Health Quality & Safety Commission New Zealand
Kupu Taurangi Hauora o Aotearoa

# Quality improvement toolkit:

## *Improved, safer care for you and your patients*

This toolkit was originally developed for the age related residential care (ARRC) sector. The common example used is the prevention and investigation of falls. While falls may not be a common occurrence in a pharmacy, most people can relate to a fall being an undesirable event, often with poor consequences for the person that fell. The techniques for reviewing an event and implementing change and improvements are universal.

February 2016; updated April 2019

ISBN 978-0-908345-23-6



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A PDF of this toolkit and Microsoft Word versions of the separate tools can be downloaded from the Commission website at www.hqsc.govt.nz/our-programmes/reducing-harm-from-falls/projects/arrc-mini-collaborative/quality-improvement-toolkit/.

**Acknowledgement**

This toolkit came to fruition thanks to a collaborative improvement project to reduce harm from falls.

The project involved a group of age related residential care providers representing and supported by their three district health boards, the Health Quality & Safety Commission's Reducing Harm from Falls programme and the Accident Compensation Corporation (ACC).

Eight case studies from the collaborative are available on the Commission website at: www.hqsc.govt.nz/our-programmes/reducing-harm-from-falls/publications-and-resources/publication/1810/.

**Contributions**

We would like to acknowledge Dr Jan Weststrate (Care-Metric) and the staff of *First, Do No Harm* in the Northern Region (in particular Peter Leong and Karen O'Keeffe), who have contributed to the development of this toolkit. Many others have also contributed their time in testing the toolkit and providing feedback – there are too many to acknowledge individually, but we thank you all.

*Front cover photo: A recognition to Dame Kate Harcourt who has supported the work of the Reducing Harm from Falls programme with her personal endorsement, stories and experiences. Her support means a lot to us.*

# Contents

## Introduction

This toolkit is designed to help health care staff undertake quality improvement, specifically those working in age related residential care (ARRC). It aims to provide a foundation-level, introductory guide to key aspects of improvement science.[1]

The toolkit uses the common language of quality improvement. It shares some of the techniques underpinning the improvement work of the Health Quality & Safety Commission. This will help teams working on quality improvement activities understand if the changes they are making have resulted in the desired improvement. The idea is to move from a culture of thinking in 'projects', to one of continuously striving for improvement.

> ***'Improvement is not about a project – improvement is a way of life.'***
>
> ***Frank Federico[2]***

The toolkit starts with a broad overview of quality improvement and how it is applied in New Zealand. It then continues through the 'Model for Improvement', a roadmap for a common and consistent approach to improving the quality of care. There is also a fictitious residential care facility 'improvement story', which shows how the tools included in the appendices can be used.

The examples used in the toolkit are based on ARRC topics (although not exclusively), such as the prevention of pressure injuries, falls and skin tears. Each illustrates different aspects of quality improvement.

1 'Improvement science' is the use of evidence-based and practical learning strategies to make a timely difference to outcomes. Marshall M, Pronovost P, Dixon-Woods M. 2013. Promotion of improvement as a science. *The Lancet* 381(9864): 419–21.
2 http://koawatea.co.nz/wp-content/uploads/2014/06/Frank-Federico_Throwing-the-Switch-for-Change-2.pdf.

## About quality improvement

Quality improvement is about creating sustainable, beneficial and measurable change in the provision of health care. It involves teamwork, tools and techniques, and much more.

Anyone who has implemented change knows it can be difficult. Improvement efforts often fail because we tend to focus on the technical aspect of a change (what we want to change) and forget about the effect on people – the human or psychosocial issues (what do people think about the change and how will they change?) that influence the results of any change.

To improve the likelihood of success of the improvement process,[3] those involved must develop an understanding of the key improvement concepts and tools.

### Quality in New Zealand

For years now, New Zealand health care providers have focused on improving the quality of care given to consumers.[4] There has been great progress in providing safer care, reducing delays and wastage, and encouraging services to provide high quality care.[5]

Quality is rarely simply the result of learning new knowledge, exciting innovations or one-off changes. Instead, quality focuses on the day-to-day work of providing a safe, reliable service and continuously trying to improve performance.[6]

New Zealand has adopted the New Zealand Triple Aim for quality improvement for the New Zealand health and disability sector and for individuals and their families/whanau. The Triple Aim guides improvement activities to achieve the vision of a world-class and patient-centred health and disability support system, where all three elements are in balance. Those three elements are:


- improved quality, safety and experience of care
- improved health and equity for all populations
- best value for public health system resources.

The key dimensions of quality (described below) help to define improved quality, safety and experience of care for the individual. The 'population' is the population of concern to the organisation undertaking the improvement. Value-based decisions are based on achieving what matters to patients relative to the cost of achieving those outcomes.[7] [8]

The key dimensions of quality in health care are that it is people-centred; there is access and equity; and care is safe, effective and efficient.

3 Langley GJ, Moen RD, Nolan KM, et al. 2009. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance* (Second Edition). San Francisco: Jossey-Bass.
4 www.hqsc.govt.nz/assets/Consumer-Engagement/Resources/consumer-definitions-Mar-2015.pdf.
5 www.healthnavigator.org.nz/for-health-professionals/h/healthcare-improvement/.
6 Batalden PB, Davidoff F. 2007. What is "quality improvement" and how can it transform healthcare? *Quality and safety in health care* 16(1): 2–3.
7 Porter ME, Lee TH. 2013. The strategy that will fix health care. *Harvard Business Review* 91(10): 50–70.
8 Whittington JW, Nolan K, Lewis N, et al. 2015. *Pursuing the triple aim: the first 7 years. Milbank Quarterly* 93(2): 263–300.

These dimensions are underpinned by the partnership, participation and protection principles of the Treaty of Waitangi. They are shown in Figure 1 as 'slices' through semi-circles representing the different levels of the system, with the focus on people.

*Figure 1: Quality dimensions for the New Zealand health and disability support system*[9]


Improving quality requires balancing the dimensions, and recognising contributions and interactions across all levels of the system.

On a quality improvement journey, change is inevitable. Any change or intervention introduced to make an improvement must balance the dimensions of quality while taking into account the values and circumstances present in a health facility. At all times, it must recognise that a focus on people is at the heart of quality.

9 Minister of Health. 2003. *Improving Quality (IQ): A systems approach for the New Zealand health and disability sector.* Wellington: Ministry of Health.

## Driving your improvement work

A successful quality improvement journey requires good teamwork, planning and communication. Here are some basic ideas to help you establish an improvement team, set up regular meetings and plan your improvement work. See also the 'Communication' section on page 19 for more about how to communicate, to whom and how often.

### Establish a multidisciplinary team

An ideal quality improvement team will include a cross-section of staff working in the health facility related to the topic of interest. For clinical topics, this means both health care assistants and registered nurses will be on the team. You will also need managers and other health professionals, such as medical doctors and/or nurse practitioners, pharmacists, physiotherapists and dieticians. These people can view the issue from their own perspective, for example, medication, finance or nutrition.

Within a team, there is no hierarchy but people have different roles and responsibilities, as they each bring different strengths and viewpoints. See Tool A for more about team roles and working effectively within a team. The team will need to have a leader, sometimes called the project manager and a project sponsor. The team leader calls the team meetings, establishes the agenda and keeps the team on track at and between meetings to ensure agreed actions are carried out. The project sponsor is someone in a senior management position who can resolve any issues outside of the control of the project team and/or project manager.

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The team should include a resident from within the facility. They can provide insights into the real impact of change, which many staff may take for granted. There is growing evidence supporting the relationship between consumer engagement and improved health outcomes.[13] Co-designing solutions with consumers and families/whānau is a key principle for health care improvement. With co-design, you know the improvement meets the needs of consumers and families/whānau, as they have been involved in the design.[10] For more information about engaging with consumers go to: www.hqsc.govt.nz/our-programmes/partners-in-care/publications-and-resources/publication/2162/.

### Have regular meetings

Having regular, planned meetings will be crucial for achieving and embedding your improvement goal. Improvement journeys rarely happen overnight. It sometimes takes more than a year to achieve a goal. Even when the goal has been reached, you will need to monitor and measure the improvement to make sure the results are not drifting back to where you started.

Each meeting should have an agenda and minutes – these are also critical for success. The minutes function as a 'breadcrumb trail' to show where the team started, what decisions were made, the actions agreed, and who is doing what. Finally, the minutes record the impact of any improvement.

See Tool B for a meeting agenda/minutes template.

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10 Health Quality & Safety Commission, 2015. *Engaging with consumers: A guide for district health boards.* Wellington: Health Quality & Safety Commission.

### Use a project plan

Using a project plan provides clarity to the team. A project plan (sometimes called a 'charter') is a communication tool that helps you explain your project to others and keeps you on track by having the agreed expectations clearly stated.

The plan should be developed by the team and agreed to by the project sponsor.

See Tool C for a project plan/charter template.

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## Using the Model for Improvement

Every improvement journey needs a roadmap to give a sense of where you currently are and where you want to be. In addition, you will need to consider how you are going to get there and what progress you are making.

The Model for Improvement (MFI) functions like a roadmap (see Figure 2).[11] It is widely used[12] in health care and can speed up the process of improvement. It provides a common and consistent approach to improving the quality of care, which can be used by any member of staff working in any health care facility. It also provides a helpful framework for the improvement process and encourages all those involved to work together.

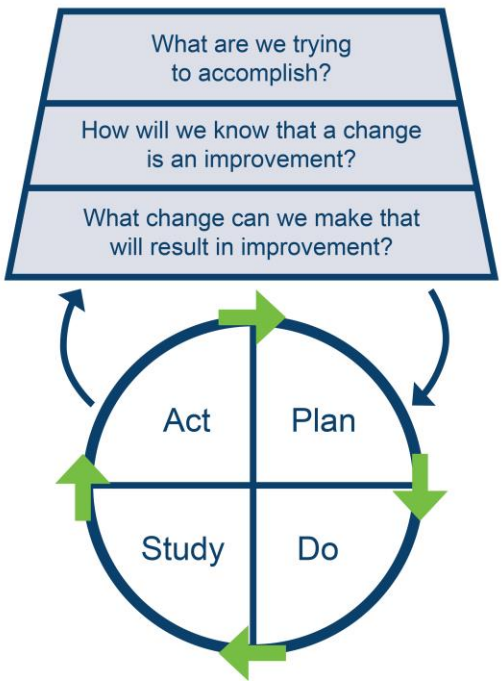
The MFI is structured around two main sections. The first section (three questions) provides direction:

1. What are we trying to accomplish? (This is the **aim** and provides direction.)
2. How will we know that a change is an improvement? (These are the **measures** and describe the current and future position.)
3. What changes can we make that will result in an improvement? (These are the **changes** that describe how you are going to reach your aim.)

The following sections explain these three aspects of the MFI in more detail.

The second section focuses on testing the changes using a small-scale cycle of change called PDSA – plan–do–study–act (described in more detail on page 16).

*Figure 2: The Model for Improvement*




11 Developed by Associates in Process Improvement based in the USA (www.apiweb.org).
12 Crowl A, Sharma A, Sorge L, et al. 2015. Accelerating quality improvement within your organization: Applying the Model for Improvement. *Journal of the American Pharmacists Association* 55(4): e364. http://doi.org/10.1331/JAPhA.2015.15533.

### Aim

The first step is to define your aim. The aim statement answers the question 'What are we trying to accomplish?' and has the following components:

- focus (eg, falls with harm)
- timeframe (eg, in six months' time)
- measures (eg, number of falls per 1000 bed-days)
- goal (eg, reduce the number of falls with harm by 50 percent).

Use the SMART acronym to check if the aim statement is detailed enough.

> **Specific:** Is the aim statement specific enough and does everybody involved have the same understanding of it?
>
> **Measurable**: Can progress be measured objectively?
>
> **Achievable:** Can the aim be achieved? Nothing is so demotivating than trying to achieve the impossible.
>
> **Relevant:** Does the aim matter? Is achieving the aim actually beneficial to residents?
>
> **Time bound.** Does the aim have a beginning and an end, so it can be evaluated and the next step identified?

Setting SMART aims and goals helps you evaluate whether or not you have achieved your aim.

The following are examples of aim statements:

> *To reduce the number of residents that have falls with harm in our facility by 20 percent over a period of one year starting on 1 February 2014.*
>
> *To increase the number of 'pressure injury free days' in the hospital wing by 50 percent over a period of six months starting 1 August 2014.*
>
> *Within a period of one year, starting on 1 January 2015, we want to reduce the number of residents with frequent falls (as defined by your organisation) by 40 percent.*

### Measures

When you are clear about your desired aim and goals, next you need to choose a standard to measure the goals against. Measures will help provide the answer to question two in the Model for Improvement: How will we know that a change is an improvement?

There are three phases in an improvement project where you use measurements: understanding your areas for improvement; supporting improvement in practice; and sustaining the gains made and identifying the next improvement.

There are two types of measure you can use:[13]

1. **Outcome measures.** Outcome measures evaluate whether or not you have achieved your aim or goal. Usually this will be a measure related to the people you are trying to have an impact on. For falls, this can be the number of falls per month or the number of

13 The IHI website has more information about measures (www.ihi.org/resources/pages/howtoimprove/scienceofimprovementestablishingmeasures.aspx).

unique residents that had a fall per month (regardless of how many falls one person had). For example, internationally, the number of falls is expressed in the number of falls per 1000 occupied bed-days. An example of how to calculate this is provided in Tool D.

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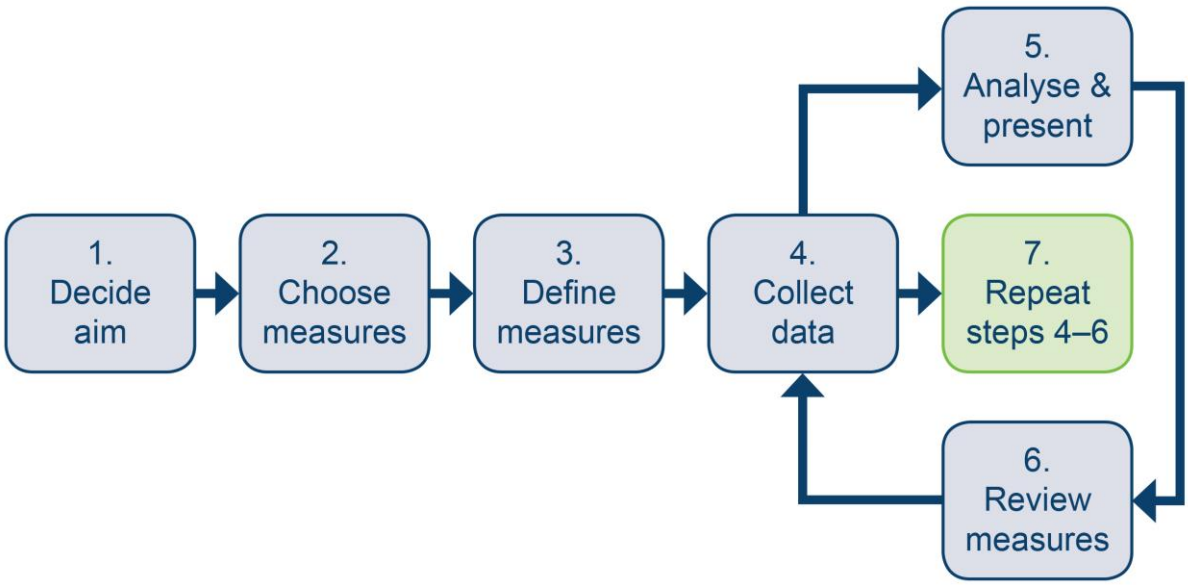
2. **Process measures.** These measure the activity performed to, or for, a person, which is thought to impact on the final outcome. They are the care processes. An example might be the number of pressure injury risk assessments carried out on a weekly basis, or the number of times a risk assessment was done and the prevention strategy put in place as a result. Or the number of staff that attended the monthly skin tear educational meeting. Process measurements are often measured as a percentage. For example, out of 50 residents a pressure injury risk assessment was carried out on 45 of them = 90 percent (45/50 x 100)).

It is important to use both types of measure so you know the right processes have been implemented for achieving the desired outcome.

To understand where you are at the start of your improvement journey, you will need to use data to establish a baseline. Data may exist as numbers (quantitative) or as documented resident and staff comments (qualitative). Data may already be available, or you may need to collect and analyse new data, using the seven steps described below.

### *The seven-steps of measurement*[14]

This is a step-by-step data collection process for establishing a baseline.




14 Final NHS Elect Measurement Guide 130315.pdf downloaded 7 December 2015 from: www.nhselect.nhs.uk/file_download.aspx?id=16359.

| | |
|---|---|
| 1 | Decide the aim (reduction of falls). |
| 2 | Choose the type of measures you will use (outcome, process or a combination). |
| 3 | Define your measures (eg, the number of residents that developed a pressure injury this month). |
| 4 | Collect appropriate data. Plan how you are going to collect data, who will collect it, and when.<br>A simple way to collect and analyse data is to use a form called a check-sheet (see Tool E). A check-sheet can reveal more about your problem or monitor the effects of your changes. It can also be used when you have no other way to collect data. |
| 5 | Analyse data and present it in a useful form (eg, run chart – see Tool F). |
| 6 | Review what you have found to identify what decisions need to be made (use your understanding of the information to make decisions). |
| 7 | Start the collect–analyse–review cycle (step 4–6) all over again. |

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TOOL F page 31

Steps 1–3 have already been covered above. Steps 4–6 consist of the 'collect–analyse–review' cycle, which is described more fully below.

*Collect–analyse–review*

The first collect–analyse–review cycle provides the baseline of current performance (the starting point). This cycle can be repeated and data collected and analysed each time (eg, weekly or monthly), creating regular data points.

The number of collect–analyse–review cycles needed will depend on whether or not the team believes it has enough data to understand the problem. Remember, measurement is not the goal; improvement is the goal. Before moving forward, the team needs just enough data to make a sensible judgement about next steps. It is also important that enough data is collected to give you an understanding of the underlying causes of the topic at hand.

Run charts provide a simple way to organise and analyse information (step 5) over time (see Tool F).

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Step 6 (review) is important because it requires you to study the results of the analysis and investigate what the information telling you. Data collected over time is always telling a story. There are two options here:

1. You know what the data is telling you, in which case:
    a. start with the next phase of the model for improvement
    b. continue measurement and evaluation. Return to step 4.
2. You still don't know what the data is telling you, in which case, either:
    a. continue to collect data
    b. collect more detailed data
    c. analyse the data in another way. Return to step 4.

***Examples from the falls collaborative***

*Case study A*

Facility A were charting and analysing their monthly falls data. They noticed a pattern in the data relating to the time of the falls. Data indicated there was a peak of falls between 3pm and 7pm. A diversional therapy programme was developed in the afternoon during this time. As a result of this change the data showed a reduction in falls at that time of day.

The facility also introduced focused individualised falls prevention activities for people who fell frequently.

As a result of the changes the data showed an overall reduction in the facility's falls rate.

*Case study B*

Facility B started collecting falls data and displaying it on a falls safety calendar as part of the collaborative. After analysing their data they put in individualised plans for residents who were falling frequently. On finding that one resident was struggling with a heavy door, they put in place a privacy curtain so the resident didn't need to use the door.

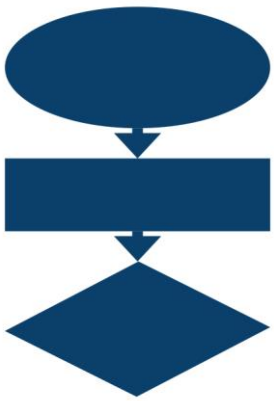
By using the display of data they could see patterns, particularly the times and locations of falls. This meant they could put in place effective changes to reduce the falls rate in the facility.

The falls safety calendar used at Facility B can be used to record other types of safety events and is also sometimes called a 'safety cross'. You can download one from: http://gembapantarei.com/2008/01/101_kaizen_templates_safety_cross.html

### Changes/Interventions

The next phase in the MFI is about what changes (interventions) you can make to bring about improvement.

Before you decide what changes are needed, you will need to look critically at the available data to understand why things happen (eg, why do skin tears occur?). The following three tools can help you identify the underlying causes of a problem:

| | | |
|---|---|---|
|  | 1. **Cause and effect diagram.** This will help you identify many causes, of which one or more will be the main cause of the problem (eg, skin tears, falls, pressure injuries, etc). See Tool G for more details. | TOOL G page 35 |
|  | 2. **The Pareto chart.** This counts the various occurrences or events in decreasing order of frequency. See Tool H for more details. | TOOL H page 37 |
|  | 3. **The process map.** This helps you describe the steps in the process, understand the system and identify any duplication of steps, or steps where problems may be occurring. See Tool I for more details. | TOOL I page 39 |

### *Understand the root cause*

A root cause is the underlying system issue that led to the causal factor (action or inaction) that allowed the problem to occur. Understanding the root cause is important because it leads to action plans that are more likely to prevent the event from happening again. There are various methods you can use:

- Analyse incident forms for a specific topic – this will help you identify patterns that indicate the type of intervention needed to solve the problem.
- Find out what is not working – feedback from residents can provide vital information.
- Ask 'why' five times[15] [16] – this is a simple and commonly used troubleshooting tool. The actual number of questions is not limited. The tool is meant to encourage you to dig deep enough to discover preferably only one root cause, but also one that your team can work on. You should always try to use data to support your findings (you might find this in incident reports, resident records or observations). The '5 Whys' tool can be used in conjunction with the cause and effect diagram in Tool G. For an example of using the 5 Whys, see Tool J.

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A more in-depth method of root cause analysis used by New Zealand DHBs is outlined on the Commission website at: www.hqsc.govt.nz/our-programmes/reducing-harm-from-falls/projects/analysing-and-learning-from-falls-events/. The resources include a human factors guide, a framework guide to analysing falls events and a falls analysis template.

*Article: A programme to reduce acquired pressure ulcers in care homes*[17]

This paraphrased article summary shows how root cause analysis (RCA) was used to detect the main cause of pressure injuries.

*In the group of care homes in this study, whenever a newly acquired pressure injury is reported a root cause analysis (RCA) is started. The RCA is led by a senor clinical staff member and involves all members of the care team. The RCA process consists of a reflective examination of the care before the pressure injury occurred, identifying any changes to the resident's condition and any actions taken at the time. The team seeks to answer the question, 'was there anything that could have been done to prevent this occurrence?' and if the answer is 'yes', to ensure new systems and processes are put in place to prevent the occurrence in the future.*

*In 2013 an RCA of all pressure injuries in the previous six months was undertaken. It found 28 percent of these were preventable/avoidable. Monitoring has continued bi-monthly with the use of a visual report known as a safety cross. Staff received training in skin care and RCA, and assess residents' skin daily.*

*In 2014 the RCA was replicated. The findings showed the numbers of avoidable/preventable pressure injuries had decreased, the use of inappropriate equipment decreased and the greatest pressure injury incidence in 2014 was in those who were nearing the end of life.*

15 www.hqontario.ca/Portals/0/documents/qi/qi-ltc-improvement-guide-en.pdf.
16 McCarty T, Daniels L, Bremer M, et al. 2005. *The Six Sigma Black Belt Handbook.* USA: McGraw-Hill.
17 Morris Thompson T, Marks-Maran D. 2015. A programme to reduce acquired pressure ulcers in care homes. *British Journal of Nursing* 24S4-S12.

*The authors concluded that raising awareness of skin care/pressure injuries, together with regular monitoring of risk, robust systems and staff training, is leading to a decrease in preventable/avoidable pressure injuries in older people in these care homes.*

### *Developing change ideas*

Once you have a better understanding of the cause of the problem, various change ideas can emerge.

When developing a change idea, look for ways to do things differently. Using the data and tools already discussed will help. You can also adapt known good ideas, and be creative and develop ideas no one else has tried.

Known good ideas come from:

- national and international guidelines on the topic of interest
- best practice guidelines published on the topic
- Health and Disability Commissioner incident reports (www.hdc.org.nz)
- Health Quality & Safety Commission Open Book reports (www.hqsc.govt.nz/our-programmes/adverse-events/projects/open-book)
- literature in medical and nursing journals
- local, national and international experts in the field.

With any idea, you often cannot just copy it, but need to adapt the idea to your own situation through testing.

You can also use ‘change concepts’ that have been useful in other fields to trigger ideas and adapt them for use in your facility. For a list of change concepts see the IHI website: www.ihi.org/resources/Pages/Changes/UsingChangeConceptsforImprovement.aspx.

Creativity and innovation are useful for any problem-solving process. They are particularly required when you have already tried several ideas and been unable to achieve the desired level of change. Creativity can be as simple as brainstorming among your team. This is where team diversity and involving residents are vital. Several creativity tools and methods are available, for example:

- www.creativitypost.com/create/101_tips_on_how_to_become_more_creative
- American Society for Quality website: http://asq.org/
- Plsek PE. 2000. Creative thinking for surprising quality. *Quality Progress* 33(5): 67.

### Plan–do–study–act (PDSA)

Once a change is agreed, even if it has been shown to work in other settings, take the time to do a small-scale test. There are almost no ‘plug and play’ solutions that work in all situations. Testing allows you to adapt actions to particular settings.

Small-scale testing helps to ensure the change is manageable. It also reveals whether or not the intervention is successful, before introducing it into the whole organisation. An example would be to start with one, two or three residents, in one setting, using one service provider.

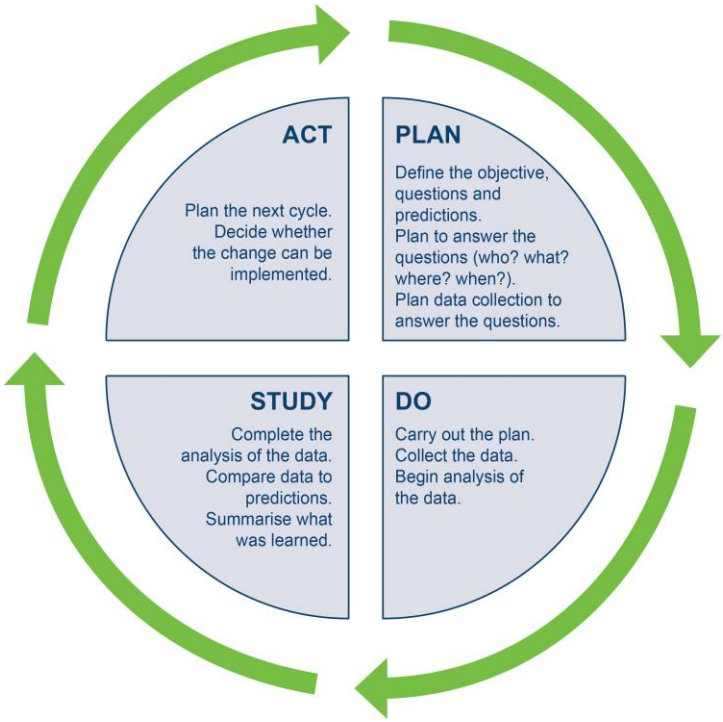
Make sure the change is measurable and there are not too many of them. It is important to be able to measure and obtain quick feedback so you know whether the intervention has

made an improvement. Multiple cycles of testing mean all staff can take part in the improvement journey.

The success of testing lies in what is learned from the test, no matter how the test turns out.

To test a new change/intervention use PDSA cycles. These have been briefly described already but are now explained more fully below.

*Figure 3: PDSA cycle*




***Plan***

In the planning phase decide what you are going to do differently – 'who, what, where and when'. Write down what you predict will happen when the intervention is tested and what success will look like. This helps you 'keep your eye on the ball' rather than all the things happening around it. Health care is a busy environment where distraction from the goal is a daily threat. If possible avoid making a large number of changes at once, or you will not know which change is responsible for the success or failure of the intervention.

***Do***

Carry out the plan exactly and collect information on what worked and what issues arose. This is the most exciting part of the cycle. Note any additional observations that might be of importance later or that might turn out to influence the outcome. This is especially important in the early PDSA cycles you complete.

### *Study*

Gather the team as soon as possible after the test for a short informal meeting. Analyse your data and any additional information gathered. Compare what was predicted against what actually happened. Ask these questions:

- What happened?
- What is the information telling us?
- What worked and what didn't work?
- Was the change properly executed?
- What should be adopted, adapted or abandoned?

### *Act*

Use new knowledge from the study phase to plan the next test. Agree on the change and adjust the measurement of the change if necessary. Plan it, do it, study it and act on the results. Adapt your plan based on what the results show, then start another PDSA cycle to re-test. It's important to understand how your tests of change impact on your results and to record each step.

Keep records and a description of the quality improvement journey. Remember there are no 'failed' PDSA cycles if you document as you go and learn from your tests of change.

**TOOL K page 43**

Tool K provides a template to guide you through a PDSA cycle.

The Improving Together website has an example of a real PDSA cycle (http://improvementmethodology.govt.nz/improving-together-stories). Behind the tab 'stories' is case study 4. This is about how a rest home reduced its falls rate by using orange dots to identify residents who need assistance to walk. The video demonstrates the crucial role played by the PDSA cycle.

## Communication

Good communication and collaboration support every part of an improvement journey by involving people, sparking new ideas, exploring procedures and techniques, and changing organisational cultures.

An effective communications strategy reinforces the success of the improvement journey by:

- developing language that wins 'hearts and minds'
- communicating the improvements to those closely involved
- developing tools that help frontline staff and leaders understand what needs to be done
- describing the involvement of staff and reporting success
- creating a 'joined up' approach that energises the project, maintains momentum and spreads new ways of working throughout organisations.

To present information in ways that will be understood and encourage involvement, you will identify your audiences and the perspectives they bring. For example, taking the time to ask questions and understand what motivates frontline staff is essential for shaping all communications with them.

Focus groups can be a useful way of uncovering issues that may support or neutralise the improvement. The results can then be used to develop communication objectives and deliver important messages.

A well-crafted key message conveys the focus of the improvement work in a short but memorable statement, reflecting the values and hopes of those involved. This is part of developing a 'hearts and minds' approach, which engages people at a practical and emotional level.

Real resident/family/whānau stories about how lives have been affected by quality and safety events are also key to engaging the hearts and minds of staff in a drive for improvement.[18] Use real events and personal consequences from your own facility to paint a vivid picture. This helps to create passion and commitment from staff that will sustain you on your improvement journey.

Listen to the views, thoughts and successes of frontline staff. This will encourage others to get involved in the improvement work. Gather as much information as possible on the progress and achievements of frontline staff, and communicate this widely.

It is important to provide resources for others to spread the message. These could include project summaries, the project plan or charter, key communication points/messages from meetings, visual aids, posters, etc, along with advice on how to use them.

When a quality improvement programme continues over a long period of time, the real challenge is how to maintain people's interest and momentum. Resist the temptation to change the messages and approach to 'freshen things up'. Keep your focus on the aim of the work, those who are delivering the changes and the differences the changes are making to everyone involved – residents, families/whanau and staff.

For further information, see the Health Foundation online communications toolkit: www.health.org.uk/collection/communications-health-care-improvement-toolkit.

18 *Ibid.*

## An improvement story

This is a fictitious story describing a possible improvement journey and how various parts of this quality improvement toolkit can be used.

### Background

The Townside Rest Home was concerned about the number of falls occurring there.

The facility uses the *Stay independent falls prevention toolkit for clinicians*[19] to develop an individual plan for each resident admitted. Each plan is reviewed regularly and whenever a resident falls.

Despite this, Townside residents were still having serious falls.

Facility staff know that staying active is important for the elderly to maintain quality of life and to reduce the risk of falling. However, a resident (Joan) recently suffered a fractured neck of femur from a fall and was struggling to recover from this and regain mobility.

Joan is an 85-year-old grandmother, who had been admitted to the facility six months prior to the fall.

The caregiver (Mary), who had been caring for Joan since her return from hospital, wanted to see what could be done to prevent injury from falls and reduce the risk of falling, while maintaining mobility for Joan and other residents at Townside.

### Identifying the problem

Mary looked at the facility data and noticed falls were occurring every month. Very few were as serious as Joan's fall but every fall carries a risk of serious harm to the resident.

The facility falls data could either have been displayed on a run chart (see Tool F) or by using a safety cross.[20]

TOOL F page 31

Mary decided that involving other team members would help her explore the issue.

### Building a team

Mary went to the senior nurse, Hannah, to ask who would be best to work with her. Hannah and Mary spoke to the facility manager to let them know what they were planning. The facility manager agreed to support the improvement work.

Hannah and Mary thought about who they would need on their team (see Tool A). They also wanted to include a consumer.[21]

TOOL A page 25

The team, once agreed and assembled, decided they wanted Mary to lead the work. Mary agreed.

Joan also agreed to join the team and was excited to think she may be able to help stop someone else having a similar experience.

19 www.hqsc.govt.nz/our-programmes/reducing-harm-from-falls/publications-and-resources/publication/2232/.
20 Downloadable at http://gembapantarei.com/2008/01/101_kaizen_templates_safety_cross.html.
21 For more about consumer engagement go to www.hqsc.govt.nz/our-programmes/partners-in-care/publications-and-resources/publication/2162/.

Mary scheduled regular meetings for the team. Hannah helped her set the agenda for the first meeting (see Tool B) and establish the improvement methodology – the Model for Improvement (see page 9).

TOOL B page 27

### Getting started

At the first meeting the team reviewed the facility data from incident reports, their run chart or recent safety crosses so they knew what was happening currently. They knew they would need an aim to guide them in their work (see page 10). They agreed on a SMART aim, which helped them decide what their outcome measure would be (see page 10). They needed to see what changes they were going to test before they could decide on their process measures. They documented everything in their meeting minutes and their charter (see Tool C).

TOOL C page 28

### After the meeting

Mary took the project charter and a copy of the meeting minutes to the facility manager to sign as sponsor. Mary would keep the manager informed with regular updates on the improvement work.

The manager asked Mary to speak at a staff meeting and a residents' meeting to communicate the work to other staff and residents, so everyone could support her and the team (see page 19).

### Analysing the problem

The team wanted to see if the facility had a general problem with falls or a more specific one. They decided to look at where the falls were occurring and how many in each area.

Using the safety crosses and/or their incident report data, they create a Pareto chart (see Tool H) of all falls at Townside in the last six months. They noted that 60 percent of falls were occurring in one area (Wing 1), 20 percent were in Wing 3, 10 percent were in Wing 2 and 10 percent were outside in the grounds.

TOOL H page 37

The team wondered why more falls were occurring in Wing 1 than either of the other wings. Hannah helped them to create a cause and effect diagram (see Tool G) to use their collective knowledge to analyse the cause of falls in Wing 1. Joan's contribution offered a different perspective. She helped them consider ideas they would not have thought of without her input.

TOOL G page 35

They had many causes on the branches of the cause and effect diagram. They drilled down into the causes using '5 Whys' analysis (see Tool J). They decided there were two main root causes on the diagram. These were:

TOOL J page 42

1. the old carpet in the corridor
2. the time of day – the corridor became very crowded around that time, with Wing 1 residents returning to their rooms, using the toilet and other residents using the corridor as a short cut to the library for activities after lunch.

The team's theory was that too many residents were using Wing 1 as a thoroughfare. They decide to test the theory with a PDSA cycle (see page 16).

### Observation

The Townside team were aware of the need to always go and look at what is really occurring. So they decided to observe Wing 1 for a week and take note of the number of people in the wing between 12.30pm and 2.30pm. Were these Wing 1 resident or others, and why were they in the wing? They would use process measures of the numbers of residents in the wing at any one time, checking every 15 minutes. They would also count how many of the residents were from Wing 1, how many were from other wings and how many staff were also there during this time.

They developed a check-sheet to document their findings (see Tool E) and planned who would collect data and when. They documented their plan on the PDSA template and carried it out over one week.

TOOL E page 30

### Study

The team met the following week to study the data they collected. They found out not only were large numbers of residents using Wing 1 at this time but also clean laundry was being delivered to residents' rooms, linen cupboards and bathrooms. This was noted as causing problems and several near misses on many of the checklists the team completed over the week.

### Act

The team revised their theory, now thinking that maybe it was the bulky linen trolley that was creating a hazard in the corridor for residents. They wanted to test the idea first before trying to change any other possible causes of congestion.

### Process diagram/flowchart

The Townside team decided to see if they could keep the linen trolley out of Wing 1 or any of the other wings during the crucial time period. They reviewed the linen process to see if this could be changed. They consulted the laundry worker (Jim) to see if he would work with them on this because he had the best information about how and why things were done that way. They mapped Jim's workflow on a flowchart (see Tool I) to see if there were alternative ways to do things that would improve the situation for both the residents and Jim.

TOOL I page 39

### Plan

Jim looked at his process. He suggested some changes he could make to his routine workflow so he could deliver laundry at lunchtime when the residents were all in the dining room. The team decided to test this idea and see if it reduced congestion, falls and near misses in Wing 1.

They documented the change idea in their project charter and PDSA cycle.

Mary updated the facility manager and went to the next staff meeting and residents' meeting to communicate how the team would test the change, how it might affect them and how they could help. They also posted notices around the facility.

Jim and the team designed a new flowchart for the linen process. They decided to test the process for both Jim and the residents in Wing 1. They still had the same outcome measure of falls in Wing 1, but their process measure became the amount of time taken to deliver the

laundry. (They started a baseline measure of this while they were going through the process of preparing for the change to start.)

The team also decided to monitor the experience for residents and staff by recording any resident complaints regarding laundry and getting staff feedback on the new process. These are sometimes called balancing measures as they help to monitor that a planned change does not create any unexpected side effects.

Falls are not a frequent occurrence, so it can be hard to see an improvement quickly. Process measures are more useful to judge the impact of a change. So, as well as these specific measures, the team continued the 15-minute monitoring between 12.30pm and 2.30pm on the check-sheet begun at the start, to see if the changes had any effect.

**Do**

The team tested the change for one week and then met the following week.

**Study**

The team looked at the data they had collected. The new process was not causing any delays for Jim in his work. The numbers of residents in the corridor had not significantly changed but there were fewer staff in the corridor because Jim was not there anymore. Observers completing the checklists noted there was less congestion without the big trolley blocking access. They observed no near misses or actual falls in the week of testing.

**Act**

The team decided to test the change for longer to check they hadn't just struck a good week.

Over a period of weeks, they gradually built confidence that keeping the trolley out of the corridor during peak traffic times was reducing the falls risk for residents. Reviews of their data on check-sheets, run charts and safety crosses showed there were no falls or near misses in the wing over the period of testing.

The team continued to monitor the improvement. They made some small adjustments with Jim to how he did his work and decided to make the change in process permanent.

They continued communicating with residents and staff, and celebrated the success of their work.

Joan felt valued by being a member of the improvement team and regained her mobility. As Joan's confidence increased, she wanted to continue to contribute to facility safety and is now chairing the residents' committee.

The improvement team are now exploring how they can reduce falls across the whole facility further.

## Other improvement resources

### Websites on health care improvement

*First, Do No Harm*: www.firstdonoharm.org.nz

Health Navigator: www.healthnavigator.org.nz/for-health-professionals/h/healthcare-improvement

Health Quality & Safety Commission: www.hqsc.govt.nz

Improving Together: http://improvementmethodology.govt.nz

Learn Online: http://learnonline.health.nz

Ko Awatea: http://koawatea.co.nz

### Books

Langley GJ, Moen RD, Nolan KM, et al. 2009. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. (Second Edition) San Francisco: Jossey-Bass.

Provost LP, Murray SK. 2011. *The Health Care Data Guide: Learning from data for improvement.* San Franscisco: Jossey-Bass.

### Articles

Batalden PB, Davidoff F. 2007. What is “quality improvement” and how can it transform healthcare? *Quality and safety in health care* 16(1): 2–3.

Berwick DM. 1996. A primer on leading the improvement of systems. *BMJ* 312(7031): 619.

Moen RD, Norman CL. 2010. Circling back. *Quality Progress* 43(11): 22.

Perla RJ, Provost LP, Murray SK. 2011. The run chart: a simple analytical tool for learning from variation in healthcare processes. *BMJ Qual Saf* 20(1): 46–51. doi: 10.1136/bmjqs.2009.037895.

Varkey P, Reller MK, Resar RK. 2007. Basics of quality improvement in health care. *Mayo Clinic Proceedings* 82(6): 735–9.

## Tool A: Team roles

Quality improvement depends on a team approach.

Dr RM Belbin investigated the different roles people need to play within a team.[22] Sometimes people need to play another role to make the team more effective.

A team needs a mix of the team roles, Belbin says:

> *A team is not a bunch of people with job titles, but a congregation of individuals, each of whom has a role which is understood by other members. Members of a team seek out certain roles and they perform most effectively in the ones that are most natural to them.*[23]

Belbin describes nine team roles:

**The plant**

Strengths: Creative, imaginative, free-thinking. Generates ideas and solves difficult problems.

Allowable weaknesses: Ignores incidentals. Too preoccupied to communicate effectively.

**Resource investigator**

Strengths: Outgoing, enthusiastic, communicative. Explores opportunities and develops contacts.

Allowable weaknesses: Over-optimistic. Loses interest once initial enthusiasm has passed.

**Coordinator**

Strengths: Mature, confident, identifies talent. Clarifies goals. Delegates effectively.

Allowable weaknesses: Can be seen as manipulative. Offloads own share of work.

**Shaper**

Strengths: Challenging, dynamic, thrives on pressure. Has the drive and courage to overcome obstacles.

Allowable weaknesses: Prone to provocation. Offends people's feelings.

**Monitor evaluator**

Strengths: Sober, strategic and discerning. Sees all options and judges accurately.

Allowable weaknesses: Lacks drive and ability to inspire others. Can be overly critical.

**Teamworker**

Strengths: Co-operative, perceptive and diplomatic. Listens and averts friction.

Allowable weaknesses: Indecisive in crunch situations. Avoids confrontation.

22 http://www.belbin.com
23 *Ibid.*

**Implementer**

Strengths: Practical, reliable, efficient. Turns ideas into actions and organises work that needs to be done.

Allowable weaknesses: Somewhat inflexible. Slow to respond to new possibilities.

**Completer finisher**

Strengths: Painstaking, conscientious, anxious. Searches out errors. Polishes and perfects.

Allowable weaknesses: Inclined to worry unduly. Reluctant to delegate.

**Specialist**

Strengths: Single-minded, self-starting, dedicated. Provides knowledge and skills in rare supply.

Allowable weaknesses: Contributes only on a narrow front. Dwells on technicalities.

## Tool B: Meeting agenda/minutes template

| |
|---|
| Name of organisation:<br>Department name:<br>Day and date:<br>Time of meeting:<br>Meeting location: |
| Leader:<br>Recorder:<br>Time-keeper:<br>Facilitator:<br>Participants: |

| Time | Method | Item | Aim / Action |
|---|---|---|---|
| | | 1. Clarify objectives<br>a.<br>b. | |
| | | 2. Review roles<br>Leader<br>Recorder<br>Time-keeper<br>Facilitator/Advisor | |
| | | 3. Review agenda | |
| | | 4. Work through agenda items | |
| | | 5. Review meeting record and summarise key points for communication to staff | |
| | | 6. Plan next agenda | |
| | | 7. Evaluate meeting | |

Adapted from © 2004, Trustees of Dartmouth College, Godfrey, Nelson, Batalden 09/02/03 110 Version 2: Rev 4/13/2004

## Tool C: Project plan/charter template

<table>
<tr><td colspan="2">Project name:</td><td>Date:</td></tr>
<tr><td colspan="3">Project sponsor:<br>Project lead:<br>Project team members:</td></tr>
<tr><td colspan="3">Aim:<br>What are we trying to accomplish?<br>How much by when?</td></tr>
<tr><td colspan="3">Problem statement:<br>Background to the problem/why area was selected</td></tr>
<tr><td colspan="2">Project scope:<br>Area(s) of focus</td><td>Metrics:<br>How will we know that a change is an improvement?</td></tr>
<tr><td colspan="2">Expected outcome(s)/goal(s):<br>Success criteria</td><td>Business case:<br>How does this affect patient safety, experience, costs, and revenue/other aspects?</td></tr>
</table>

## Tool D: Falls rate calculation example

Falls rate: Falls per 1000 bed-days

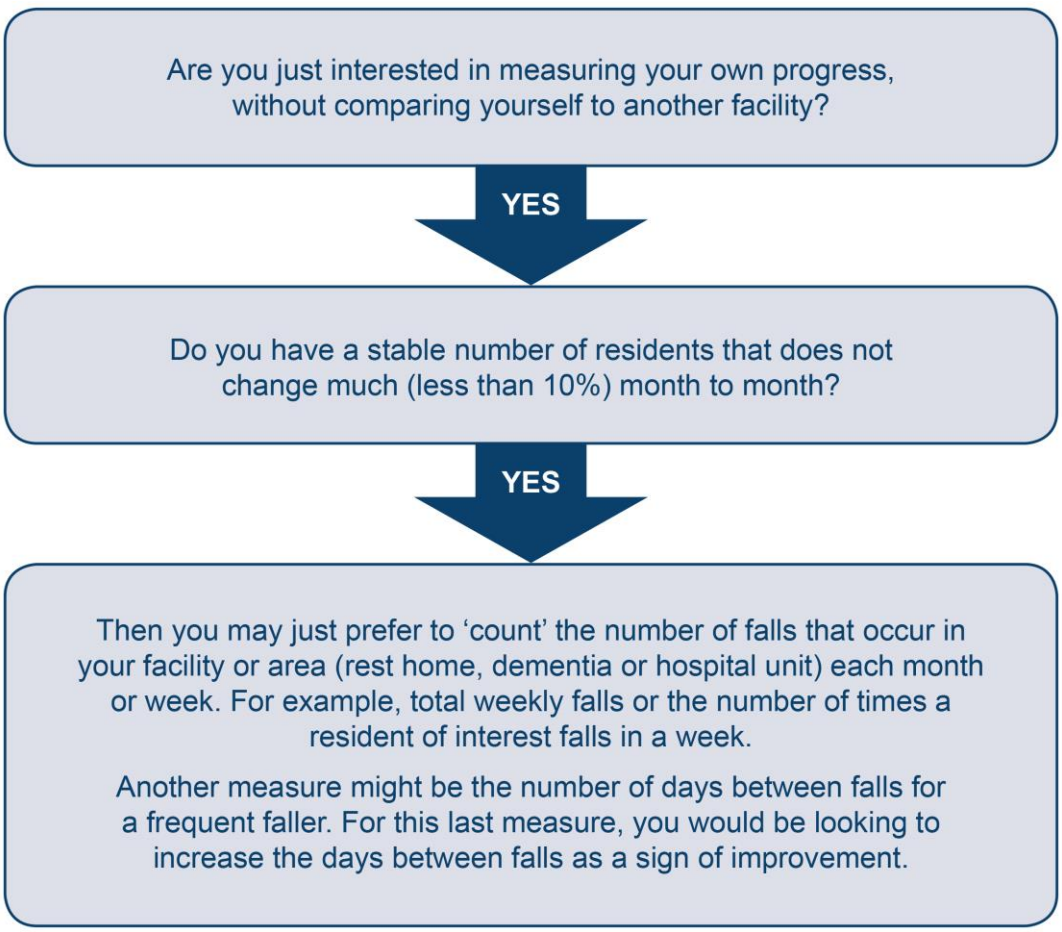
$$\text{Falls rate} = \frac{\text{Numerator: Number of falls per month}}{\text{Denominator: Number of residents X days in the month}} \text{ X } 1000$$

The numerator can be changed to any measure, eg, number of falls with harm per month, number of residents that had repeated falls, etc.

An Excel spreadsheet is available to download from the Commission website, which can be used to enter data and automatically calculate this rate: www.hqsc.govt.nz/our-programmes/reducing-harm-from-falls/projects/arrc-mini-collaborative/learning-session-two/.

Incident rates are calculated in this way so different-sized but similar facilities can compare falls rates with each other; so you are 'comparing apples with apples'. For example, if a 10-bed facility has five falls in the month and a 50-bed facility has five falls, which facility **may** have a problem?

It is important to remember the numbers are only part of the picture. If the 10-bed facility is a dementia facility and the 50-bed facility is a hospital-level facility, the picture changes. This again demonstrates the importance of 'comparing apples with apples'.



## Tool E: Check-sheet

A check-sheet is a structured, prepared form for collecting and analysing data. It is a generic tool that can be adapted for a wide variety of purposes. A check-sheet can help us answer the question: how often are certain events happening?

Use a check-sheet when:

- data can be observed and collected repeatedly by the same person, or at the same location
- collecting data on the frequency or patterns of events, problems, defects, defect location, defect causes, etc
- collecting data from a process.

### Procedure

- Decide what event or problem will be observed. Describe clearly so everyone understands what the problem or event to be observed is.
- Decide when data will be collected and for how long.
- Design the form. Set it up so data can be recorded simply by making check marks or Xs or similar symbols.
- Label the form.
- Test the check-sheet for a short trial period to be sure it collects the appropriate data and is easy to use.
- Each time the targeted event or problem occurs, record data on the check-sheet. Collect the data consistently and honestly. Ensure sufficient time is allocated for this task.

### Example

Telephone interruptions:

| **Reason** | **Day** | | | | | |
|---|---|---|---|---|---|---|
| | Monday | Tuesday | Wednesday | Thursday | Friday | Total |
| Wrong number |  |  |  |  |  | 20 |
| Info request |  |  |  |  |  | 20 |
| Boss |  |  |  |  |  | 19 |
| Total | 12 | 6 | 10 | 8 | 13 | 49 |

Which days were the worst for interruptions?

Which interruptions were most frequent?

## Tool F: Run charts

### How to construct a run chart[24]

There are seven steps involved in constructing a run chart:

1. The horizontal axis for the run chart will usually be a timescale. Appropriate time increments to develop the axis will typically be days, weeks or months. A useful practice is to label several future time increments even though no data yet exists for that timeframe. The scale should cover the time period of interest for the graph, not just the time when data is currently available.
2. Develop the vertical axis for the run chart. Choose a good scale that is easy to plot and read, and leaves ample room for future data that might be larger or smaller than the values used to create the initial run chart. Criteria for a good scale include:
    a. most of the data lies in about the middle half of the graph
    b. labelled values on the axis are round numbers and equally spaced.
    3. Plot the data point. Make a dot (or another symbol). Connecting the dots with a line is optional but the dots should always be distinguishable from the line. Data is communicated through the dots, not the line.
    4. Label the graph with a descriptive title. Label the horizontal axis with the sequence of the data. Label the vertical axis with name of the intervention or characteristic you are studying.
    5. Calculate and draw a median of the data on the run chart. The median is the number in the middle of the data set when the data is reordered from the highest to the lowest value. If the number of observations is even, the median is the average of the two middle values. The median is necessary in order to interpret a run chart. To analyse a run chart you need at least 10 data points.
    6. Add additional information to the chart. Add a goal or target line if appropriate. Annotate unusual events, changes tested or other pertinent information on the run chart at an appropriate time location.

### Interpreting run charts

There are four rules to identify non-random patterns in the data displayed on a run chart:

1. A **shift** in the process or too many data points in a run (six or more consecutive points above or below the median).
2. A **trend** (five or more consecutive points all increasing or decreasing).
3. Too many or too few **runs** (use a table to determine this one).
4. An ‘astronomical’ data point (explained below).

If one or more of the above rules apply to the run chart, this indicates the intervention tested has influenced the collected data. These results can be negative (not what you expected; it didn’t improve things or even made things worse) or positive (improvement seen; what you

24 Provost LP, Murray SK. 2011. *The Healthcare Data Guide: learning from data for improvement.* San Francisco, CA: Jossey-Bass.

predicted). The team needs to study the run chart and decide whether they are on track and then expand the test, then adapt or change the intervention.

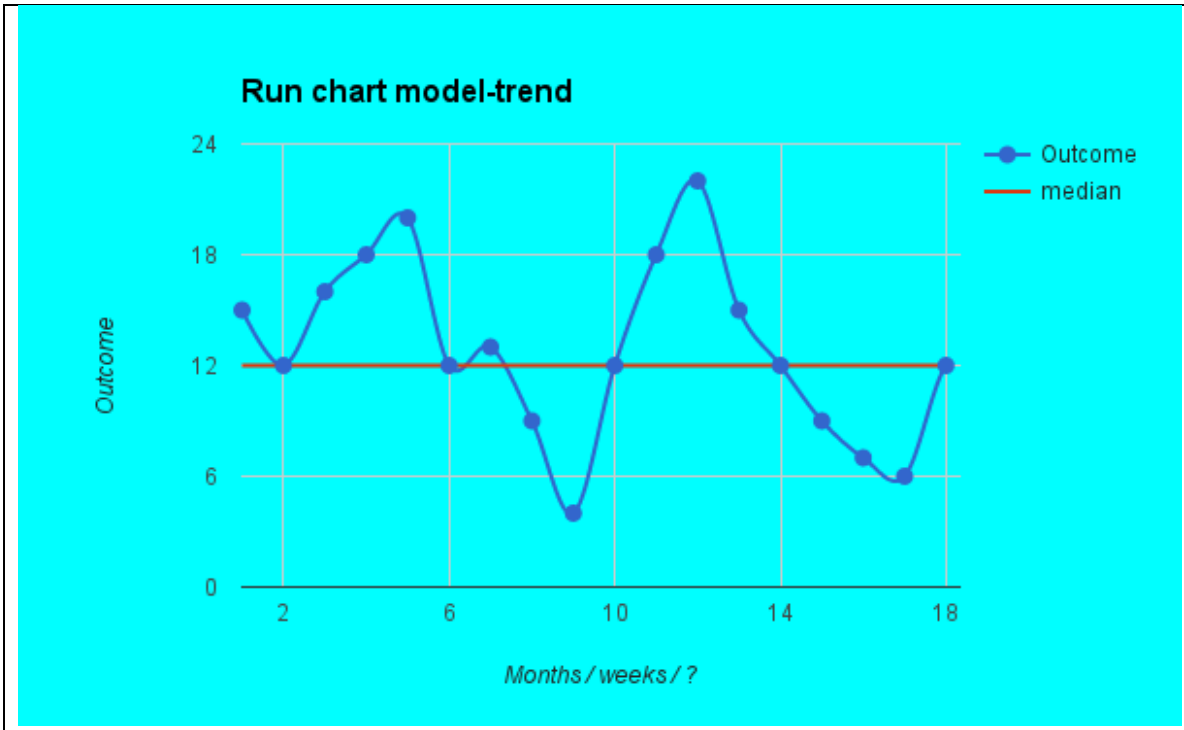
Provost and Murray describe a more in-depth analysis on the use of run charts in *The Healthcare Data Guide*.[25]

An ‘astronomical data point’ is used in detecting unusually large or small numbers. An astronomical data point is one that is obviously, even blatantly, different from the rest of the points; all studying the chart would agree the point is unusual. Astronomical points should not be confused with the highest or lowest data points, which every run chart will have. While rules 1, 2 and 3 are probability based and objective, rule 4 is subjective and recognises the importance of the visual display of the data in a run chart.

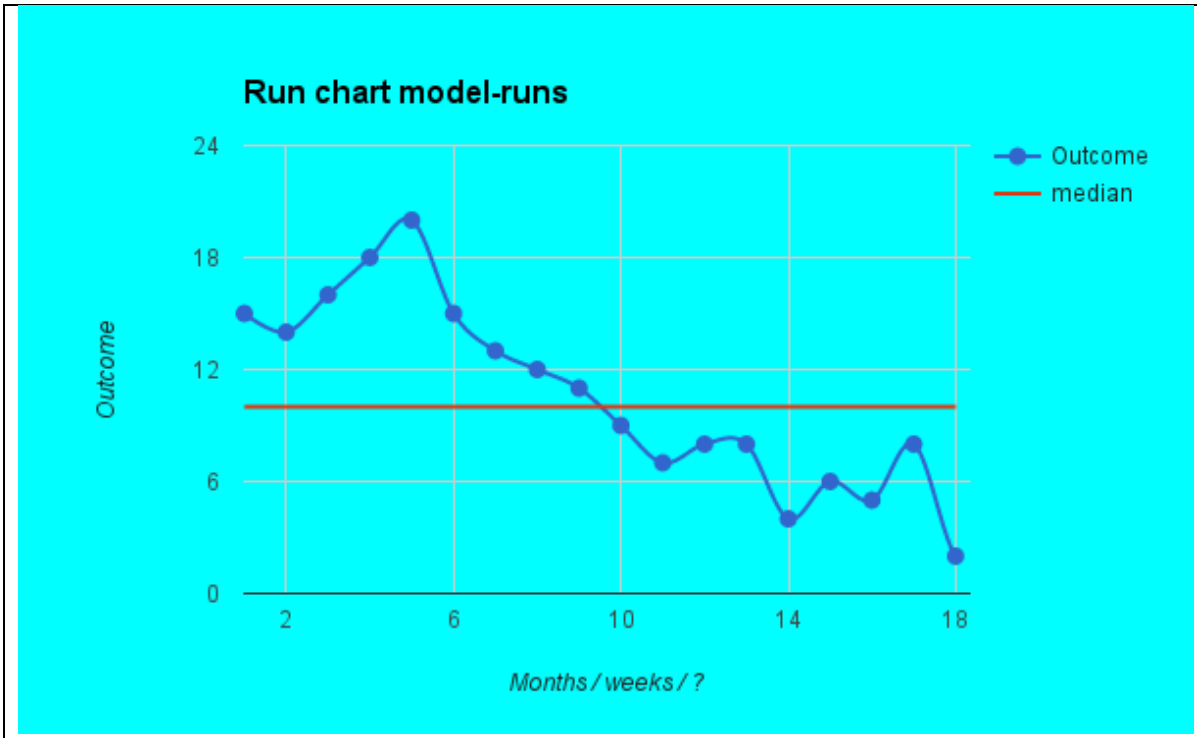
**Run chart analysis**


A shift is when six or more outcomes are positioned on one side of the median. In this example the outcomes between time moment three and eight are positioned above the median.

25 *Ibid.*




A trend is when five or more consecutive outcomes are going up or down. From time moment 12, five consecutive outcomes are going down.




A non-random pattern is signalled by too many or too few runs or crossings of the median. A run is a series of point in a row on one side of the median. An easy way to determine the number of runs is to count the number of times the line connecting the data points crosses the median and add one. In the example above, the data line crosses the median once we add one, which means there are two runs. The table below tells you if the number of runs

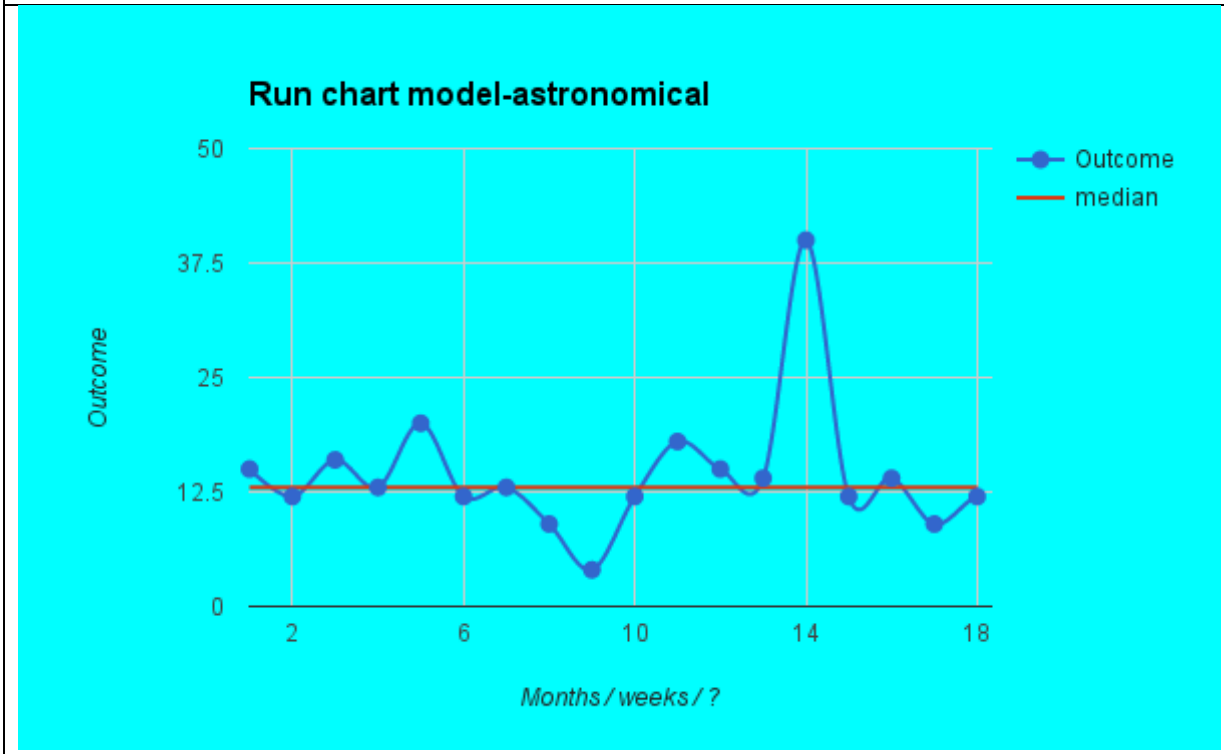
counted is too many or too few for the number of data points.

Table for checking too many or too few runs on a run chart:

| Total number of data point on run chart not falling on the median | Lower limit for number of runs (<than this is 'too few') | Upper limit for number of runs (>than this is 'too many') |
|---|---|---|
| 10 | 3 | 9 |
| 11 | 3 | 10 |
| 12 | 3 | 11 |
| 13 | 4 | 11 |
| 14 | 4 | 12 |
| 15 | 5 | 12 |
| 16 | 5 | 13 |
| 17 | 5 | 13 |
| 18 | 6 | 14 |

Source: Adapted from Swed FS, Eisenhart C. 1943. Tables for Testing Randomness of Grouping in a Sequence of Alternatives. *Annals of Mathematical Statistics* XIV(66): 87, tables II and III.

In this example there are too few runs for the 18 data points. You need at least six and there are only two. This is a clear sign of non-randomness.




The result on week 14 shows an astronomical point. This indicates that something changed at that time. We should seek to understand what caused that change and either replicate if it was a good thing, or prevent it occurring again if it was a bad thing.

## Tool G: Cause and effect (fishbone) diagram

### What it is

A cause and effect diagram helps to identify the main causes of a problem, including possible root causes.

### When to use it

- To collect and organise the current understanding of potential causes, issues or problems.
- To aid understanding that there are many causes contributing to an effect.
- To graphically display the relationship of the causes to the effect and to each other.
- To help identify potential changes to test for the quality improvement work.

### How to use it

- Identify the key problem (usually a negative statement).
- Work out major contributing factors to the problem – these are usually grouped into major categories. In health care, categories could include staff, patients, equipment, environment, measurements and processes.
- Brainstorm possible causes of the problem in these categories.
- Use observations to add to the diagram.
- It should show all possible causes relating to the problem.
- Analyse the diagram – you can use tools such as a Pareto chart (see Tool H) to discover areas on which to focus improvement efforts or use the 5 Whys (see Tool J) to check for root causes and inter-relationships.

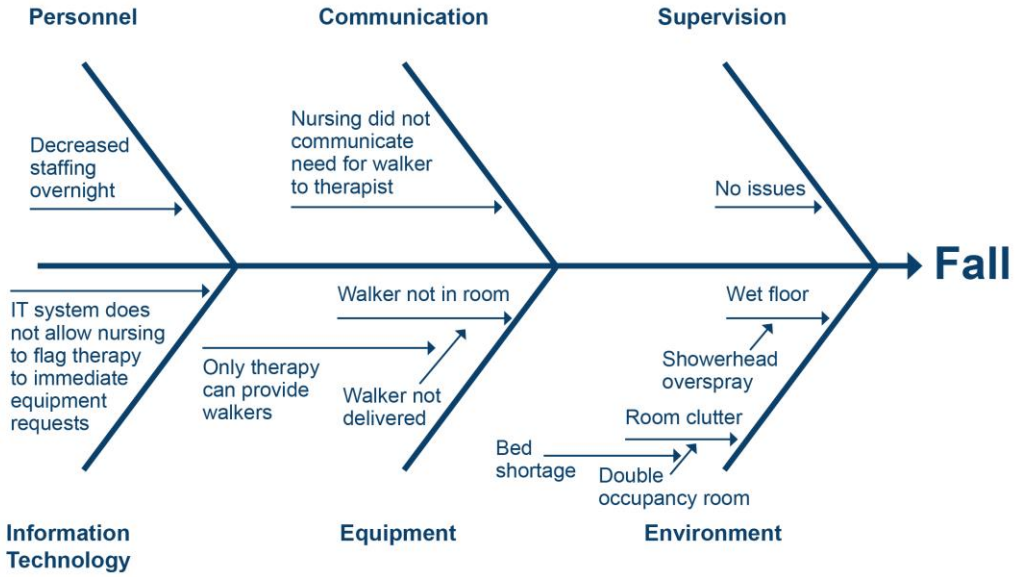
TOOL H page 37

TOOL J page 42

The figure below is an example of a cause and effect diagram analysing all of the factors that contributed to a fall.[26]

You can use the 5 Whys to drill down further into the identified causes on the branches of the diagram. For example, the walker was not in the room – why? The walker was not delivered – why? Only therapy can provide walkers – why didn't therapy provide the walker? This would be a good point to ensure you have a therapy team member on your improvement team.

26 Cumbler EU, Simpson JR, Rosenthal LD, et al. 2013. Inpatient Falls: Defining the Problem and Identifying Possible Solutions. Part II: Application of Quality Improvement Principles to Hospital Falls. *The Neurohospitalist* 3(4): 203–8. http://doi.org/10.1177/1941874412470666.




**Scenario: Patient with multiple sclerosis normally uses a walker. The night of admission, gets up to use bathroom alone and slips on water when trying to navigate IV pole left in doorway from other patient in the double occupancy room.**

## Tool H: Pareto chart

### What it is

A Pareto chart helps to visualise the most frequently occurring causes of a problem. It is based on the Pareto 80/20 principle, which asserts that a minority of the causes of a problem usually have the most or major impact on it.

### When to use it

TOOL G page 35

- Use a Pareto chart once the cause and effect diagram (see Tool G) is completed as it can help to identify the Pareto areas to work on first.
- Direct your efforts to the biggest improvement opportunity. Do this by highlighting the key causes of a problem in contrast to the multitude of insignificant causes.

### How to use it

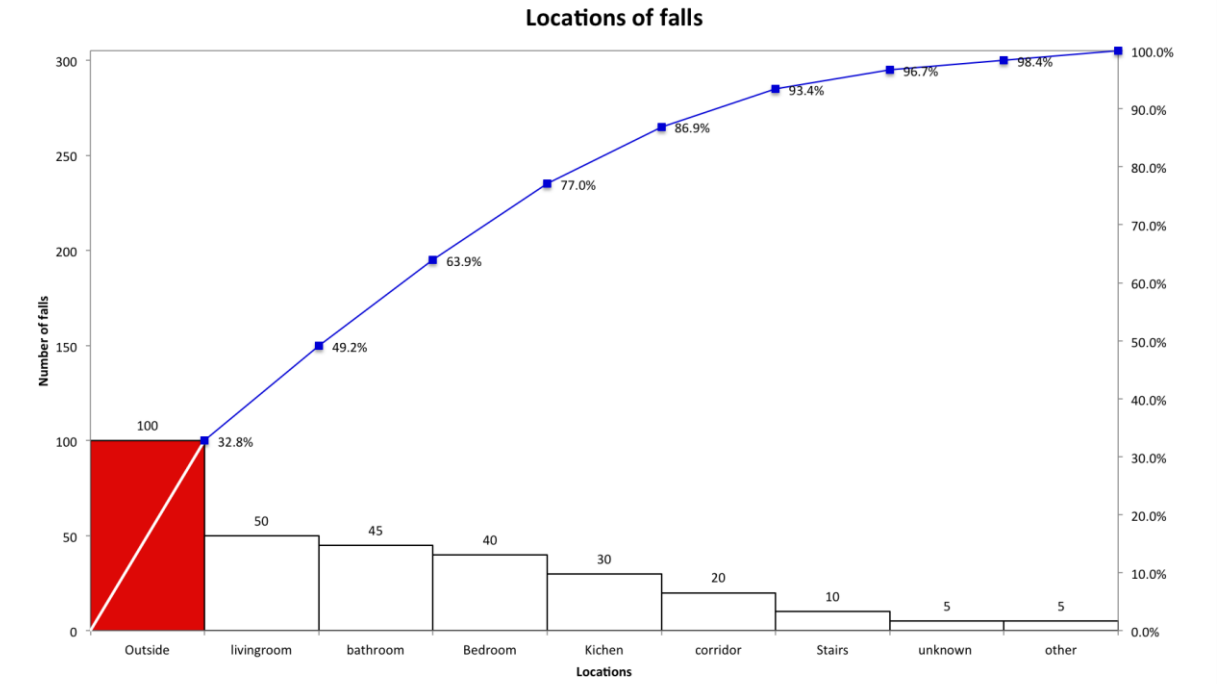
- Determine the categories and the units for comparison of the data, such as frequency, cost or time.
- Total the raw data in each category then determine the grand total by adding the totals of each category.
- Re-order the categories from largest to smallest.
- Determine the cumulative percent of each category (ie, the sum of each category plus all categories before it in the rank order, divided by the grand total and multiplied by 100).
- Draw and label the left-hand vertical axis with the unit of comparison.
- Draw and label the horizontal axis with the categories. List the categories from left to right in rank order.
- Draw and label the right-hand vertical axis from 0 to 100 percent. The 100 percent should line up with the grand total on the left-hand vertical axis.
- Beginning with the largest category, draw bars for each category representing the total for that category.
- Draw a line graph beginning at the right-hand corner of the first bar to represent the cumulative percent for each category as measured on the right-hand axis.
- Analyse the chart. Usually the top 20 percent of the categories will comprise roughly 80 percent of the cumulative total.

### Tips

- Pareto charts are useful displays of data for presentations. They show you are focused on the most significant factors.
- Use the objective data collected to perform Pareto analysis as this can provide a more accurate picture of causes rather than basing decisions on the opinions of team members.
- If there is no clear distinction between the categories (ie, if all bars are roughly the same height or half of the categories are required to account for 60 percent of the effect), consider organising the data in a different manner and repeating the Pareto analysis.
- Pareto analysis is most effective when the problem is well defined.

**Example**

A health care facility wanted to identify at what location in the facility the most falls occurred. To do so, they analysed the fall incident reports over a period of two years. They added up the number of falls for each location. The Pareto chart below was the result.




Pareto chart displaying the number of falls that occurred on the various locations in and around the facility. From this chart it is evident most falls occurred outside the facility (32 percent).

The bars on the chart display the actual number of falls that have occurred in each location. The line rising from left to right shows the percentage of the total that each category or bar represents of the total. This is to help you focus on the most important categories. So here you can see that if you reduce outside falls and living room falls, you may potentially prevent 50 percent of all falls. This could prevent a focus on falls on the stairs which would not have the greatest benefit for the residents.

## Tool I: Process mapping

A process is a series of steps or actions performed to achieve a specific purpose. All work is made up of processes. A process map is a pictorial representation of the series of actions that comprise a process.

Process mapping is undertaken to describe and understand the work being done. When used as an improvement tool, process mapping can help you identify:

- gaps and critical steps
- areas of complexity and double-ups
- inefficiencies and waste.

Process mapping can also help you reach consensus on what an improved process should look like.

There are many types of process maps. We have focused on developing a basic flowchart. The example below describes a simple process for turning on an alarm.

*Figure 4: Alarm flowchart*

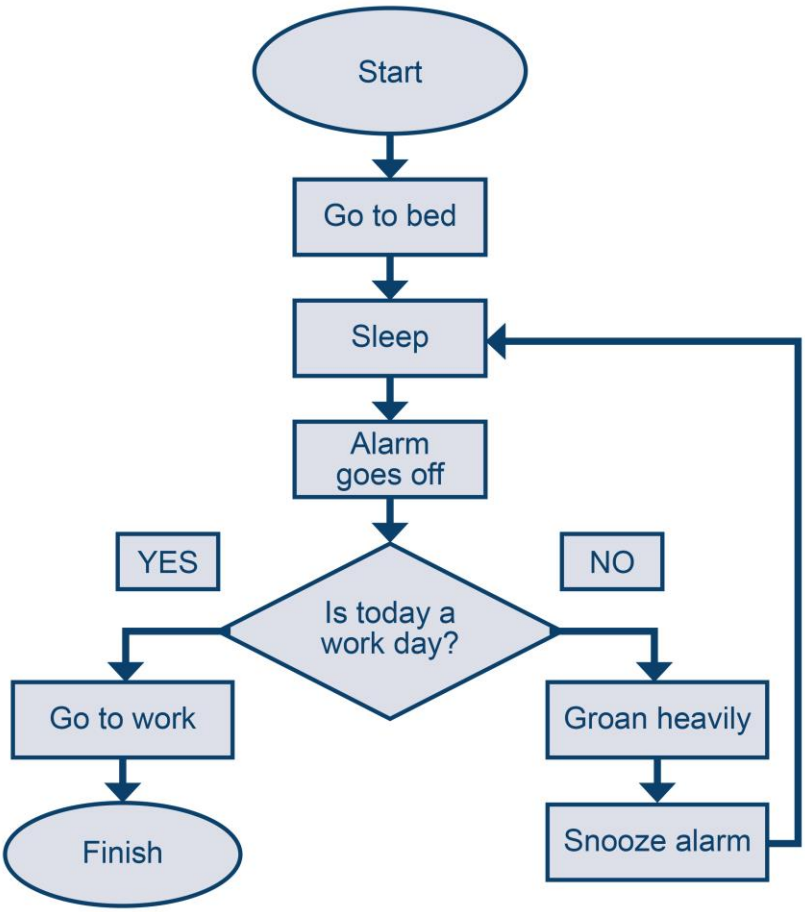
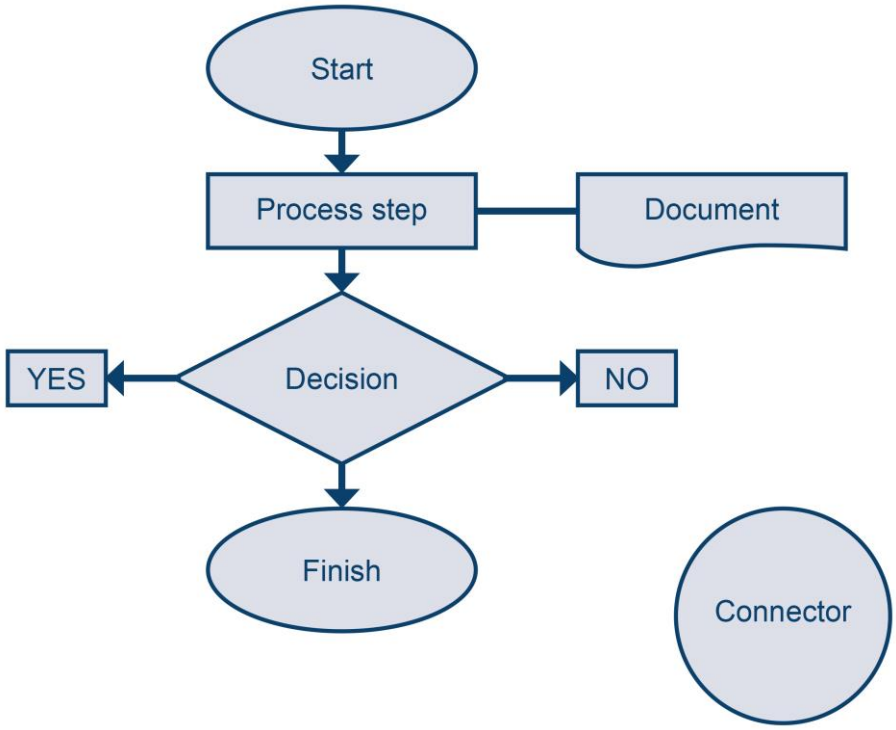


*Figure 5: The meaning of symbols used in process maps or flowcharts*



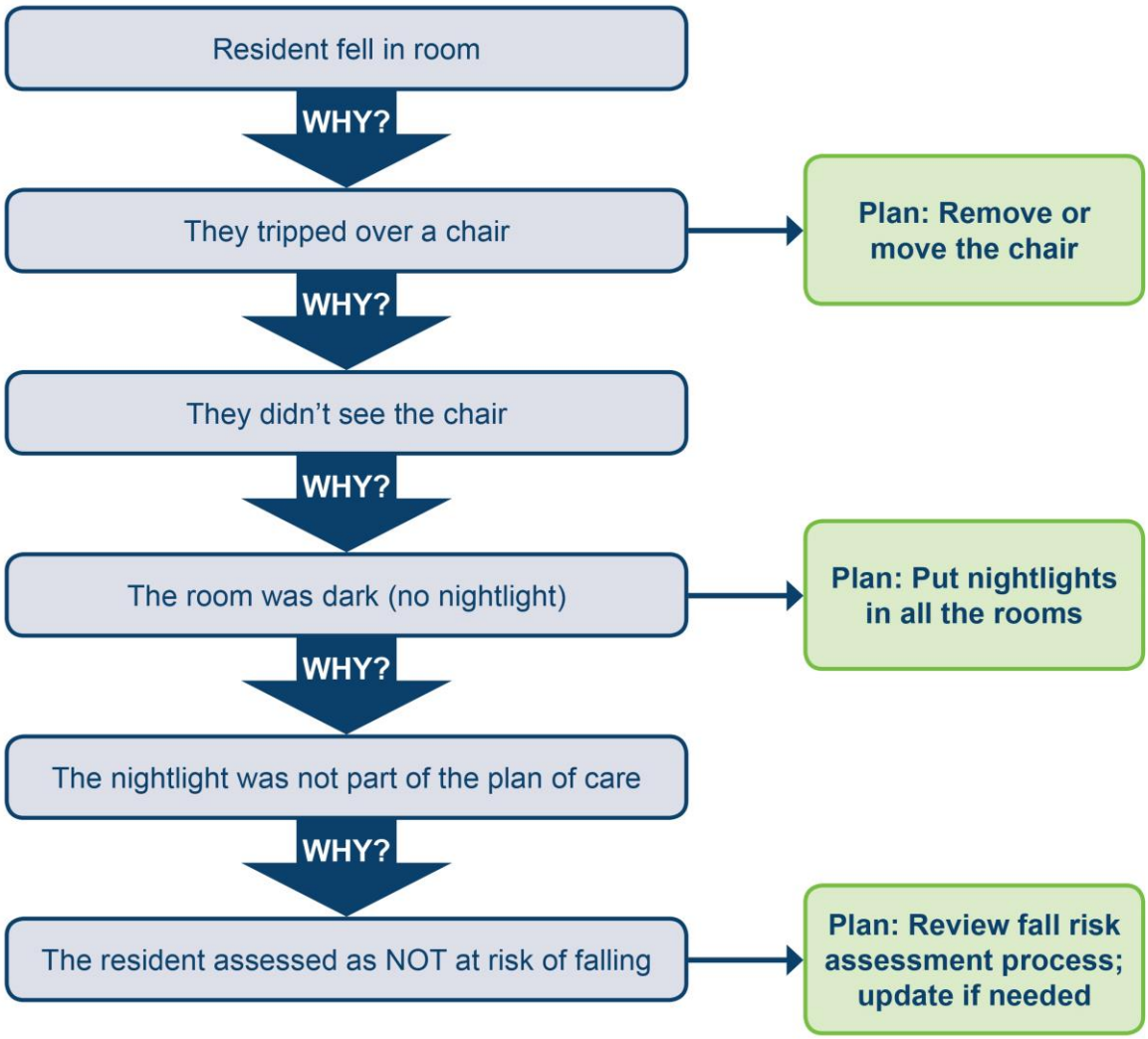

A process must always have a start and finish. The process steps are described in the square boxes and any documents attached to the process are described in the shape shown above. A decision diamond is used to show when the process may go in different directions depending on the answer to a question. There must always be at least two directional arrows out of the decision diamond. The round shape is used to show the diagram is carried onto another page or part of another process, eg, in our television process you might describe the process for contacting the television repair man in another flowchart and use a connector to say: see television repair man process.

**Process mapping procedure**

1. Gather a team of the people who are involved with working in the process. Between six and eight people is best.
2. Decide on the start and finish of the process you are going to map.
3. Use sticky notes to document the process steps as described by the team members as they actually happen.

4. Check the completed process map against how it happens in reality. Go and look. Share the process map with other team members and get their input.
5. Identify the waste and duplication in the process map.
6. Remap the process to be the ideal process.
7. Plan how you are going to make the changes needed to make the ideal a reality. Use the Model for Improvement:
    a. Answer the three questions at the top of the Model for Improvement.
    b. Ensure you have a plan to measure the effect of your changes and review the results.
    c. Plan–do–study–act.

## Tool J: Using the 5 Whys[27]




27 Taken from www.nasvh.org/Conferences/2013SummerHandouts/Haffenreffer-Falls-Investigation-Guide-Toolkit-How-To-Guide.pdf.

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## Tool K: PDSA cycle checklist[28]

<table>
<tr><td>Cycle #<br>Meeting # – date</td><td>Start date:<br>End date:</td></tr>
<tr><td>Objective of cycle</td><td>____Collect data to develop a change ____Test a change* ____Implement a change**<br>Short objective of the cycle:</td></tr>
<tr><td>Plan<br> 
</td><td>Questions:<br>1. ?<br>Prediction:<br>2. ?<br>Prediction:<br>3. ?<br>Prediction:<br>4. ?<br>Prediction:</td></tr>
<tr><td rowspan="2">Note:<br><br>*For test cycles reference p96 of Improvement Guide for testing checklist<br>**For Implementation cycle reference p136 of Improvement Guide for implementation checklist[29]</td><td>Test/Implementation plan:<br>What change will be tested or implemented?<br>How will the change to be tested or implementation be conducted (consider small scale early)?<br>Who will run the test or implementation?<br>Where?<br>When will the test or implementation take place?</td></tr>
<tr><td>Collect data plan (usually required for all PDSA cycles):<br>What information is important to collect?<br>Why is it important?<br>Who will collect the data?<br>Who will analyse the data prior to study?<br>Where will data be collected?<br>When will the collection of data take place?<br>How will the data (measures or observations) be collected?</td></tr>
</table>

[28] The form is part of IHI QI 106 course: Mastering PDSA cycles and run charts (www.ihi.org/education/ihiopenschool/courses).
[29] Langley GJ, Moen RD, Nolan KM, et al. 2009. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. (Second Edition) San Francisco: Jossey-Bass.

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|---|---|
| **Do**<br>  <br> | **Observations:**<br>Record observations not part of the plan.<br>Did you need to modify the original plan?<br>If so, how?<br>Begin analysis of data (graph of the data, picture). |
| **Study**<br>  <br> | **Questions:** (copy and paste questions and predictions from plan above and add results. Complete analysis of the data. Insert graphic analysis whenever possible.)<br>1. ?<br>Prediction:<br>Learning (comparison of questions, predictions and analysis of data):<br>2. ?<br>Prediction:<br>Learning:<br>New Issues:<br>Summary: |
| **Act**<br>  <br> | Describe next PDSA cycle; new questions to answer/decisions made/action to be taken. |
| **Ad hoc contributors** | Recognise subject matter experts and others who have contributed to the learning. |