activities and across the top, decide the scale to be used for time and label the scale.
4. Draw horizontal bars in line with each activity to indicate when an activity is to start and to be finished.
5. Monitor and revise the plan as needed.

#### What you get

A plan in graphic form that presents what should happen and the actual elapsed time needed for each activity

**Programme  
evaluation and  
review  
technique  
(PERT) chart**

**Description**

The Programme Evaluation and Review Technique (PERT) is a diagram of the interrelationships of the activities in a project or implementation of action in which circles or 'nodes' contain the activities to be carried out and lines indicate the relationships among the activities. It is similar to the **critical path chart**, but takes a more skeptical approach by including not only the most likely length of time activities will take, but also the **shortest and longest times**.

**Key steps**

1. Agree on the objectives for the project or action and the resources needed to carry out the work, that is, the people, budget and time needed.
2. Identify the milestones, that is, the key outcomes, involved in the work and the dates for the achievement of the milestones and identify and make a list of the activities needed to achieve each milestone.
3. Decide on the sequence of the activities, who should lead completion of the activities and how long it will take to complete the activities, using consistent units of time such as days or weeks and specifying the optimistic time, that is, the shortest time the activity will take to complete, the most likely time, that is, the time the activity will most probably take and the pessimistic time, that is, the longest time the activity might take.
4. Draw a diagram showing the sequence of activities for the chains of sequential and parallel activities and determine the critical path by calculating the time to complete each of the paths in the work and identifying the path that takes the longest time.
5. Monitor and revise the plan as activities are completed and actual times to complete activities are known.

**What you get**

A detailed plan for carrying out the work involved in implementing action needed as part of a project

## 7 When to use a QI tool instead of a clinical audit

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### 7.1 Quantitative tools

Quantitative tools can be used to count, order or measure what is observed. The tools produce data that can be analysed using descriptive statistical methods to organise, present and summarise data and/or inferential statistical methods to interpret and analyse data and enable drawing conclusions related to statistical significance of the findings. Quantitative tools include clinical audit, costing quality, demand–capacity analysis, statistics, surveys, run charts and control charts, all of which were described in sections 5 and 6.

## 7.2 Other QI tools that describe, measure and improve patient care

Qualitative tools can be used to learn patient or staff opinions and experiences about care or service. The major advantage of using qualitative techniques to measure quality is that the people who are being asked to participate are the ones who define what they mean by quality and their experiences relating to quality. Recipients of care or service directly provide information about their experiences and opinions that may be relevant to a team's work. Qualitative tools help teams to take maximum advantage of the contributions that recipients of services can make to understanding exactly what needs to improve.

The major disadvantages of qualitative tools are that usually only small numbers of participants can be involved and analysis of the data can be time consuming. Qualitative tools teams can use and how the techniques can help a team are in the box.<sup>19</sup>

### Qualitative tools for quality improvement—Tools and when to use them

<b>Focus group</b>	To get information on <b>people's views</b> , beliefs, feelings, experiences, attitudes or motivations for a carefully-defined issue or question
<b>Key event (critical incident)</b>	To get information on <b>key events</b> , good or bad, <b>that are significant</b> to the person involved and that cause the person to form a value judgement, for example, about a service
<b>Discovery interview</b>	To <b>understand how patients</b> or carers <b>experience care</b> or service in order to create better ways of meeting their needs

## 7.3 How to decide when to use a QI tool or recommend a clinical audit

Consider the guidance in the box to decide whether to use a QI tool instead of or in addition to a clinical audit.<sup>19</sup>

### When to use a QI tool and when to use a clinical audit

<b>Quantitative QI (as opposed to qualitative) tools, including clinical audit</b>	Use quantitative QI tools to produce information about what is happening now when: <ul style="list-style-type: none"><li>• It is desirable to describe the characteristics of a population or sample used in measurement.</li><li>• It is useful to know the composite picture of the cases included.</li><li>• It is important to identify patterns and relationships among data.</li><li>• You want to be able to summarise and present data.</li></ul>
<b>Clinical audit</b>	Use clinical audit when: <ul style="list-style-type: none"><li>• You need a systematic approach for demonstrating that standards relating to patient care are being met or that compliance with standards is improved.</li><li>• It is essential to calculate the level of compliance with standards the first time quality of care is measured and following action to achieve improvement.</li></ul>

<b>Run chart or control chart</b>	<p>Use a run chart or a control chart when:</p> <ul style="list-style-type: none"> <li>• You want to measure or monitor one or a few key aspects of patient care or service over at least 25 cases or units of time such as days.</li> <li>• You need to know whether or not there is variation in the way one or a few key aspects of care are happening.</li> <li>• You suspect there is variation in the way a key aspect of care is being carried out and you want to know more about the nature of the variation.</li> <li>• You want to know if the current variation in practice is within control limits.</li> </ul>
<b>Statistics</b>	<p>Use descriptive or inferential statistics when:</p> <ul style="list-style-type: none"> <li>• You need to describe patterns among data.</li> <li>• You want to decide if results are significant statistically and therefore unlikely to have occurred by chance.</li> </ul>
<b>Survey</b>	<p>Use a survey when:</p> <ul style="list-style-type: none"> <li>• You want to identify patterns or trends among data.</li> </ul>
<b>Qualitative QI tools</b>	<p>Use qualitative QI tools to establish a baseline of what is happening now when:</p> <ul style="list-style-type: none"> <li>• You want people's views, opinions and experiences in the way in which they would naturally relate them.</li> <li>• You don't want to categorise in advance the nature of the quality-related information you want to have.</li> <li>• The issues you want to explore are complex.</li> <li>• It might be desirable to ask questions or probe further during the process of gathering data.</li> <li>• The number of people involved isn't critical.</li> <li>• You can make time to analyse and synthesise the information provided.</li> </ul>

## 8 Preparing for new roles for clinical audit professionals and clinical audit leads

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### 8.1 Implications for clinical audit professionals' and leads' roles and responsibilities

If clinical audit is to be implemented as a QI process, the staff members responsible for supporting clinical audit activities in healthcare organisations need to be prepared to be **facilitators of the use of QI tools** with clinical teams. In addition, clinical audit leads need to be prepared to support clinical audit staff in enabling clinical audit to become a robust QI process by helping clinical audit staff members in using QI tools with clinical groups.

### 8.2 Assessing your readiness to use QI tools

Use the self-assessment tool in the box on the next page as a guide to identifying your learning and development needs in relation to being a facilitator of the use of QI tools.<sup>29</sup>

For the list of QI tools that is in the box, assess your competence in using the tool by ticking:

- if you know about the tool
- if you are confident in using the tool
- if you use the tool regularly with clinical groups.

You can tick boxes in more than one column.

QI tool	Know about	Confident in using	Use regularly
1. Brainstorming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Delphi process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Multivoting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Nominal group process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Affinity diagram	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Force-field analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Readiness-for-change rating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Critical appraisal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Benchmarking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Top-down process map	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Detailed process map	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Cross-functional process map	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Work-flow, process layout or spaghetti map	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Tree diagram	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Costing quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Demand–capacity analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Statistics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Run chart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Control chart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Focus group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Key event (critical incident) technique	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Discovery interview	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Asking why five times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Fishbone diagram	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Action plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Contingency diagram	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Critical path chart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Gantt chart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. PERT chart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Count the number of boxes ticked in each column.</b>			
<b>Totals</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Reflect on your assessment and draw conclusions about your personal preparation to support a QI approach to clinical audit. Make a note of actions you need to take to act on your self-assessment.**

### **8.3 Preparing clinical groups for involvement in clinical audit as a QI process**

Working with your organisation's Clinical Audit Committee (or the equivalent), it also will be useful to consider how to prepare clinical groups and individual clinicians for the shift in the clinical audit process to emphasise the QI approach, and the possible shift in culture that may be needed. This preparation could include consideration of any or all of the following:

- rewriting the **organisation's clinical audit policy** to make explicit references to the QI approach to clinical audit and getting an updated policy approved and disseminated
- designing and providing any **training** on clinical audit to be consistent with the QI approach
- amending the clinical audit **proposal form** and process to emphasise the QI approach
- **flagging in** clinical audit **proposals** where a QI tool could or should be used
- **allocating time in clinical audit meetings** for the facilitation of QI tools to carry out specific stages of the clinical audit process, for example, agreement on clinical audits to be carried out in the service or identifying root causes of shortcomings in care
- **teaching** the use of some QI tools **to members of clinical groups** for their use with colleagues
- **promote** within the organisation **when a clinical audit is appropriate and when another QI tool should or could be used** instead of a clinical audit.

### **8.4 Arranging for further learning and development to use QI tools**

In order to support the transformation of clinical audit to incorporate the use of QI tools, you may have to arrange for your further learning and development to be competent and confident as a facilitator of clinical audit using a QI approach.



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## Appendix. Sample role and responsibilities description for clinical audit managers, other clinical audit staff roles and clinical audit leads related to using QI tools

For examples of detailed sample job descriptions for clinical audit staff, see *Report on Job Descriptions, Person Specifications and KSF Outlines for Clinical Audit Staff in NHS Organisations* at [www.hqip.org.uk/clinical-audit-resources-3/#prof](http://www.hqip.org.uk/clinical-audit-resources-3/#prof). For a sample role description for a clinical audit lead, see *Guide for Clinical Audit Leads* at [www.hqip.org.uk/clinical-audit-resources-3/#prof](http://www.hqip.org.uk/clinical-audit-resources-3/#prof).

Samples of role and responsibility statements related to the facilitation of clinical audit using QI tools for various clinical audit jobs and clinical audit leads are in the box.

Samples of role and responsibility statements related to the facilitation of clinical audit using QI tools	
Head of clinical audit or clinical audit manager	
Role	Responsibilities
<b>Proactively leads the development of clinical audit as a QI process carried out through clinical teamwork and using appropriate QI tools to complete stages in the clinical audit process</b>	<p>Leads clinical audit as a quality improvement process, with a clinical lead</p> <p>Promotes the use of QI tools by clinical teams as an integral part of the clinical audit process</p> <p>Provides for the teaching of the proper use of QI tools as part of the clinical audit process to clinical audit staff members, clinical audit leads and clinical staff members</p> <p>Serves as a technical master and adviser on the use of QI methods to support clinical audit</p> <p>Liaises directly with other improvement activities being carried out in the healthcare organisation to ensure coordination with the clinical audit programme and contribute to consistency in the appropriate use of QI tools among clinical teams</p>
Clinical audit practitioner	
Role	Responsibilities
<b>Develops and facilitates implementation of guidance for the organisation and all clinical services and professional groups on how to effectively use clinical audit as a QI process</b>	<p>Develops drafts of strategy and policy documents that position clinical audit as a QI process and contributes to the widespread dissemination of the documents in the organisation</p> <p>Acts as an internal consultant to the organisation, clinical services and professional groups on the use of QI tools as part of the clinical audit process</p>

Ensures that organisation-wide or high profile clinical audits carried out in the organisation use appropriate QI tools in their execution and follow an explicit and effective QI approach

Leads the development and delivery of effective teaching programmes on the QI approach to clinical audit for clinical staff working in the organisation

Contributes to integrating clinical audit effectively with other improvement initiatives and programmes being carried out in the organisation

#### **Clinical audit specialist**

##### **Role**

##### **Responsibilities**

**Proactively works with clinical services and professional groups to use a QI approach to the clinical audit process**

Explains the QI approach to clinical audit to clinical teams and professional groups

Facilitates clinical services and professional groups in the use of QI tools as part of or to support the clinical audit process

Contributes to the use of appropriate QI tools in the conduct of organisation-wide or high profile clinical audits carried out in the organisation

Teaches how to use QI tools as part of or to support the clinical audit process

At clinical service level, contributes to integrating clinical audit effectively with other improvement initiatives and programmes being carried out in the organisation

#### **Clinical audit facilitator**

##### **Role**

##### **Responsibilities**

**Supports the implementation of clinical audit as a QI process in clinical services and professional groups**

Supports the implementation of the QI approach to clinical audit by clinical teams and professional groups

Supports the facilitation of clinical services and professional groups in the use of QI tools as part of or to support the clinical audit process

Contributes to the use of appropriate QI tools in the conduct of organisation-wide or high profile clinical audits carried out in the organisation

Contributes to teaching how to use QI tools as part of or to support the clinical audit process

At clinical service level, contributes to integrating clinical audit effectively with other improvement initiatives and programmes being carried out in the organisation

## Clinical audit lead

### Role

**Proactively leads the development of clinical audit as a QI process carried out through clinical teamwork and using appropriate QI techniques and tools to complete stages in the clinical audit process**

### Responsibilities

Ensure that the clinical audit process and making quality improvements based on clinical audit findings are established as part of the business and governance processes of the service, directorate or division

Lead and encourage the involvement of staff working in the service, directorate or division in the use of QI tools as part of or to support the clinical audit process

Check that the clinical audits in the service, directorate or division programme are focused on confirming or improving patient care and are of high quality, that is, that proposals for clinical audits represent best practice in clinical audit, and arrange for improvement of the design and execution of clinical audits that aren't consistent with a QI approach to clinical audit

Arrange for meeting the learning needs of staff working in the service, directorate or division relating to the use of QI tools as part of or to support the clinical audit process

Ensure that clinical audits carried out by junior doctors use a QI approach and focus on achieving improvements in the quality of patient care