Special article

A team quality improvement sequence for complex problems

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Abstract

To solve complex quality problems teams need to follow a systematic sequence of inquiry and action. In this article a practical description of a team quality improvement sequence (TQIS) is given based on the experience of the more successful teams in the Norwegian total quality management experiment. There are nine phases in the sequence and teams have the flexibility to choose the best quality methods for completing each phase. The strengths of the framework are in ensuring that personnel time is used cost effectively and that changes are made which result in measurable improvement. One limitation is that the framework has not been as widely tested as FOCUS-PDCA (find, organise, clarify, understand, select—plan, do, check, act) and other frameworks to which the TQIS framework is compared. It is proposed that if team projects are to be the main vehicle for quality improvement, then their work must be made more cost effective. The article aims to stimulate research into the conditions necessary for different quality teams to be successful in health care, and draws on the research to propose a "risk of team failure index" to improve the management of such teams.

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Introduction

Some quality problems can be solved easily in the course of everyday management or unit team meetings. But the best way to solve more complex problems is for a special team to use quality improvement methods in a systematic way. There are many types of complex problems in health care and many are due to failures of coordination and communication between professions and services and to poor "system of care quality".[1 2] Perhaps the greatest potential for quality improvement lies in addressing complex problems which require different professions and departments to analyse and carry through changes.

That is the theory, but a systematic team approach to complex problems has proved difficult to achieve in health care. Many healthcare workers find it difficult to contain patient demands while they spend time doing a detailed analysis—especially if they are not sure that improvements will follow. Implementing change has proved difficult also, even on a microlevel where a team has some influence.

There are a growing number of reports of team projects in this and other journals where multidisciplinary teams have used quality methods and have made changes which have resulted in measurable improvements. Yet, for every one report, and every "successful" team, there are probably many teams which have not produced results or which have dwindled and disappeared. In the research which this article draws on, there were teams which produced thorough analyses as well as feasible solutions, but few solutions were implemented. We know little about the failure rate or about the reasons why, although we do have ideas from research into other types of teams about how to increase the chances of success.[3 4] If failing is not being able to show measurable quality improvement, then experience suggests that team failure is widespread.

Although it not politically correct to talk about failure in the quality movement, this is how some ordinary health workers see the achievements of teams. Teams are one of the most visible features of quality programmes, in part because they take personnel time from direct patient care. Some people take the view that quality project teams, like medical audit, are fine in theory or for those with time for research, but are not cost effective in ordinary health care. This raises the question, are quality teams really the most effective way to improve the increasingly complex health systems in which we work? Or is it that we are not

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"They met every Friday lunchtime for over a year, but I never saw any results. Their time would have been better spent seeing patients—all I can see is a longer waiting list."

"One doctor came for the first few meetings, but then we never saw him again."

"They started off using the methods they had been taught, but they never gathered data. I think some stopped coming to the meetings because they felt that managers did not support the work and that nothing would change."

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managing them in the right way or using the best methodologies for different types of problem?

If failing is not being able to show measurable quality improvement, then experience suggests that team failure is widespread.

If we continue to use teams for quality improvement, one solution is to choose simpler problems to work on, at least in the early stages of a programme. Another way forward is to study empirically the conditions which such teams need to be successful and to look critically at different team methods. Research exists into what makes an effective team,[3 4] but we need to recognise also that generalisations from this research may not always apply to quality project teams in health care, many of which are temporary project teams comprising different professions and with ambiguous leadership. This article considers how to make such quality teams more effective for resolving complex problems and contributes ideas for future research into the conditions necessary for successful quality improvement teams. I propose that we can develop team methodology to help teams to become more cost effective and to achieve a better link between analysis and implementing change.

Norwegian research

This article presents a framework which teams can use to investigate and resolve a complex quality problem—the team quality improvement sequence (TQIS). It proposes that for complex problems, more teams would have greater success if they worked through each of the nine phases systematically. There is flexibility within each phase for teams to choose the quality tool or idea which promises to be the most effective for the tasks in that phase. I do not propose that all quality problems need such a time consuming approach, nor that all teams should use this framework. Neither do I have easy solutions for the most difficult part—ensuring that changes are implemented.

The framework draws on evaluation and change management theory as well as on research into successful teams in the Norwegian total quality management programme, established by the Norwegian medical association in 1994.[1] Six hospitals started total quality management programmes in 1994/5, and all used quality teams as one of their main vehicles for quality improvement. By 1997 one hospital had over 100 teams registered.

The research methods and examples of team projects are reported in the first volume of the report.[5] It is relevant here to note some of the findings of the research. Nearly all the teams formed were multidisciplinary and most were interdepartmental. Most personnel had some training in quality methods before joining a team, apart from teams at one hospital which used a "just on time" training approach. At the start, most teams did not have a facilitator, but this was soon recognised to be necessary. All had difficulty involving and keeping doctors as part of the team, and this is recognised as a challenge for the future: doctors' involvement appears to be necessary for implementing changes and also strengthens a team's ability to design data collection, collect data, and analyse the data.

Two findings stood out. Firstly, "the change issue": the problems in implementing change and the poor link between analysis and change. The TQIS framework emphasises the importance of this link to help make the work of other teams more effective. Secondly, many teams did not properly investigate the causes of complex problems and moved too quickly into planning solutions which would not have been effective. Successful teams appeared to be able to use quality methods flexibly and appropriately. They used quick and simple methods for simple problems, but they were able to recognise when they needed to do a thorough investigation, before then planning and implementing a solution. These teams followed the disciplined approach described below.

Inexperienced teams without facilitators did not distinguish between simple and complex problems and often used inappropriate methods; impatience and lack of time characterised their approach. Success or failure did not appear to be dependent on doctors' continued participation in the team. There were as many reports of doctors wanting to cut short necessary data gathering as there were reports of doctors who left because they felt that the team was not taking a sufficiently scientific approach.

In this article I have drawn on this research to describe the nine phases of a team quality improvement sequence, using an example team project and noting some methods which can be used within each phase. The paper then compares this TQIS framework with other team frameworks such as the audit cycle, PDCA (plan-do-check-act),[2] FOCUS-PDCA, (find, organise, clarify, understand, select)[6] and the clinical improvement worksheet.[7] The appendix provides a checklist of the conditions which teams need if they are successfully to use the TQIS approach. This team failure index needs development through more predictive empirical research in different settings, but, if the limitations of the research on which it is based are recognised, it can help managers and others to highlight quickly some important missing ingredients.

The nine phases of investigation and solution

There are two parts to the approach: the first comprises the five phases which guide how the team investigates the problem. The second part comprises the four phases of solution which cover how the team plans, implements, and evaluates a solution:

PART 1: INVESTIGATION
- Phase 1: *choosing* the problem or improvement
- Phase 2: *formulating* the problem and the team
- Phase 3: *guessing* the causes of the problem
- Phase 4: *gathering* data to find the cause
- Phase 5: *deciding* the real cause.

PART 2: SOLUTION
- Phase 6: *planning* the solution
- Phase 7: *implementing* the change
- Phase 8: *evaluating* the results
- Phase 9: *closing* or continuing.

PART 1: INVESTIGATION

Phase 1: choosing the problem or improvement

Choosing the wrong problem to work on was common in the teams in our research. For many, a wrong problem was one which was not matched to the team's ability or to the organisation's goals. Clinical significance seemed important for some doctors, who commented that teams chose trivial problems (but sometimes ones which were important to patients). "Not strategically significant" was the complaint of some managers. Some quality coordinators and team members felt that teams had chosen overly difficult problems, which they were not able to analyse because of their lack of training, or where the changes likely to be required lay outside of their ability.

The process of choosing was mysterious to many team members, who had difficulty in recounting how a decision was reached. For some it was one member's "force of personality", which later led to problems if that member left and if other team members had not felt that the problem was important. Successful teams either had a problem delegated by a manager who maintained personal involvement, or the team had used a method to involve everyone in discussing and choosing the problem. Team members also looked ahead to the change part of their work rather than seeing their work as involving analysis only. They seemed able to gauge before doing the investigation the type of changes which might be required and able to use this realism to decide against working on some problems.

The lessons for others are that the process of choosing is important for team commitment and motivation, and for ensuring that the team's work is relevant to patients and the organisation's objectives. By defining the choice of the problem as a distinct phase, with tools and criteria to use, we are more likely to help teams to start their work with a greater chance of success. This phase involves listing possible improvements or problems to work on, and then deciding which problem has highest priority by scoring each against criteria.

One method is to use a decision matrix,[8 9] and to score each problem (0–5) in terms of the following criteria: (a) potential cost saving if the problem is solved; (b) possibility of the team being able to implement a solution (or of influencing others to do so); (c) amount of suffering caused by the problem; (d) importance of the problem to the organisation's future; (e) difficulty of the problem in relation to the experience and expertise available to the team; and (f) the team's energy and motivation to work on and solve the problem.

Phase 2: formulating the problem and the team

The example team we consider started with the general problem of how to "improve efficiency of operations", and discussed what they meant by efficiency and different quality problems. One method they used was to work down an objectives ladder to define smaller objectives and subtasks by asking "how?" They agreed on a less abstract formulation, "reduce the number of cancelled operations", but recognised they needed a more precise formulation and used an approach which guided them to define three things: (a) who suffers and who benefits from solving the problem and why; (b) a measure of the problem; and (c) a target objective for the team:

"Cancelled elective operations are a quality problem because patients suffer, and personnel waste time. The measure of the problem is the number of operations cancelled during a three month period, for different reasons. The target objective is to achieve a reduction of 50% of avoidable cancelled operations in one year's time."

This is an example of how a quality problem can be formulated in a way which is meaningful and measurable. Many teams miss this phase or only have abstract statements of aims. We know from research into many types of teams that discussion and shared understanding of purpose are important, as are clear goals.[3 4] Working on a formulation gives all members time to think through what they are trying to achieve. The "three ingredients formulation" is a way of formulating the problem that builds motivation to solve the problem and gives a method for discussing the different views in the team as well as for agreeing the precise objectives.

In this phase the team also decides whether its membership should be changed to include other people with knowledge about the problem or who may be needed to implement solutions. In the example, the team decided to involve a nurse from one of the surgical wards and a secretary involved in scheduling. They decided to ask some clinicians and others to be "associate team members" and to involve them when necessary rather than make the team too large or demand too much time of them.

"There is a time for fantasy and a time for facts", is how one team member described the balance needed in all phases. This is a balance between an open ended brainstorming approach and a focused, limited, and rational, fact based approach, or a need to combine "divergent" thinking with "convergent" thinking.[10] It is important to emphasise a fact based and systematic approach, but not at the expense of creativity and generating of ideas, which some frameworks do not give sufficient room for.

Phase 3: guessing the causes of the problem

The team listed their guesses about the causes of cancellations: "patient condition destabilised" (too unwell), "patient not properly

prepared", "tests not completed", "patient information not available immediately before surgery", "surgeon or anaesthetist unavailable", "nurses not available", and other possible causes. They used a "fish bone" diagram in this phase to gather their ideas under different headings of types of causes.[8] They recognised, however, that these guesses needed to be treated as predictions about what might really cause the problem, and that they had to be more certain which causes were the most important before thinking about which changes to concentrate on.

A common fault is impatience; teams cut corners in data gathering and try to implement changes immediately. The data gathering phase helps the team to see which cause is the largest contributer and to discover other causes. It also helps the team to understand the interrelation between the causes (the "cause system") and gives them data gathering methods which they can use later to evaluate changes.

Phase 4: Gathering data to find the cause

The team discussed whether to collect data to draw a flow diagram of the stages of the patient's journey from the ward to the operating room and back to the ward. The member proposing this argued that they could then use this diagram to decide which data to collect to find the causes of cancellations and delays. In addition, he felt that the diagram would also help to plan changes later. "Takes too long" was the view of another member who proposed using a data gathering matrix[8] to collect data to find out if the reasons which they had guessed were causes were in fact the real causes. In the end, the team decided to keep things simple and to first find out how many cancellations and delays could be categorised under the different causes which they had guessed.

They made a data collection form for an operating room nurse to use to record the number of cancelled and delayed operations by different categories of causes. They used a data gathering plan[9] to plan this phase of their work. This plan had the following headings which listed the data they needed and possible sources: (1) possible cause of the problem; (2) question to be answered to find out if this is a cause; (3) data needed to answer this question; (4) sources of data (already collected, or we collect specially); (5) method of data collection; (6) how often; (7) sample; (8) who is responsible for collecting and presenting the data; and (9) by when?

Would it have been better to draw a flowchart to decide which data to collect, or would this have taken the team into another project? Should the team have used this flowchart to see where problems occurred, then used it to decide which data were needed to measure the size of each of the problems? Often, only an experienced facilitator can help a team to decide the most cost effective methods to use within a phase.

Phase 5: deciding the real cause

Overall the team found that 10% of elective operations were cancelled over the three month period. The team analysed the data they had collected and found that three of the most common reasons for cancellations were: surgeon unavailable, patient condition destabilised, and patient information not available. Some members of the team then questioned whether these three causes of the cancellations were the real causes. Why was patient information not available? They felt that these should be each treated as a subproject for investigation to discover the real causes—that the team should further investigate these to know with more certainty which solutions to implement.

Other members of the team felt that they knew enough from the data to start work on the solution. There was also debate about whether some causes of cancellations, such as patient condition unstable should be categorised as "avoidable" or "unavoidable". The team finally decided to move to the solution part on the agreement that, if they felt that more data were needed about the cause, they could return to phase 2 of the sequence and define a subproject.

Sometimes the data do not show clearly what is the real cause or how different causes interact to produce the problem, which make it necessary to go back to phases 3 and 4 again. Some teams make the mistake of taking short cuts in this phase and start work on a solution which does not tackle the real root cause. Making the judgment about when to move to the solution is difficult, and one reason why the TQIS clearly separates the investigation from the solution part of the sequence.

Change is the weakest link in the healthcare quality improvement chain

PART 2: SOLUTION

A bad solution is a good one which is not implemented. Change is the weakest link in the healthcare quality improvement chain. Teams in our research found that change was the most difficult part of their work, or they did not recognise any responsibility for change and finished their work by reporting their findings or just failing to meet after encountering delays and problems. In the TQIS framework, recommending changes which others should make is not a solution. The solution phases are about implementing and evaluating a change, using the analysis made in part 1.

Phase 6: planning the solution

The example team chose to focus on the three most common reasons for cancellations, and discussed possible solutions for each. They discussed again the question of which were avoidable or unavoidable, and agreed that some causes were more easy to resolve than others. The team decided to implement one easy solution from the list they had made: to publicise the cancellation data by presenting them at meetings of surgeons, nurses, and others, and to remind people that they would gather data again for a three month period, in

six months time. The team's planned intervention was thus to give information and, as one member put it, to "threaten to measure them again in a way they could not refuse".

Not involving the right people in planning the solution is a common mistake made by teams. Another is not planning which data to collect to follow progress in resolving the problem. In the example, the team decided to continue using the same data gathering forms and methods to collect data so that they could make comparisons between the two time periods. Often, teams can use the same or modified data gathering methods to those used in the investigation phase. These are scarce skills—practical skills in cost effective data gathering—and it is important to use the experience which the team has gained.

The quality of the solution (its "implementability" and cost effectiveness) depends in part on the time the team has spent on the earlier investigation phases. These phases enable the team to learn collectively about many aspects of the problem and of the system of care within which the problem resides. The team needs to build up this understanding to generate feasible and effective solutions. They need to stay with the change process to develop this understanding: we only really understand a system when we try to change it as long as we study what happens when we try the change.

Phase 7: implementing the change

The example team chose the simplest solution from their list. They arranged lunchtime seminars where they presented the data showing the size of the problem. They led discussions about possible causes of a surgeon being unavailable, patient condition destabilised, and patient information not available, and about what could be done. In one sense the team handed over responsibility for change to the people involved: the team realised that they did not fully understand the reasons for the different causes, and, even if they had, they could not implement changes on their own. They thought that presenting the data was a cost effective way to promote change, and that stating that they would repeat the data collection in six months would also have an effect.

Many teams find this phase the most difficult. One reason is because they do not recognise a responsibility for change or do not have the members in the team who would be needed for implementing change (phase 2). But there are no easy solutions. The challenge of implementing change in health care is one which is underestimated in team frameworks developed outside of health care. One approach is for the team to work only on problems which are within their area of influence, but in health care this may not be feasible. Complex problems involve many people and have solutions which are difficult to predict when forming a team. The change rule of involving all who will be impacted by the change in the team is difficult to follow, at least from the outset. For many projects this would make the team too large (more than 10 people). It is difficult to predict the types of changes which will be required and to involve people from different departments in the analysis phases so that they have a fuller understanding of the reasons for the change. After completing the analysis, many teams have to go to other departments to persuade others to make changes, and this is where the project often meets delays or breaks down.

Detailed discussion of causes for and solutions to the problem of implementing quality change are outside the scope of this paper and were a subject of a *Quality in Health Care* supplement.[11] Yet this problem is the underlying theme of this article and something which the TQIS framework is intended to address. The TQIS framework gives the flexibility to use whichever methods are appropriate for a particular phase and nowhere is this more important than in planning and implementing change. There are tools and ideas from within the quality movement,[12] but teams also need to learn about and make more use of change methods and ideas which have proved to be successful in health care and in other sectors. Change success is a function of the context, people's motivation, and their change ability ($c = f(c+m+c)$).[1] More research is now available about which approaches work best in health care for different types of change in different settings.[13–15] Common strategies are to make changes to organisation; initiate or give training; establish guidelines,[16] protocols, or standards; use computer prompting; or use decision support systems,[17] or combined interventions to resolve the problem.[18]

One strategy is to have more senior managers working with others to achieve the changes. A higher manager or steering group above the team keeps other departments and professions informed of possible implications of the team's project, and then, when the time comes, works to carry through the changes. Another underused technique is project management and methods developed within this occupation.[19 20]

No easy solution exists to the problem of change, but the TQIS framework highlights the importance of this problem in health care by:

- Making responsibility for change and evaluation a clear part of the team's brief and proposing that the team is accountable to higher management for this responsibility
- Guiding teams to focus attention to change planning and implementation by treating these as separate phases (6 and 7)
- Showing the links between successful change and actions in other phases: in the choice of problem (phase 1) and team members (phase 2), in the need to do a thorough analysis to decide the right causes and solutions (phases 4 and 5), and in emphasising that the team has some responsibility for change and for evaluating results
- Giving flexibility within the change phases (6 and 7) to choose the methods and research which will be of most help for the tasks to be done
- Giving the option of forming a new implementation team. Retaining some members of the "old analysis team" is important, otherwise the "new team" will not have the

understanding of the problem which the old team built up through its earlier careful work, nor the expertise to measure the impact of the change on the problem.

Phase 8: evaluating the results

In this phase the team brings together the data they collected towards the end of phase 7. In the example, the team repeated their data collection and found that cancellations due to "surgeon unavailable" had dropped by 6.5%, those due to "patient condition destabilised" by 4%, and those due to "patient information not available" by 2%. They used the problem statement which they formulated in phase 2 to assess how far they had achieved their objectives. This was to reduce avoidable cancelled operations in one year's time by 50%: the figures showed that they had achieved a 19% reduction. The debate again returned to how many cancellations were avoidable.

For many teams which reach this phase, a common problem is how to be sure that the data they collect show the impact of the change or intervention they introduced rather than some other change, such as an increase in staffing or a new manager. It is here that a recognition of the difference between research and quality improvement is important, although the two do overlap in many ways.[21 22] When planning data collection it helps to have thought previously about other possible explanations for any differences that may be found between the before and after data sets. Having team members with some research skills helps, but it can also lead to too much time and attention being given to ensuring a scientific evaluation when this is not necessary. There should be a balance between the pragmatists in the team ("this is good enough for our purpose, we are not trying to win a noble prize") and the scientists who want more certainty, fear misleading others with "the magic of numbers", and know that some attention to controls, matching, and research design is necessary for the project to have credibility with doctors.

Phase 9: closing or continuing

The second phase of formulation defines a time target, and this is the date when the team decides whether to continue working. When the example team formulated their aims in phase 2 they had scheduled a final review meeting for one year's time. The agenda of this meeting was the choices about the future: (a) to complete the eight phases if they have not solved the problem; (b) to start another problem solving sequence on the same problem; (c) or to work on a new one.

In the example, 10 months after starting, the team decided to start a new project to reduce "patient information unavailable", and they returned to a new phase 2 to define this problem and the team. They decided to use the scheduled one year review meeting to assess what they had learnt about teamworking and about quality methods—how could the team's work have been better and what were their successes? At this meeting they decided that they should have spent more time thinking about which data to collect in the investigation, scheduled meetings to fit better with surgeon's schedules, and have managed their time in meetings better.

Conditions for successful quality teams for complex problems

Observations of teams in total quality management programmes in six hospitals suggests that quality teams should only be used for complex problems if the organisation can provide eight conditions which appear to be necessary for their success:

- Adequate training for the team leader and team members about teamworking, quality methods, and about a problem solving sequence
- The team has access to expert facilitation during its work (especially if the training has not been intensive)
- A requirement that, when defining the quality problem, the team specifies its objectives in measurable terms, the data it will gather to measure problem resolution, and is also responsible for implementing a change to resolve the problem (or for initiating action to do so)
- A higher manager who is responsible for ensuring that the time and resources spent by the team results in measurable improvements, and who makes regular assessments of progress from the teams reports
- Meetings are no less frequent than every month, and ideally weekly
- Over 50% of the team members take part in every meeting for each problem addressed
- The first problem to be worked on should be simple and viewed as a training exercise, with the expectation that within 6 months a change will be implemented which shows measurable results (that is, the team gains experience of working through all nine phases of the sequence)
- The team does not move onto a second problem without completing the full sequence, when it was necessary to complete this sequence.

Although the above list has not been widely validated, it is one way to assess the risks of team failure (or the chances of success): a score of 0–5 can be given to each of the above and the appendix to this paper gives a checklist for this purpose. These conditions have been formulated from observation of teams in six different sized public hospitals in Norway. Predictive testing is necessary to develop this knowledge through research into teams in different circumstances.

The TQIS compared with other frameworks

There are many frameworks to guide quality problem solving and improvement.[6 7 23 24] The most well known approaches are the audit cycle (set standards, compare with practice, act) and the PDCA cycle.[2] The PDCA cycle describes implementing an experimental change (plan and do), gathering data to find out if the change improves quality (check), and then implementing the change fully if there is evidence that it

does improve quality. The TQIS framework discussed in this article was developed in Scandinavian public health care but appears to be relevant elsewhere. It differs from other approaches in giving more guidance than the PDCA cycle, and in being applicable to a more general range of complex problems than approaches which emphasise process improvement. An example of this is the FOCUS-PDCA which involves finding a process to improve, organising a team, clarifying the process, understanding the causes of problems, and selecting a change to make.[6] It more clearly separates the investigation work from solution work, which is necessary to ensure teams do not move too quickly to planning solutions. The sequence involves two data gathering exercises: gathering data to discover the cause, and then gathering data before and after implementing a change to test if the change is a solution or does make an improvement. The discussion in this article of the change planning and implementation phases noted that other frameworks underestimate the problem of change in health care, and described the ways in which the TQIS framework gave more guidance for achieving effective change.

The TQIS framework is similar to other framework in its assumptions that complex quality problems need careful investigation of the possible causes of the problem and a team project approach. Teams are necessary to bring together people with an understanding of how the organisation works, to share the work, to support and encourage each other, and to implement a solution.

Conclusions

"All improvement takes place project by project and in no other way." J Juran[20]

The main aims of this article were:

- To present a systematic way of working which could enable teams working on complex problems to successfully implement changes which result in measurable quality improvement
- To stimulate further research into factors which account for failure and success in different types of quality teams working on different types of quality problems.

If we are to continue to use teams as the main vehicle for quality improvement then we need to pay more attention to ensuring that these teams produce results. Such teams have a potential for solving the complex problems of modern health systems, yet many do not appear to be cost effective.

The team sequence described in this paper is a guide for teams to work systematically through nine phases of action to resolve a complex quality problem. It suggests methods to use within each phase and gives flexibility within the framework—a team is only as good as the methods it uses and the creativity, energy, and persistence its members bring to the tasks in each phase. The sequence differs from other frameworks in emphasising investigation and change, and in separating investigation clearly from the change implementation. It is based on research into hospital total quality management programmes in Norway and the experience of successful teams. This research had limitations and generalisations may not be justified; the success factors may be different outside of the public hospital sector and in other cultures with a more hierarchical work structure. The research did not study all the teams in all the hospitals in depth, and it relied on reports from team facilitators, members, and managers as well as the team's documentation.

Not all quality teams are problem solving teams. Some use teams to set standards, to improve processes, or to work on "speeding" patient pathways, establishing critical paths or protocols. Not all teams need to use this sequence. Using this systematic approach in a team takes up time and resources from patient care. It should only be used for problems which require a sustained and collective approach—teams and facilitators need to build up experience about when to form a team and for which problems this systematic sequence should be used. Other frameworks exist which may be more appropriate for particular problems, or which teams should use because it is the standard approach in their organisation. More research is needed to test these ideas in other healthcare settings, especially predictive research which tests hypotheses about the conditions required for quality team success. Research into all types of quality teams is needed to help to increase the success rate of this important and visible feature of most quality programmes and to assess why many teams do not achieve their potential.

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Appendix

Risk of team failure index for complex problems

Score 0–5 according to:

- Amount and depth of training for the team leader and team members about teamworking, quality methods, and about the problem solving sequence (score 5 = none, 0 = members have had in total over 10 person days of training)
- Does the team have access to expert facilitation (especially if the training has not been intensive)? (0 = facilitator in the team, 5 = no access)
- Has the team been required to specify its objectives in measurable terms, the data it will gather to measure problem resolution, and is expected to implement a change to resolve the problem (or for initiating action to do so)? (5 = no, 2 = is required to, 0 = has done so).
- Is a higher manager known by all to be responsible for ensuring that the time and resources spent by the team result in measurable improvements, and do/will they make regular assessments of progress from the teams reports? (5 = no, 0 = yes)
- How often does the team meet? (5 = <1/ month, 0 = weekly)
- How many team members on average take part in every meeting, for each problem addressed? (5 = <50% regular attendance, 0 = 90% regular attendance)
- Was the first problem simple and viewed as a training exercise, with the expectation that within 6 months a change will be implemented which shows measurable results (0 = yes, 5 = no)

- Has the team moved onto another problem without completing the full sequence when it should have completed the sequence? (5 = yes, 0 = no).

Score 0–10 = consider how other teams can use this team's expertise and learn from their experience.
Scores >20 = consider providing what is missing—the higher the score, the more likely it will not achieve measurable or perceivable quality improvements
Score >40 = it is likely the team will stop meeting soon because it will get stuck or not make progress.

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