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HOW TO Guide for quality improvement



Foreword

It is a timely opportunity for this set of HOW TO Guides to arrive just as the use of methods of quality improvement is accelerating in health systems throughout Africa and other developing, or resource constrained, countries. Under a variety of banners such as “health systems strengthening”, “implementation research”, ‘systems improvement”, “quality improvement” and many others, these basic methods from the science of improvement are being used to improve the health and health care systems.

Designed especially for Africa and other developing countries, these HOW TO Guides make the tools and methods of improvement readily available to Africa and other developing countries in a very practical and appealing way. While the hands-on examples provided include applications in health systems dealing predominantly with HIV, PMTCT, and TB, the very accessible material is easily adapted to other sectors. The target audience for these HOW TO guides are healthcare workers or people working for non-government organizations supporting health care who are implementing or managing improvement projects. They can guide those completely new to improvement methodologies or provide a refresher to those with previous experience.

The HOW TO guides are comprehensive, covering philosophies such as the psychology of change, developing changes, sustainability, and spread and also the use of specific tools like process maps, PDSA cycles, and run charts. Using these HOW TO guides as part of training programs or as tools used for direct applications by Individuals and improvement teams, will add great value.

I highly recommend these tools and know they will add tremendous value to individuals and organisations seeking to improve.

Lloyd Provost

Associates in Process Improvement, Austin, Texas, USA

Co-Author: *The Improvement Guide, Quality Improvement through Planned Experimentation,* and *The Health Care Data Guide.*

MODULE 1
HOW TO USE THE MODEL FOR
IMPROVEMENT

MODULE 2
HOW TO DEVELOP IDEAS FOR CHANGE
THAT MAY LEAD TO AN IMPROVEMENT

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HOW TO PRODUCE AND ANALYSE
A PROCESS MAP

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MODULE 10
HOW TO USE PSYCHOLOGY TO HELP
SECURE AND SUSTAIN IMPROVEMENTS



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MODULE
one

1

HOW TO
Use the model
for improvement

The Aurum Institute would like to acknowledge and thank the authors, Cathy Green (Institute for Healthcare Improvement) and Lauren de Kock (Aurum Institute) for their insight, dedication and vision.

The Authors would also like to thank Lloyd Provost, Co-Author: *The Improvement Guide*, *Quality Improvement through Planned Experimentation*, and *The Health Care Data Guide* for his editorial guidance, direction and wisdom. The richness of the material and its applicability to developing countries, specifically South Africa, has further been enriched by the contribution and insight of the following

Aurum Institute advisors, area managers and mentors:
Patricia Chauke, Alinah Denge, Thabiso Gaothosa, Caciua Maepa, Neo Masike, Amos Ndlovu, Jasantha Odayar, Craig Parker, Bonolo Pitse, Sylvia Radingoana, Rudzani Ramagundo, Msanyana Skhosana

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HOW TO GUIDE FOR QUALITY IMPROVEMENT

“

This model is not magic, but it is probably the most useful single framework I have encountered in twenty years of my own work on quality improvement

Don Berwick

”

Module one

HOW TO USE THE MODEL FOR IMPROVEMENT

In this **HOW TO** guide we cover:

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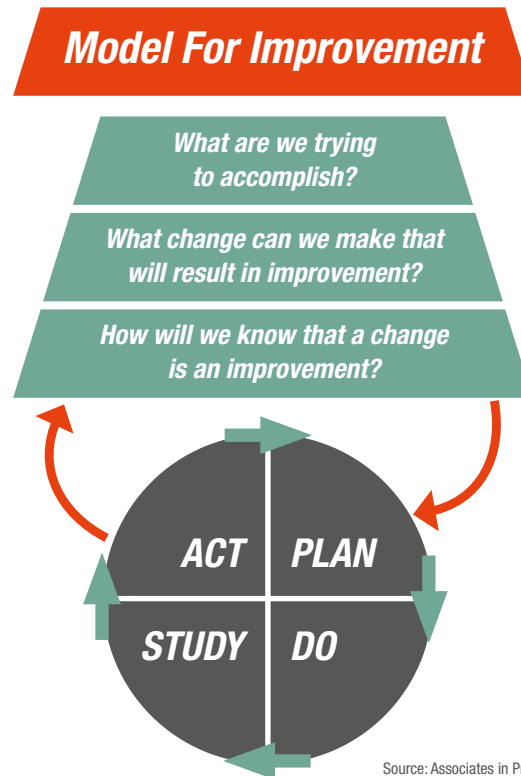
Introduction

The Model for Improvement was developed by the Associates in Process Improvement in the late 1980s/early 1990s. It was designed to capture their extensive learning of how to secure improvements drawing from the theories of Edward Deming¹ (Langley et al 2009²). This framework has become the bedrock of improvement activity performed over decades and across the globe.

The Model for Improvement asks **three questions that are fundamental to making improvements**

- › **What are we trying to accomplish?**
- › **What change can we make that will result in improvement?**
- › **How will we know a change is an improvement?**

In combination with the Plan-Do-Study-Act (PDSA) test cycle (see HOW TO Module 5) it is the **foundational framework for successful improvement activity**. Let us have a look at each question in turn.



¹ Deming W.E., 2000. *The New Economics: For Industry, Government, Education*. 2nd ed. The MIT Press, Cambridge, USA

² Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W., Norman, C.L. & Provost, L.P., 2009. *The Improvement Guide – A Practical Approach to Enhancing Organisational Performance*. 2nd ed. Jossey-Bass, San Francisco, USA

The three questions that are fundamental to making improvements

1. What are we trying to accomplish?

This encourages us to think about our aim.

This should be:

specific – we can describe it clearly and precisely who will benefit, what will be achieved?

measurable – we need to be able to use data to tell us whether our aim has been achieved

ambitious – when we set our aim we may not know how we are going to achieve it but this shouldn't stop us declaring a bold target if we know that it is what our customers need or expect

yet achievable – we may not know how we are going to achieve our aim but we should have the will, some ideas, and a means to execute it³

relevant – if we need resources or support to achieve our aim, it will need to be meaningful to others

time-bound – we need to be clear about when we expect to achieve our aim

If our aim has a timeframe some distance away (e.g. 2 years from now), we can set ourselves interim targets or **milestones** to help us know we are making adequate progress and keep us motivated.

EXAMPLE OF AN AIM:

- › I aim to lose 5 kgs in weight by the start of my holiday in 6 weeks' time
- › Tambo Clinic aims to reduce its TB treatment defaulters from 37 to 10 percent or less by the end of February 2014

WHAT IF I FAIL?

We live and work in a culture where failure is looked down on, even punished. We've therefore learnt, to set unambitious aims so that we avoid any criticism arising from failure.

However, the people we really look up to are those who have dared to **believe that the extraordinary is possible**. Think of Nelson Mandela, Usain Bolt, the Apollo Space Mission programme.

Even if we don't quite make our target, if we've set ourselves an ambitious aim our failure is usually so much greater than others' success. And if we try things out that don't work, we've learned something really valuable; they didn't work!



When asked by a critical journalist how it felt to have failed 1000 times, Edison is said to have replied:

"I did not fail one thousand times; I found one thousand ways how not to make a light bulb"

3. Nolan, T.W., 2007. *Execution of Strategic Improvement Initiatives to Produce System-Level Results*. IHI Innovation Series White Paper. Cambridge, MA: Institute for Healthcare Improvement. Available at www.IHI.org



‘Good Will Hunting’



Sometimes we are limited by our own beliefs of what is possible. Have you seen the movie “Good Will Hunting”? In the early stages of the film we see Will doing his work as a caretaker in a university. He is young, good looking and, as we are to discover, he is very intelligent. But he’s from a poor background and attends the university to wash its floors and clean the toilets, not to study. One Friday afternoon a Maths lecturer puts a complex formula up on the board. He explains that the best Mathematicians in the world are still trying to solve it. He jokingly invites his students to have a go themselves.

Will arrives for work that evening. He sees the formula and copies it down. He doesn’t know it’s proved impossible to solve. He works on it over the weekend and before classes start on Monday he writes the solution up on the board. The lecturer is completely amazed and is desperate to find out who the genius is who’s solved the problem.

Did Will have an advantage in not knowing the maths formula had never been solved? He didn’t expect to fail and he didn’t.

2. “What change can we make that will result in improvement?”

This question directs us to thinking about changes we could make that may help us achieve our aim. We often call these **change ideas**. We know we **have to make a change to see an improvement. However, not every change will be an improvement.**

There are lots of different techniques and tools we can use to help us identify changes that are likely to be successful. We can:

- › compare ourselves with others who are doing better than we are and work out what they are doing differently. This is called **benchmarking**
- › study and ask experts to find out what is **known best practice**
- › use **root cause analysis** tools to try and discover what is **the underlying cause of us not achieving our aim**. These include **5 whys** and **fishbone**
- › use **creativity tools** such as **provocations⁴** and **random words⁵** to help us think more innovatively about what changes might lead to improvement

- › consult lists of **change concepts⁶** (e.g. “task shifting”, “reducing waste”) to see if they offer any hints as to what we could do differently
- › **map** key steps in the **processes** associated with our aim to help us see where **process improvements** could be made

For more information, see HOW TO Module 2.

The Model for Improvement encourages the use of **PDSA** cycles to test changes and determine if they are effective in securing improvements before implementing them (see below and HOW TO Module 5).



“Here is Edward Bear, coming downstairs now, bump, bump, bump, on the back of his head, behind Christopher Robin. It is, as far as he knows, the only way of coming downstairs, but sometimes he feels that there really is another way, if only he could stop bumping for a moment and think of it”

EXAMPLE OF CHANGE IDEAS:

- › Reducing the numbers of calories consumed every day to 1,200 by reducing intake of carbohydrates and fats
- › Asking community care workers to follow up patients on TB treatment who are >7 days late in returning to the clinic for repeat prescriptions by visiting them in their homes

4 De Bono, E., 1970. *Lateral Thinking: Creativity Step By Step*. New York: Harper & Row

5 De Bono, E., 1994. *Teach Your Child How to Think*. London: Penguin Books

6 Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W, Norman, C.L. & Provost, L.P., 2009. *The Improvement Guide – A Practical Approach to Enhancing Organisational Performance*. 2nd ed. Jossey-Bass, San Francisco, USA



3. “How will we know the change is an improvement?”

This question in the Model for Improvement speaks to **measurement**. In order to know our change led to an improvement we have to find a way of measuring something that would **demonstrate we've achieved our aim**; for example, the amount of money we have saved, the distance we can run. This is known as our **outcome measure**. Before we start making any changes we need to find out **how we are currently doing against our outcome measure** – how much money have I already

saved, how far can I run now? This is known as our **baseline**. We then need to observe what happens to our outcome measure as we introduce different changes.

We also want to be sure we are **making the changes we planned so we need to introduce a process measure that will tell us**. The **process measure** relates to the change **and tells us how well we are doing that change or step in the process**.

❑ EXAMPLE OF OUTCOME MEASURES:

- › Weight in kgs
- › Percentage of TB patients who failed to return to the clinic for their repeat prescription >7 days after their due date this month



❑ EXAMPLE OF PROCESS MEASURES:

- › Calories consumed in a day
- › Percentage of TB patients who were > 7 days late in picking up their repeat prescriptions whose names were passed on to the community healthcare worker
- › Percentage of the same patients who were followed up by the community healthcare worker in their own homes



Why do you need both an outcome and a process measure?

Imagine you were trying to lose some weight and you decided to go on a strict diet. After two weeks you weigh yourself and you haven't lost anything. Frustrated, you abandon your diet and conclude it didn't work, it didn't lead to an improvement. However, maybe you didn't stick to the diet as closely as you were supposed to. Maybe you cheated a little, adding snacks and increasing portion sizes when you were really hungry. If you measure how closely you are following your plan of change you are in a better position to answer the question "how will we know the change is an improvement?"

We live and work in complex systems where **actions in one part of that system can have an unexpected impact in another part of the system**. A change could lead to an improvement in the performance area you are focussing on yet have a negative effect somewhere else. **EXAMPLE** you could find your dieting is helping you lose weight but you are falling asleep at work.

These consequences are not necessarily negative. You could find, for example, **you are saving money on your grocery bill because you are eating less**. If you are concerned or interested in these **potentially unplanned consequences of a change you can develop measures to monitor them**. These are known as **balancing measures**. For more information, see HOW TO Module 4.

EXAMPLE OF BALANCING MEASURES:

- › How much your grocery bill is each week after starting your diet (this could be positive or negative)
- › The time community healthcare workers spend visiting patients with other conditions after being assigned to follow up TB defaulters





WHEN BALANCING MEASURES WERE NEEDED

Healthcare Improvement Project – Afghanistan was running a Learning Collaborative to reduce maternal mortality. One of the early change ideas their primary healthcare clinics identified was to emphasise during antenatal visits the importance of planning for the birth and understanding danger signs that signalled the women's health was at risk.

Midwives attended a workshop after they'd been testing this change and proudly reported their outcome measure showed the women could remember the danger signs they'd been taught. However, one or two did point out that the antenatal consultation was now so long some women left at the end of the day without being seen. So some patients were now getting a deluxe service, while others were getting no service at all.

The midwives were advised they should continue to adapt and test their change idea until the women got the information they needed and everyone got seen. This led to the introduction of group counselling.

How do we interpret our data?

The change has led to an improvement when:

- › outcome measure shows there is improvement and
- › process measure shows we did the change we said we were going to do

Explanation:

The change was introduced and we saw improvement – we deduce the one probably contributed to the other

The change has not led to an improvement when:

- › outcome measure indicates there has been no improvement and
- › process measure tells us we did make the change we planned to

Explanation:

The change was introduced and we saw no improvement – we deduce the change wasn't effective in securing an improvement

- › outcome measure indicates there has been an improvement and
- › process measure shows we did not introduce the change as we'd planned

Explanation:

We saw an improvement without the change being introduced so we can't attribute the improvement to the change

We don't know if the change could lead to an improvement when:

- › outcome measure is telling us we've made no improvement and
- › process measure shows we did not introduce the change as we'd planned

Explanation:

We haven't seen an improvement but we haven't introduced the change properly so we still don't know whether the change could lead to an improvement

OR

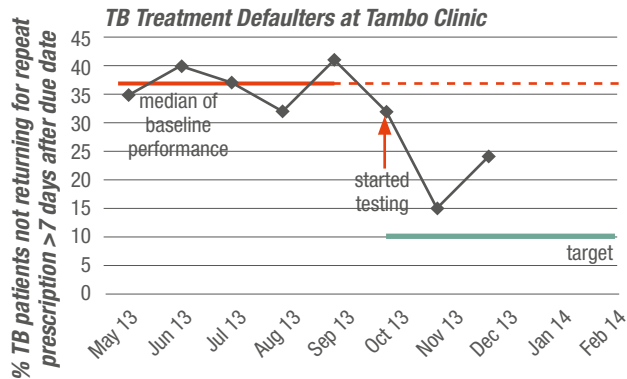
Run charts

In improvement work, we plot our outcome measures over time so that we can see:

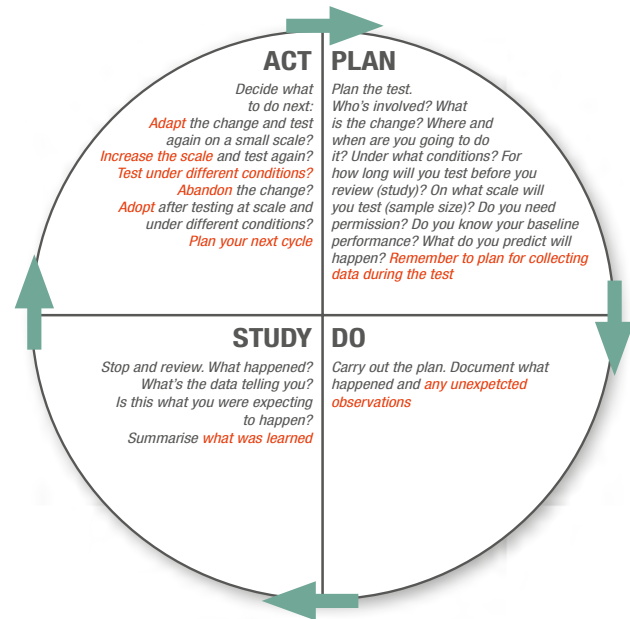
- » what performance was like before the change
- » what happens as we introduce changes
- » what performance was like after making the change
- » whether performance is sustained once improvements have been secured.

For more information on plotting and interpreting run charts see HOW TO Module 6.

EXAMPLE OF A RUN CHART:



Plan-Do-Study-Act (PDSA) cycles



The Model for Improvement introduces us to the principle of **testing out our changes while monitoring outcome and process measures so that we know they are leading to an improvement before we implement them**. Testing also allows us to make any **necessary modifications** to our original idea **before we make it permanent**. We test using a framework called the Plan-Do-Study-Act cycle. We initially test on a very small scale (e.g. for a few hours or days or on a small number of patients) to see if our change is looking promising.



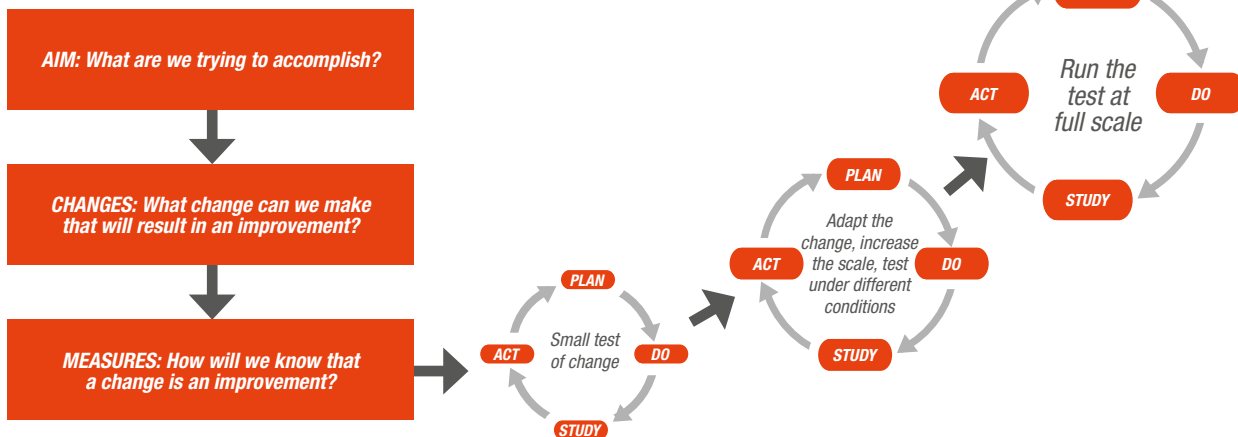
We **PLAN** to introduce our change on a defined sample e.g. the next 5 patients or over a limited period of time e.g. for the next hour, on Tuesday and then **DO** what we planned and record what happens. Once we've carried out our plan, we stop and **STUDY** our observations and measures. What is our data telling us? Did we see an improvement in our outcome measure during the period we were running our test? Were we able to do the change we planned to do? Were there any positive or negative consequences associated with introducing the change that we hadn't anticipated? Then we **ACT**. What are we going to do next? If the change shows promise but needs to be modified slightly to get it to work even better, we adapt it and run the test again on a small scale. If the idea worked really well and it doesn't need adapting we increase our sample size and test

again. If the change showed no improvement at all we may decide to abandon it and test another change.

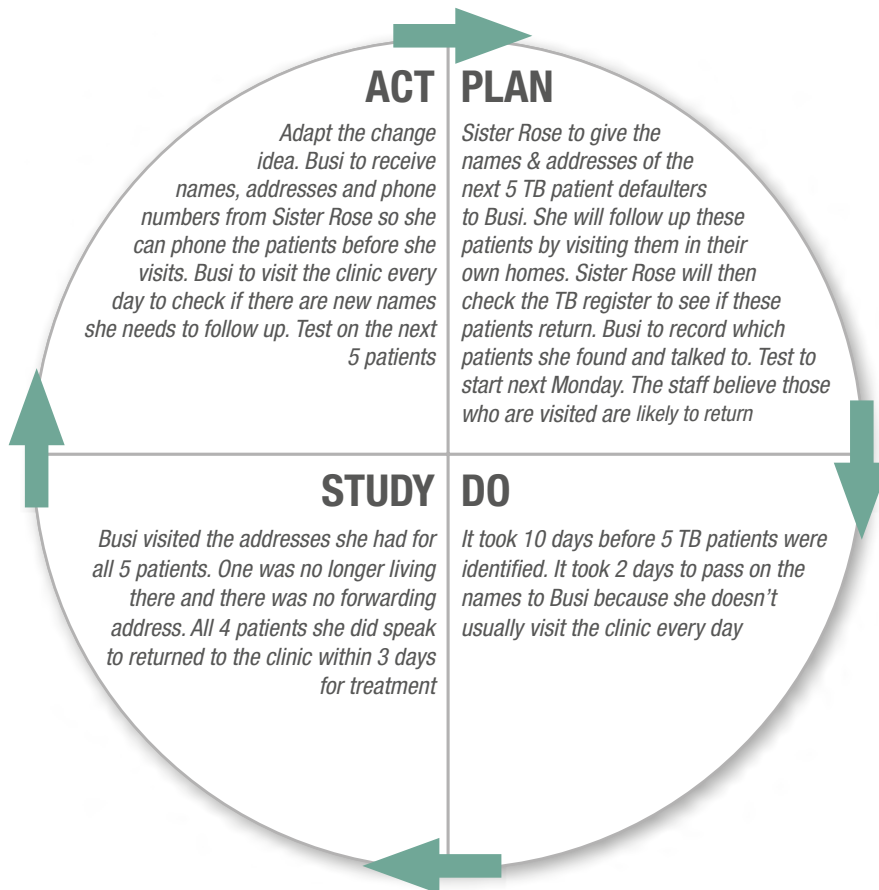
PDSAs are repeated firstly to test adapted changes as necessary and then to increase the scale to see if we can get the change to work on bigger numbers, over a longer period of time. The change may need to be altered further at this point to accommodate the increase in scale. Then we **test under a range of different conditions** to check the change still leads to an improvement.

EXAMPLE we may have tested an idea mid-week when our work demand is modest but can our change also work on a Monday morning when we are rushed off our feet? For more information on using PDSAs, see HOW TO Module 5.

Rapid change cycles (PDSAs)



EXAMPLE OF A PDSA CYCLE:



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MODULE two

2

HOW TO
Develop ideas
for change that
may lead to an
improvement



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HOW TO GUIDE FOR QUALITY IMPROVEMENT

HOW TO DEVELOP IDEAS FOR CHANGE THAT MAY LEAD TO AN IMPROVEMENT

“ *Insanity:
doing the same thing
over and over again and
expecting different results.*

Attributed to Albert Einstein & Narcotics Anonymous

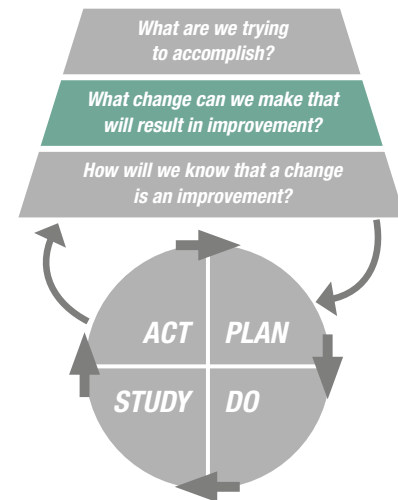
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Module two

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Model for improvement



Source: Associates in Process Improvement



Introduction

In order to make an improvement we have to make a change. Indeed, one of the questions in the Model for Improvement¹ asks “What change can we make that will result in improvement?” (see HOW TO Module 1). But how can we be certain our change will have a positive impact? One way of increasing the likelihood is to apply particular tools and techniques to assist in identifying a change idea. This HOW TO Guide introduces some of the most useful of these. Even when we have been very diligent in using an appropriate tool to generate our ideas, **it is rare that we are absolutely certain they will work in our context. This is why we test our changes on a small scale before we attempt to implement them** (see HOW TO module 5).

Tools to help us access what we already know

Generating and organising ideas

Brainstorming and affinity diagram

One of the simplest tools for **generating ideas is brainstorming**. Most of us are familiar with this technique. Usually conducted in a group, individuals share their thoughts about a given topic. While gathering ideas, participants are encouraged to think as freely as possible. Contributions are not judged or analysed until the production of ideas has been exhausted.

CHALLENGES one of the challenges of using brainstorming is you can end up with more contributions from the more vocal, outspoken members of the group and less from the quieter ones.

TIP a way to overcome this is to introduce some individual reflection as part of the brainstorming:

- › ask every member of the group to write 3-5 ideas on separate post-it notes
- › invite everyone to stick their post-it notes onto a piece of large paper
- › as people are adding their post-it notes to the paper, start to group these ideas under common themes
- › once all the ideas have been captured, share them with the group, pointing out the themes that have emerged
- › don't ignore any of the ideas even if they are unrelated to any others; these could be your most innovative

The grouping of themed ideas you create is known as an **affinity diagram**.



1 Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W., Norman, C.L. & Provost, L.P., 2009. The Improvement Guide – A Practical Approach to Enhancing Organisational Performance. 2nd ed. Jossey-Bass, San Francisco, USA

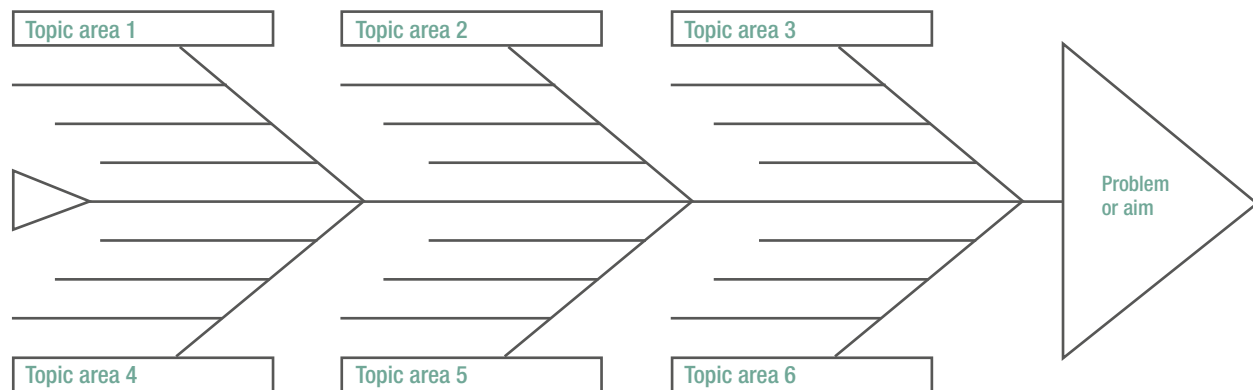
Root cause analysis

There are a number of different tools we can use to help us **analyse why we are getting the results we get**. These tools don't automatically generate ideas for change but they do help us to analyse our problem in detail and in doing so make it more likely that any changes we identify as a consequence will address the cause of poor performance.

Fishbone or cause and effect diagram

One such tool is known as the **fishbone** or **cause and effect diagram**. This tool is very versatile and can be used in a number of different ways, but here we are going to look at how it can **encourage more breadth of thinking**. The fishbone is so-called because it looks like a fish skeleton. In the head of the fish you write either your problem or your aim and at the end of each diagonal bone you write topic areas selected to help guide your brainstorming.

EXAMPLE OF AN UNCOMPLETED FISHBONE





EXAMPLE

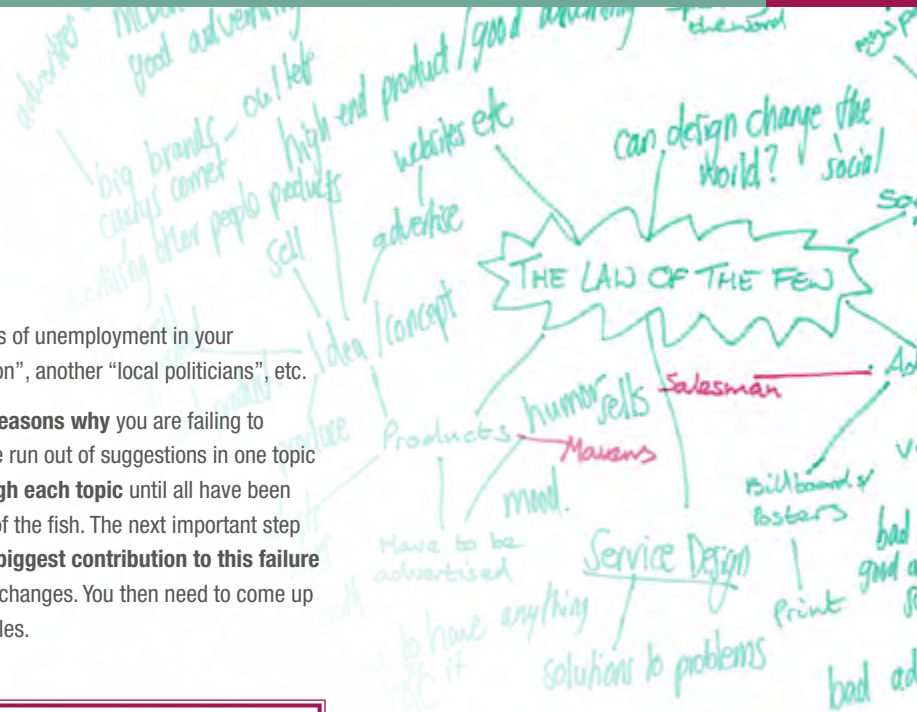
If you were trying to think about why there were high levels of unemployment in your community, one topic you might choose could be “education”, another “local politicians”, etc.

Having selected key topics you then **start to brainstorm reasons why** you are failing to reach your aim or the causes of your problem. Once you’ve run out of suggestions in one topic area you move to the next **working systematically through each topic** until all have been analysed. Reasons are written along the horizontal bones of the fish. The next important step is to **identify three to five reasons that are making the biggest contribution to this failure and are within the control of the team** seeking to make changes. You then need to come up with **change ideas** that could help overcome these obstacles.

HOW DO YOU SELECT TOPICS FOR YOUR FISH BONE?

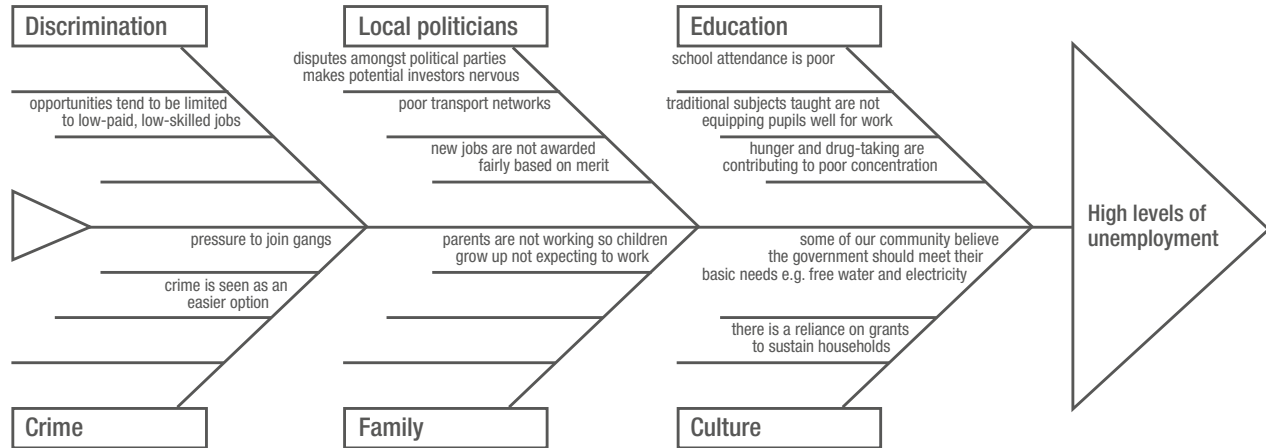
In choosing your topics you are trying to achieve a number of things:

- › you want to encourage a breadth of thinking that is likely to pick up the majority of root causes
- › you are trying to encourage those participating in the exercise to look at how they might be contributing to the problem as well as looking for external causes
- › you are trying to identify those problems most likely to generate powerful change ideas



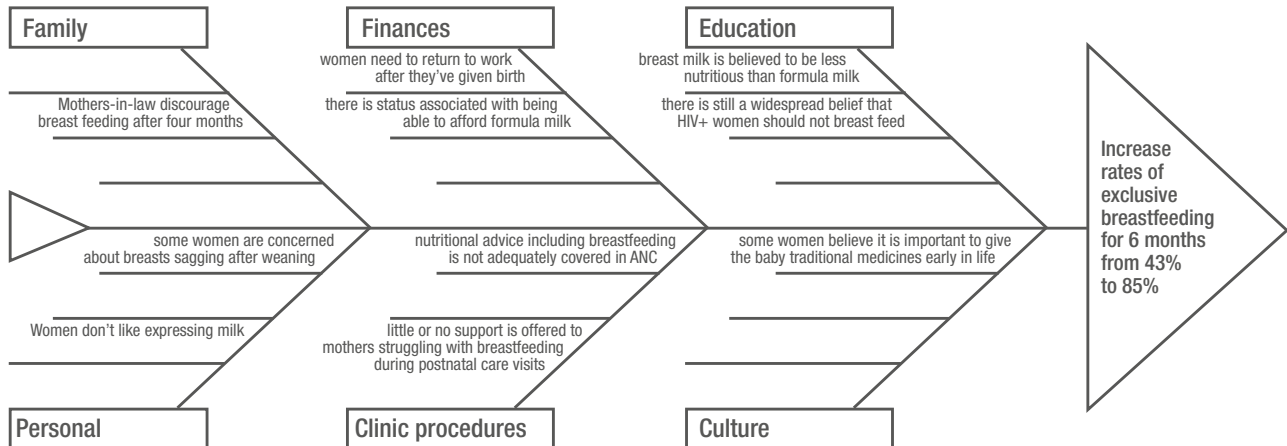
EXAMPLE OF A COMPLETED FISHBONE:

“WHY DOES THIS COMMUNITY HAVE HIGH LEVELS OF UNEMPLOYMENT?”



EXAMPLE OF A COMPLETED FISHBONE:

“MACASSA CLINIC AIMS TO INCREASE EXCLUSIVE BREASTFEEDING FOR 6 MONTHS FROM 43 TO 85%”





WHY? why? WHY why

5 Whys

A quicker, more simple way of identifying the **root cause** of your problem is to use the **5 whys technique**. All of us who have been around children for any length of time know they go through a phase of asking “why?” to everything. “Why is the sea blue?”; “Why do the lights come on when I press this switch?” This often leaves us wishing we’d concentrated more in school! Here we are doing the same thing.

We start by asking why we have our problem or are not meeting our aim. We then ask “why” to the answer given and continue to do this until we feel we are at the root cause of the problem. This will be the point at which we might be able to intervene to stop the chain of events that is generating the problem or failure to meet our aim.

EXAMPLE *“Why do we have high levels of unemployment in our community?”* The answer could be: *“There are no jobs.”*

So we ask again: *“Why are there no jobs?”*

“Because investors are nervous about creating new businesses here”

Again we ask: *“Why are investors nervous about creating new businesses here?”*

“Because they are worried about crime”

“Why are they worried about crime?”

“Because crime rates were high and the local paper regularly reports on crime-related stories”

“Why does the local paper regularly report on crime-related stories?”

“Because it doesn’t have access to stories about what the community is doing to address crime and help itself”

Having become more and more focussed on the problem and its possible root cause, you have helped to identify opportunities for changes. **EXAMPLE** you could commit to sending articles to the local newspaper or invite potential investors to visit the community and learn first-hand what is really happening and how crime is actually on the decline.

EXAMPLE OF 5 WHYS:

- › “why dont women exclusively breast feed for 6 months?”
“because they think when the baby cries after a feed it is still hungry”
- › “why do they think when the baby cries after a feed it is still hungry?”
“because that’s what their mother-in-law is telling them”
- › “why is their mother-in-law telling them this?”
“because when she had her babies this is what everyone believed”
- › “why is this what everyone believed?”
“because there was no advice available from the health clinic”

Change Idea:
Health Clinics target ANC messages to pregnant women and their mothers and mothers-in-law



TIP you often get to a probable root-cause and therefore a testable solution before asking the question 5 times. That's fine. Stop when you think you are there.

CHALLENGES this tool doesn't always lead you to a helpful answer. For example, imagine in answer to the question "Why are there no jobs?" you get the answer: "The country is in recession". You then ask "Why is the country in recession?" Answer:

"There is a global recession triggered initially by the collapse of the banking sector". At this point you're stuck. Few of us, including governments and powerful world leaders have easy answers to a global recession! This tool can be helpful but it can also lead you to identifying problems well beyond your control. Skilled facilitation of the tool can help to some extent in avoiding this (see table below).

Tool/ Technique	Purpose	Advantages	Disadvantages	When to Use	Tips for Facilitation
Brainstorming	Generation of ideas	Easy to set up and facilitate	Outputs can be biased towards more vocal members of the group Individuals may be reluctant to share ideas that could be thought of as silly	A team is comfortable working together and sharing ideas Good ideas are relatively accessible or members are open to being self-critical and tolerant of innovative suggestions	Try to draw out ideas from those not contributing Steer the team away from commenting on or assessing ideas until the generation of ideas has been exhausted
Affinity Diagram	Organising qualitative information	Quickly identifies common themes	Grouping of ideas can be subjective and artificial In clustering, some of the uniqueness or details of individual contributions can be lost	When you don't want to put limitations around the generation of ideas but you need to be able to organise and interpret a large number of contributions	Start to identify themes as ideas are being generated You can invite the first person who shared their ideas to take responsibility for identifying common themes



Tool/ Technique	Purpose	Advantages	Disadvantages	When to Use	Tips for Facilitation
Fishbone Diagram	To encourage more systematic and wide-ranging brainstorming	Careful topic selection can facilitate the identification of key root causes and some introspection	It can be overly complex and time-consuming when the root cause of a problem lies predominately in a single topic area	When the reasons for a problem are multi-faceted	Choose the topics in advance if you understand the problem well and have a good sense of where the solutions lie Exhaust ideas in one topic area before moving onto the next
5 Whys	To identify the root cause of a problem	It is a quick way of going deeper into a problem to try and find the underlying cause	Repeated questioning can lead you into causes that are well beyond your power to influence	If you need to quickly determine underlying causes & superficial reasons are being offered. It is sometimes used in conjunction with the fishbone to encourage further analysis	Don't continue to ask the question "why?" when you have a response that you believe speaks to the underlying cause and is within your control to resolve Encourage a number of different responses the first time you ask the question "why?" Pick one that you think is most likely to lead to an answer you could address and ask the question again. At this point only focus on a single response to each "why?"

Techniques for identifying new ideas

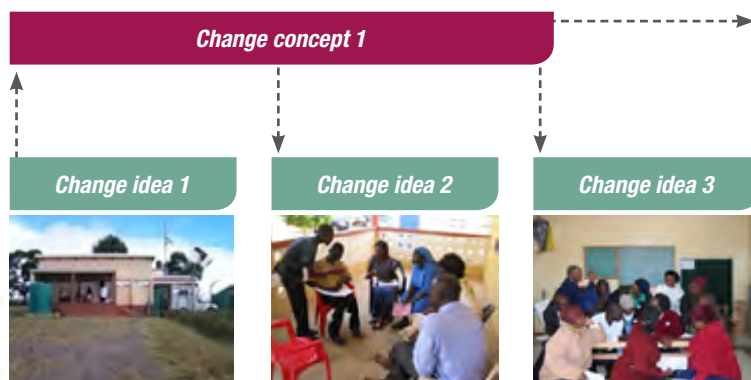
Sourcing best practice

“I can’t understand why people are frightened of new ideas. I’m frightened of the old ones”

John Cage, American composer, music theorist, writer, and artist.



One way of exploring new ideas that may lead to an improvement is to find out what other people are doing who are more successful than you. This is known as **benchmarking**; **comparing yourself to others**. Once you’ve identified high performers you can ask them what they are doing that is different. Most people who are doing well are very willing to share this information. **CHALLENGES** in trying to apply what you’ve learnt there can be an inclination to conclude “it couldn’t work here”. We often compare other’s circumstances with our own and think they are so different we can’t learn anything. For example, “they have so many more staff members than us”, “they have more money”, “their customers or patients are better educated”. These factors may make the direct application of their ideas difficult but if we **turn ideas into concepts** that capture the principles behind their changes, we can make them easier to transfer. We take the concept and generate an idea from it that could be applied in our particular set of circumstances.

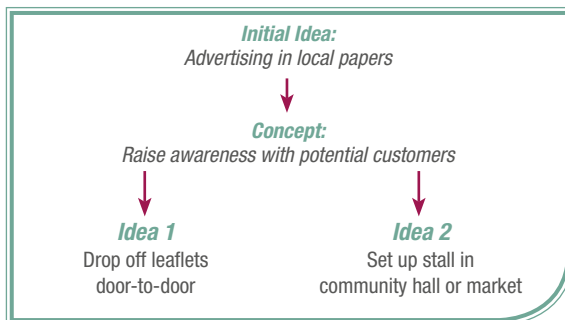




EXAMPLE: TURNING AN IDEA INTO A CONCEPT AND CREATING A NEW IDEA

Imagine you were trying to sell household cleaning products and you find out a neighbour is running a successful grocery store that is expanding. Your neighbour tells you she increased her sales when she started to advertise in the local newspaper. You think “I can’t advertise, I don’t have enough money to pay for the advertisements”.

But you can take the idea and think about its underlying concept. In this case the concept would be to raise awareness of the product with potential customers. What ideas could you test that would ensure you raise awareness of your product to potential customers? Maybe you could drop off leaflets door-to-door or you could set up a stall displaying your products in a community hall or market. It is not the same idea you started with but you’ve taken the concept behind the idea and applied it to your particular circumstances.

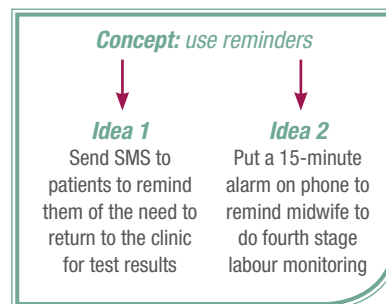


EXAMPLE: “IT COULDN’T WORK HERE”

A health centre in Ghana came up with a great change idea to improve health facility based deliveries. The team decided that the midwives would write their contact numbers on the patients’ antenatal cards with instructions that when they went into labour they should call. The midwife would then organise an ambulance to go and collect the woman. They found the idea led to a significant improvement in skilled deliveries. But when the team tried to spread the idea the first health clinic said “but we don’t have an ambulance”. So they turned that part of the idea into a concept; the health facility will help with arrangements to bring the mother and midwife together. So, the clinic tested the idea of the midwife talking to the woman’s partner on the phone to help him access a motorbike to bring the women to the facility. The next clinic said “but our patients don’t have mobile phones”. So we turned that part of the change idea into a concept; inform the midwife her patient has gone into labour. The change idea the new clinic then generated from the concept was to have someone from the village cycle to the health facility to tell the midwife the woman had gone into labour and she would organise a bicycle ambulance to bring the woman to the clinic.

Tools for Creative Thinking

In the previous examples, we took an idea from someone else, turned it into a change concept and then used the concept to help us develop relevant ideas of our own. It is also possible to generate potential change ideas from **lists of change concepts**² (see Annexure 1). Change concepts are very generalizable changes that can be applied to many different circumstances. For example, “reduce waste”, “task shifting”, “match supply and demand” (see table below). These concepts could usefully be applied to identify potential improvements in the most sophisticated of manufacturing processes as well as a rural healthcare clinic with no electricity.



Turning a concept into an idea

Change concept	Idea to improve TB treatment	Idea to improve HIV prevention	Idea to improve a production line
Reduce waste	Ask community care workers to follow up all patients who test positive for TB and do not return to the clinic for their results	Ensure HIV-uninfected women are encouraged during antenatal care visits to use condoms	Only buy as many raw materials as is absolutely necessary to feed the normal rate of your production line
Task shifting	Ask counsellors to see HIV-infected patients attending for repeat prescriptions and screen them for TB before they are seen by the professional nurse	Train community health volunteers to promote breastfeeding during the ANC period and stress the importance of HIV-infected mothers taking antiretrovirals while they are breastfeeding	Ask the cleaner to ensure there are always enough boxes at the end of the line to pack the finished products
Match supply with demand	Encourage the TB sister to work alongside the ARV sister on the days when HIV patients return for their repeat prescriptions	Order more condoms before Christmas holidays	Employ some occasional staff and use them to help in November to manage the peak in production to meet Christmas sales

2 Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W., Norman, C.L. & Provost, L.P., 2009. The Improvement Guide – A Practical Approach to Enhancing Organisational Performance. 2nd ed. Jossey-Bass, San Francisco, USA



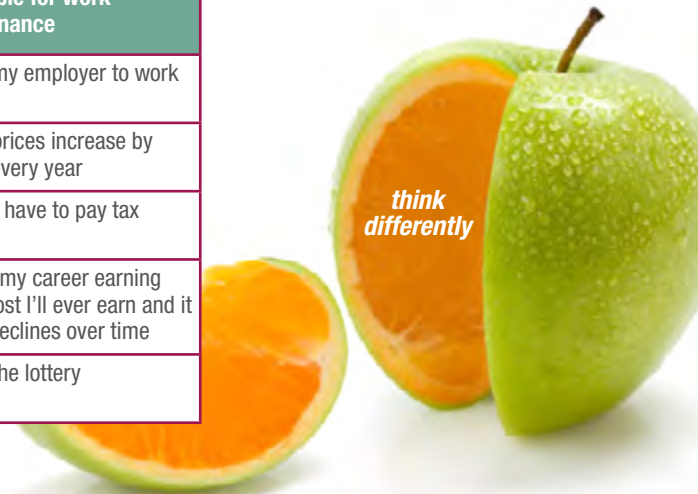
Sometimes we find it hard to come up with really innovative ideas for change. **We get stuck.** We can see our problem all too clearly but can't see any solutions other than things beyond our control. For example "I need more money", "we need more staff", "there is not enough space". **We can get locked into patterns of thinking that we need help to break out of.** Edward de Bono is famous for developing a number of techniques to assist us in creative thinking. One is called **provocations**³. To provoke is defined as "to stimulate or incite someone to do or feel something". In this case we are using provocations to stimulate different thinking.

De Bono introduced 5 provocations designed to help us think the impossible: reversal, exaggeration, escape, distortion & wishful

thinking. We are then encouraged to explore whether any of our crazy thinking throws up ideas that we could actually apply to the current situation to improve outcomes. **For each provocation, we have to create a relevant example that is applicable to the topic area we are interested in** (see table 1 below). **EXAMPLE** if you were trying to improve exclusive breast feeding for 6 months you could select the provocation "distortions" and come up with an example "only men can breastfeed!". You would let your imagination run wild thinking of what that would look like and then stop and see if your thinking identified anything that could be applied to help women exclusively breast feed.

Table 1: De Bono's 5 provocations

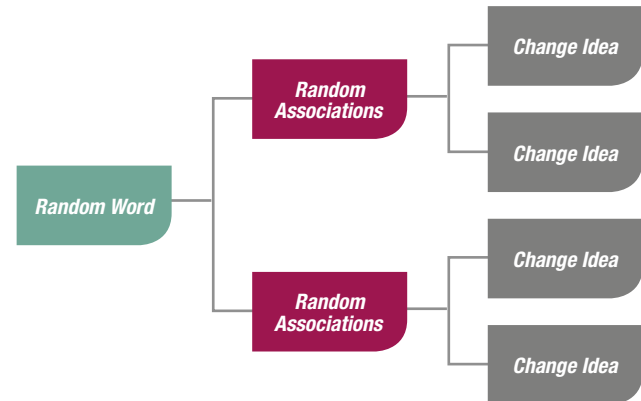
Provocation	Description	Example for health	Example for work and finance
Reversal	Go in the opposite direction to the norm	Patients treat the staff	I pay my employer to work
Exaggeration	Greatly exaggerate current situation	Over 80% of the population are infected with HIV	Food prices increase by 40% every year
Escape	Escape from what you take for granted	There is enough money to do what is good for patients	I don't have to pay tax
Distortion	Make changes to current relationships and/or time	Primary healthcare clinics are open for only 5 hours a day	I start my career earning the most I'll ever earn and it then declines over time
Wishful thinking	An impossible fantasy	Patients do exactly what they are told to do	I win the lottery



EXAMPLE OF APPLYING PROVOCATIONS TO AN AREA THAT NEEDS IMPROVEMENT

Imagine you and a group of friends all decide you need to start saving up for your childrens' university fees. Right now none of you can think how you're going to make any saving with the amount you earn and spend in a month. So you choose one of the provocations listed in Table 1, first column, say "Reversal – go in the opposite direction to the norm" and you come up with an example of a reversal that relates to money. From Table 1 we'll take the example "I pay my employers to work". It is silly, but fun. Imagine what the world would look like if this were the case. Discuss it. Play with the idea. For example, if you were paying to work would you expect to have to travel to work or would you expect your work to come to you? What hours would you work? What time of the day or night would you work? How much work time would you waste if you were paying to be there? Once you've spent some time exploring these possibilities, stop and ask yourselves "**Is there anything that we thought about when our mind was free to think crazy thoughts that may be applicable to our real-life situation?**" From thinking about having work come to you, you might decide you want to negotiate the possibility of working from home one day a week. This would create some savings in travel and free up some time that you could possibly use to earn some extra money.

Another creativity technique described by de Bono is **random words**⁴. A random word (noun or verb) is selected from a book or website designed for this purpose. Through lateral thinking and random associations originating from the random word, new thinking and ideas can be generated that are applicable to a problem or shortfall in performance.



Can you connect all the dots using only 4 straight lines? Once you start to draw the lines, you may not lift your pen off the paper. (solution on page 22)



EXAMPLE let's take the word “university” that was randomly generated from a website. Apply it to the problem of HIV-infected patients defaulting from treatment. When you think of university you think of experts, term times and semesters, study, lectures, research, exams. From this you could develop the ideas:

- › expert patients who support others and encourage them to remain on treatment
- › visit “semesters” when patients don’t need to return to the clinic to pick up repeat prescriptions so long as in “term time” they have demonstrated good adherence to treatment advice
- › easier access for patients to information and research about the benefits of ARVs and the implications of defaulting
- › “examining” or checking up on patients’ understanding of life-long treatment
- › “researching” what it is like for patients to be on long-term medication and adapting services to make this easier

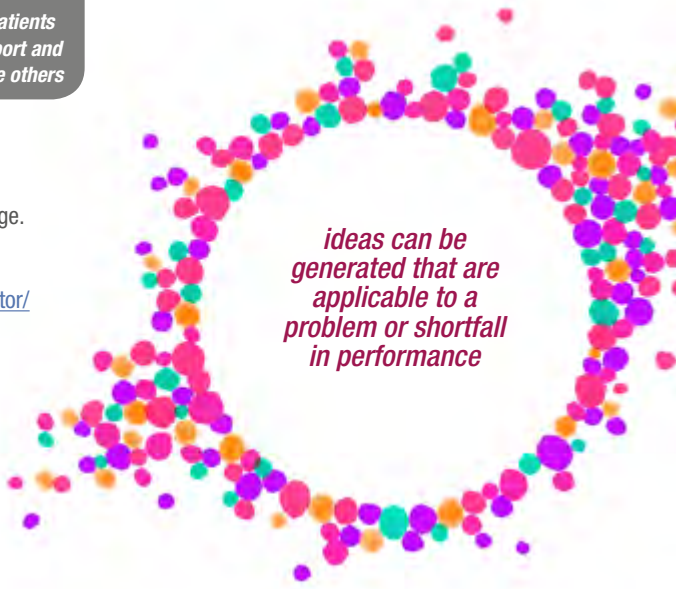
University

Expert

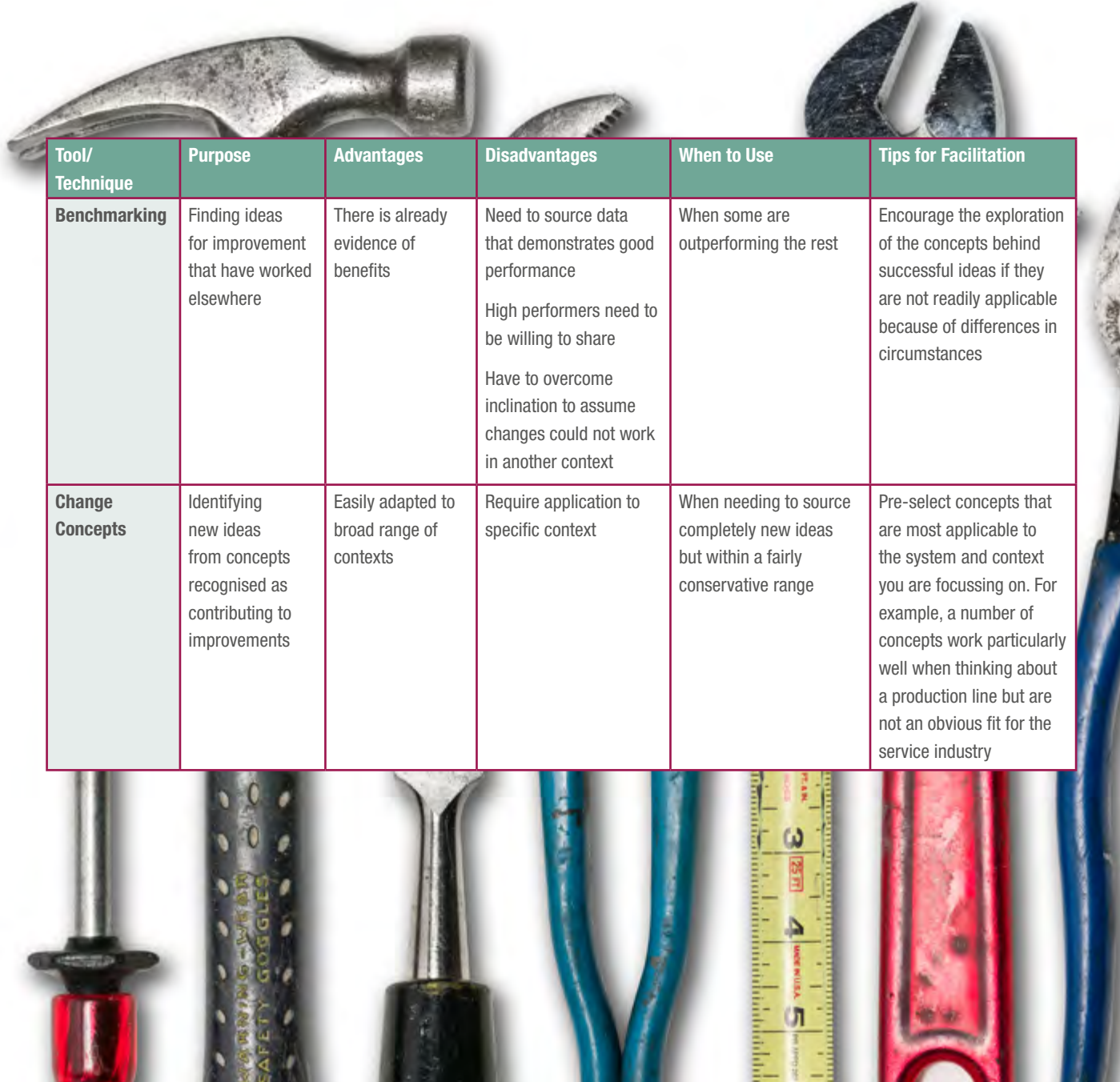
Expert patients
who support and
encourage others

Sources Of Random Words

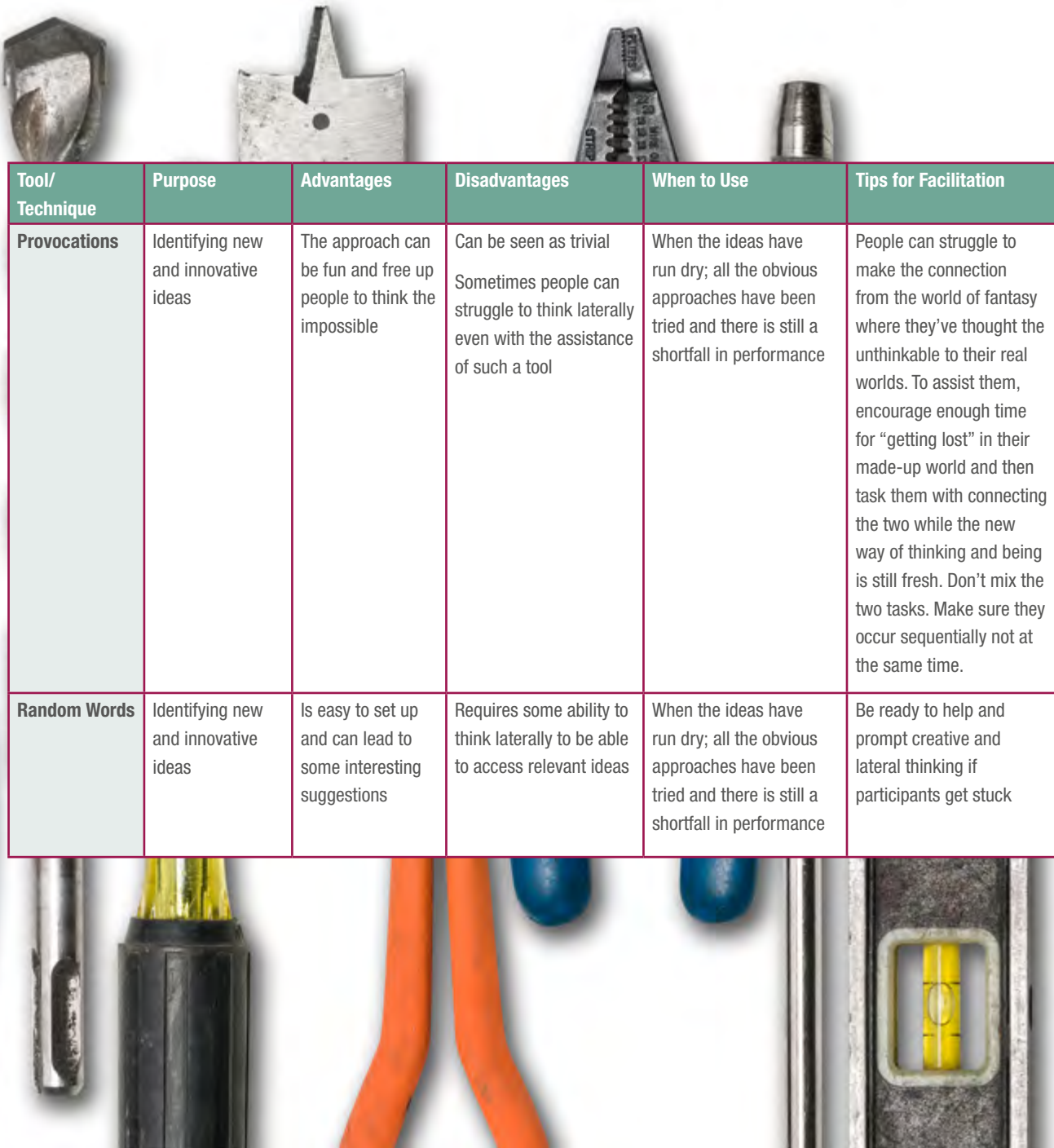
1. Open a book randomly at any page. Close your eyes and point to a place on the page. Find a word (noun or verb) that is closest to the place you are pointing to.
2. Find a random words website e.g. <http://creativitygames.net/random-word-generator/randomwords/8>



*ideas can be
generated that are
applicable to a
problem or shortfall
in performance*



Tool/ Technique	Purpose	Advantages	Disadvantages	When to Use	Tips for Facilitation
Benchmarking	Finding ideas for improvement that have worked elsewhere	There is already evidence of benefits	Need to source data that demonstrates good performance High performers need to be willing to share Have to overcome inclination to assume changes could not work in another context	When some are outperforming the rest	Encourage the exploration of the concepts behind successful ideas if they are not readily applicable because of differences in circumstances
Change Concepts	Identifying new ideas from concepts recognised as contributing to improvements	Easily adapted to broad range of contexts	Require application to specific context	When needing to source completely new ideas but within a fairly conservative range	Pre-select concepts that are most applicable to the system and context you are focussing on. For example, a number of concepts work particularly well when thinking about a production line but are not an obvious fit for the service industry



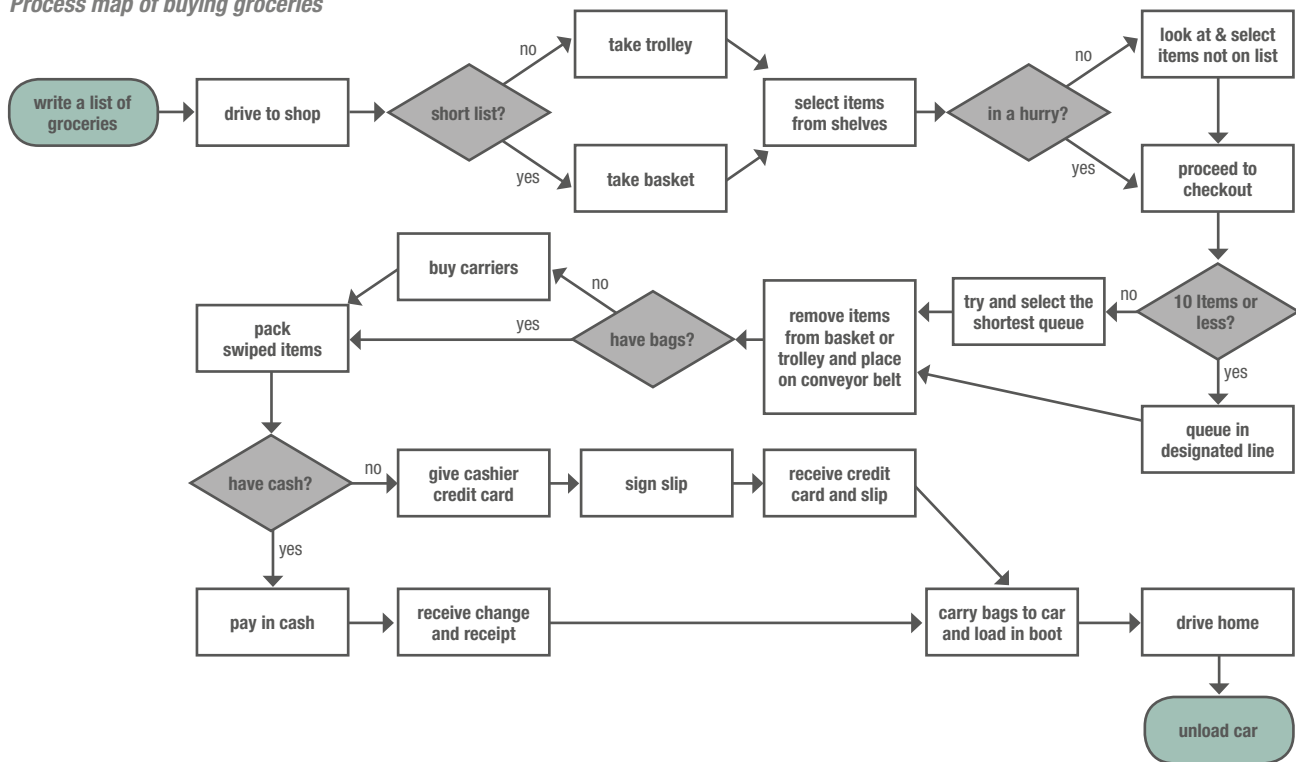
Tool/ Technique	Purpose	Advantages	Disadvantages	When to Use	Tips for Facilitation
Provocations	Identifying new and innovative ideas	The approach can be fun and free up people to think the impossible	Can be seen as trivial Sometimes people can struggle to think laterally even with the assistance of such a tool	When the ideas have run dry; all the obvious approaches have been tried and there is still a shortfall in performance	People can struggle to make the connection from the world of fantasy where they've thought the unthinkable to their real worlds. To assist them, encourage enough time for "getting lost" in their made-up world and then task them with connecting the two while the new way of thinking and being is still fresh. Don't mix the two tasks. Make sure they occur sequentially not at the same time.
Random Words	Identifying new and innovative ideas	Is easy to set up and can lead to some interesting suggestions	Requires some ability to think laterally to be able to access relevant ideas	When the ideas have run dry; all the obvious approaches have been tried and there is still a shortfall in performance	Be ready to help and prompt creative and lateral thinking if participants get stuck

Process mapping and analysis

When we are working to **improve the outcome of a clearly identifiable process**, **process mapping** and **analysis** can be invaluable techniques in helping detect problems and generating change ideas. Process mapping and analysis are

so important to improvement science that we've created a separate module dedicated solely to this topic. We briefly introduce the approach here but would encourage you to learn more by reading HOW TO Module 3.

Process map of buying groceries

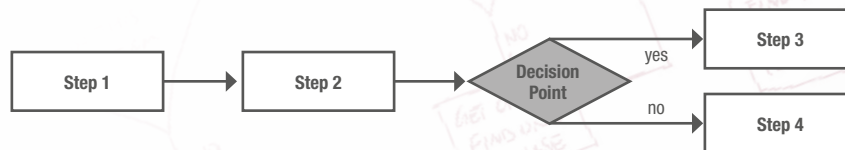




A **process** is a series of sequential tasks, known as “steps”, that together achieve a defined outcome.

EXAMPLE a pregnant woman visiting a primary healthcare clinic for antenatal care will experience a number of prescribed interventions or tasks that in combination provide the necessary care she needs at a given stage in her pregnancy. **Process mapping**, also known as “flow charting”, provides a visual

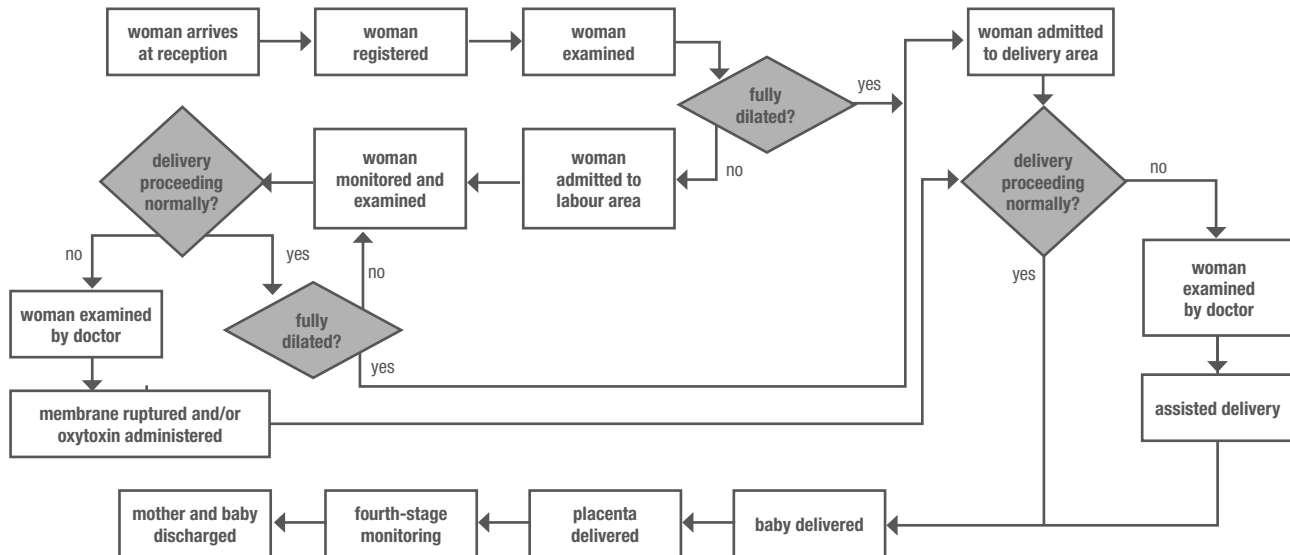
representation of a process with its constituent steps. Each key step is described in a rectangle and **steps are organised according to the order they occur in the process**. The steps are connected with arrows. Where there are decision points in the process that determine the steps followed after the decision, the map will split into two or more separate “branches”. Decision points are usually represented as diamond shapes.



Process maps can follow the journey of a person (e.g. customer, patient) as they pass through and experience the process; they can represent an object (e.g. mapping the steps in the assembly of a car) or information (e.g.

the flow of sensitive information about a planned crime from the informant to law enforcement agents who could prevent it). The process map can **represent what is actually happening, or what should be happening**.

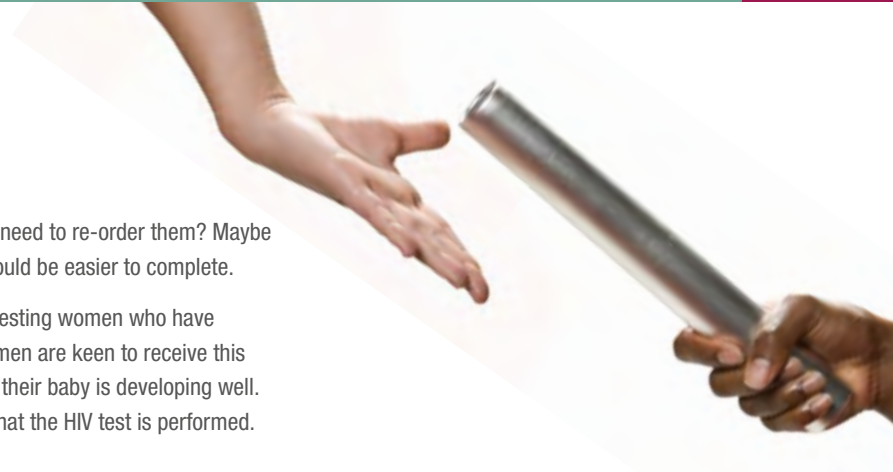
Process mapping, also known as “flow charting”, provides a visual representation of a process with its constituent steps.

Process map of deliveries in a Kabul maternity hospital

If you have mapped a process you are seeking to improve as it is currently operating, you can then apply some **basic rules of process analysis** that should help identify change ideas:

- › **Non-value added or unnecessary steps** - look to see if any steps in the process are not adding any value to the customer. These are called non-value added steps. Are they necessary, can they be removed? If so you are likely to save time and resources.
- › **Waste** - are there other areas of waste in the process? Are you wasting time, materials, money?





- › **Re-order steps** - are the steps in the right order or do you need to re-order them? Maybe if something was done earlier in the process, later steps would be easier to complete.

🔗 **EXAMPLE** providing holistic antenatal care includes re-testing women who have previously tested negative for HIV every 12 weeks. Not all women are keen to receive this service but do want to be palpated by a midwife to know that their baby is developing well. Providing palpation after an HIV test increases the likelihood that the HIV test is performed.

Original step



Re-ordered step



- › **Hand-offs** - the point at which the subject of the process map (a person, information) is passed from one step to another is known as a hand-off. Hand-offs create opportunity for error. 🔗 **EXAMPLE** in outpatients, a hand-off would occur when the patient moves from the reception desk to sit in a queue to see the vital signs nurse. The patient may sit in the wrong queue or some essential information picked up by the receptionist may not transfer with the patient to the nurse they are due to see next. Wherever possible we should try to reduce the number of hand-offs in our process to reduce the chances of these errors.

- › **RUN STEPS IN PARALLEL** - people who have very demanding jobs are often experts at multi-tasking. This means that they are able to do more than one thing at the same time. It saves them time. The same is true if we run steps in parallel in our process. Rather than doing each step one after another we find steps that can be done at the same time. Such changes offer opportunities to save time and make improvements. **EXAMPLE** the midwife checks a patient's recall on the danger signs of pregnancy whilst palpating their fundus.

Steps in sequence



Steps in parallel



- › **Identify and take pressure off the bottlenecks** - bottlenecks are steps in the process that restrict the flow through the whole process. They are often the places where people have to queue. A good example is the checkout at a supermarket. The bottleneck is often a limited resource; there is slightly less of that resource than we really need. It is often an expensive resource e.g. a doctor, pharmacy, a colour printer. If we can spot where the bottlenecks are in our processes and help to reduce the pressure on that resource we will improve the speed at which it takes to complete the process. Remember the days before there were bar-coding and electronic scanners in supermarkets? All prices had to be entered into a till manually. Now it takes a much shorter time to go through that step of the process of buying groceries. Technology took pressure off the bottleneck by making it quicker for the cashiers to do their job.

“Identify and take pressure off the bottlenecks”



Solution to the problem on page 15 😊





Annexure 1: Change concepts

Many of the concepts outlined below are particularly applicable to the manufacturing sector. All can be adapted to healthcare but those highlighted in purple are the most readily applicable.

1. Eliminate things that are not used
2. Eliminate multiple entry
3. Reduce or eliminate overkill
4. Reduce controls on the system
5. Recycle or reuse
6. Use substitution
7. Reduce classifications
8. Remove intermediaries
9. Match the amount to the need
10. Use sampling
11. Change targets or set points
12. Synchronization
13. Schedule into multiple processes
14. Minimize handoffs
15. Move steps in the process close together
16. Find and remove bottlenecks
17. Use automation
18. Smooth workflow
19. Do tasks in parallel
20. Consider people as in the same system
21. Use multiple processing units
22. Adjust to peak demand
23. Match inventory to predicted demand
24. Use pull systems
25. Reduce choice of features
26. Reduce multiple brands of the same item
27. Give people access to information
28. Use proper measurements
29. Take care of basics
30. Reduce demotivating aspects of the pay system
31. Conduct training
32. Implement cross-training
33. Invest more resources in improvement
34. Focus on core process and purpose
35. Share risks
36. Emphasize natural and logical consequences
37. Develop alliances and cooperative relationships
38. Listen to customers
39. Coach the customer to use a product/service
40. Focus on the outcome to a customer
41. Use a coordinator
42. Reach agreement on expectations
43. Outsource for “free”
44. Optimize level of inspection
45. Work with suppliers
46. Reduce setup or startup time
47. Set up timing to use discounts
48. Optimize maintenance
49. Extend specialist’s time
50. Reduce wait time
51. Standardization (create a formal process)
52. Stop tampering
53. Develop operation definitions
54. Improve predictions
55. Develop contingency plans
56. Sort product into grades
57. Desensitize
58. Exploit variation
59. Use reminders
60. Use differentiation
61. Use constraint
62. Use affordances
63. Mass customize
64. Offer product/service anytime
65. Offer product/service anyplace
66. Emphasize intangibles
67. Influence or take advantage of fashion trends
68. Reduce the number of components
69. Disguise defects or problems
70. Differentiate product using quality dimensions
71. Change the order of process steps
72. Manage uncertainty, not tasks

MODULE 1
HOW TO USE THE MODEL FOR
IMPROVEMENT

MODULE 2
HOW TO DEVELOP IDEAS FOR CHANGE
THAT MAY LEAD TO AN IMPROVEMENT

MODULE 3
HOW TO PRODUCE AND ANALYSE
A PROCESS MAP

MODULE 4
HOW TO SELECT MEASURES TO KNOW
YOUR CHANGE IS AN IMPROVEMENT

MODULE 5
HOW TO TEST A CHANGE USING THE
PLAN-DO-STUDY-ACT CYCLES

MODULE 6
HOW TO PLOT AND INTERPRET
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HOW TO RUN AN
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MODULE 8
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IMPROVEMENT COLLABORATIVE

MODULE 9
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MODULE 10
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THE AURUM
INSTITUTE

**MODULE
three**

3

**HOW TO
Produce
and analyse a
process map**

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THE AURUM
INSTITUTE

HOW TO GUIDE FOR QUALITY IMPROVEMENT

“ *Every system is perfectly designed to achieve the result it gets* ”

Ascribed to Edwards Deming, popularised by Paul Batalden & Don Berwick



Module three

HOW TO PRODUCE AND ANALYSE A PROCESS MAP

In this **HOW TO** guide we cover:

»	Introduction	3
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Introduction

A **process** is a series of activities or tasks that in combination achieve an intended outcome.

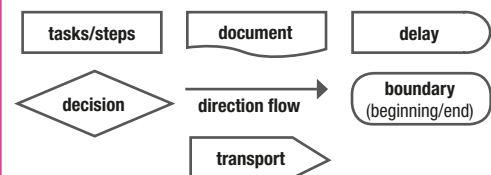
EXAMPLE when withdrawing money from an automated teller machine (ATM), there are a number of key tasks that need to be performed to get cash. These are essential, related steps and have to be completed in a given order. Initially you begin the process by inserting a valid bank card into the slot in the ATM with the magnetic strip facing downwards and to the right. You may then be asked which language you wish to conduct the transaction in and you press a button to indicate this. Then you will be asked to key in your secret code that must be entered in the correct sequence in order for further instructions to be acted upon... and so on... We are all very familiar with this process. It is simple with a few decision points; which transaction do you want to perform? Do you want a receipt? etc. **A process map is a powerful tool to help you visualise the key activities and tasks in a process and how they relate to each other.** The map is also called a **flow diagram** or a **flow chart**. On the following page is a high level process map showing all the key steps associated with the withdrawal of cash from an ATM.

You will see in the flowchart that **key activities** or **tasks**, known as “**steps**”, are described in a **rectangular** box, **decision** points in a **diamond** and **arrows** indicate the **order** in which steps are performed. The **rounded rectangle** denotes the **start and end** of the process.

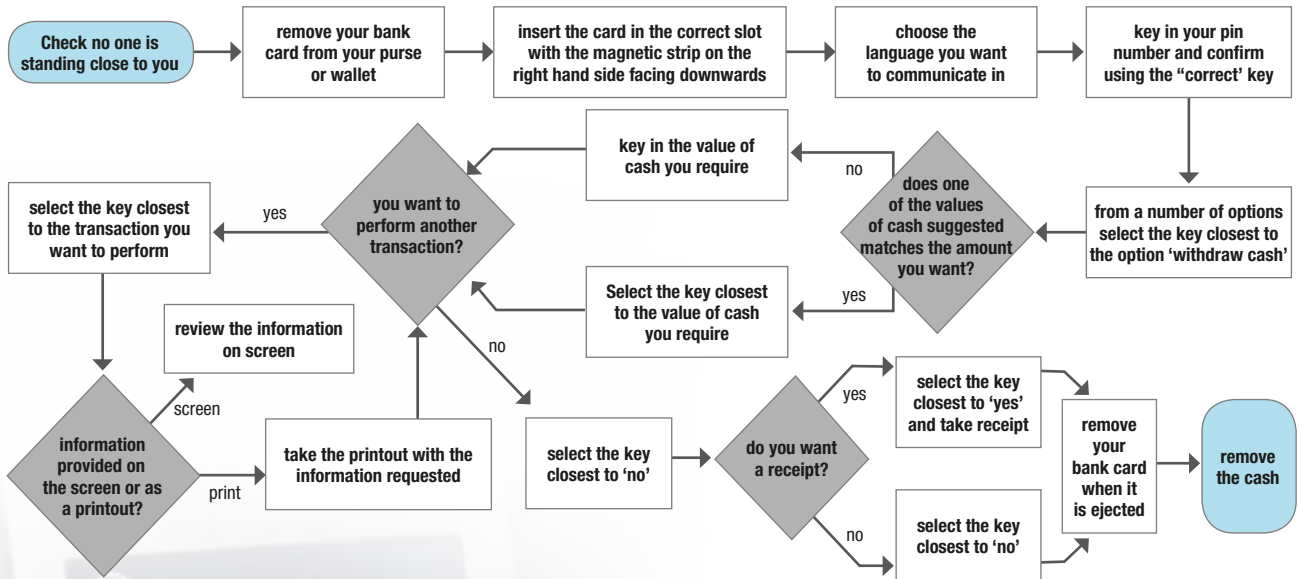
In the box below there are additional symbols that can be used to represent other aspects of the process, but these are less commonly known and applied.

The process map becomes more complicated as more decision points are introduced and the map breaks into different “branches” representing alternative steps that may be followed depending on the outcome of the decision point. The process map outlined on the following page illustrates this. It shows the process that a patient goes through from the point that they are tested as HIV-infected to receiving on-going support and medication once they are eligible for antiretrovirals (ARVs). Often **in healthcare, a patient or patients are the focus of the process map and the process is called a care pathway**. You could also map a process with something else as the focus, for example, following a set of patient notes, important information or the procurement of drugs. In manufacturing industry, process maps often describe the assembly of parts into a final product.

Symbols used in process mapping

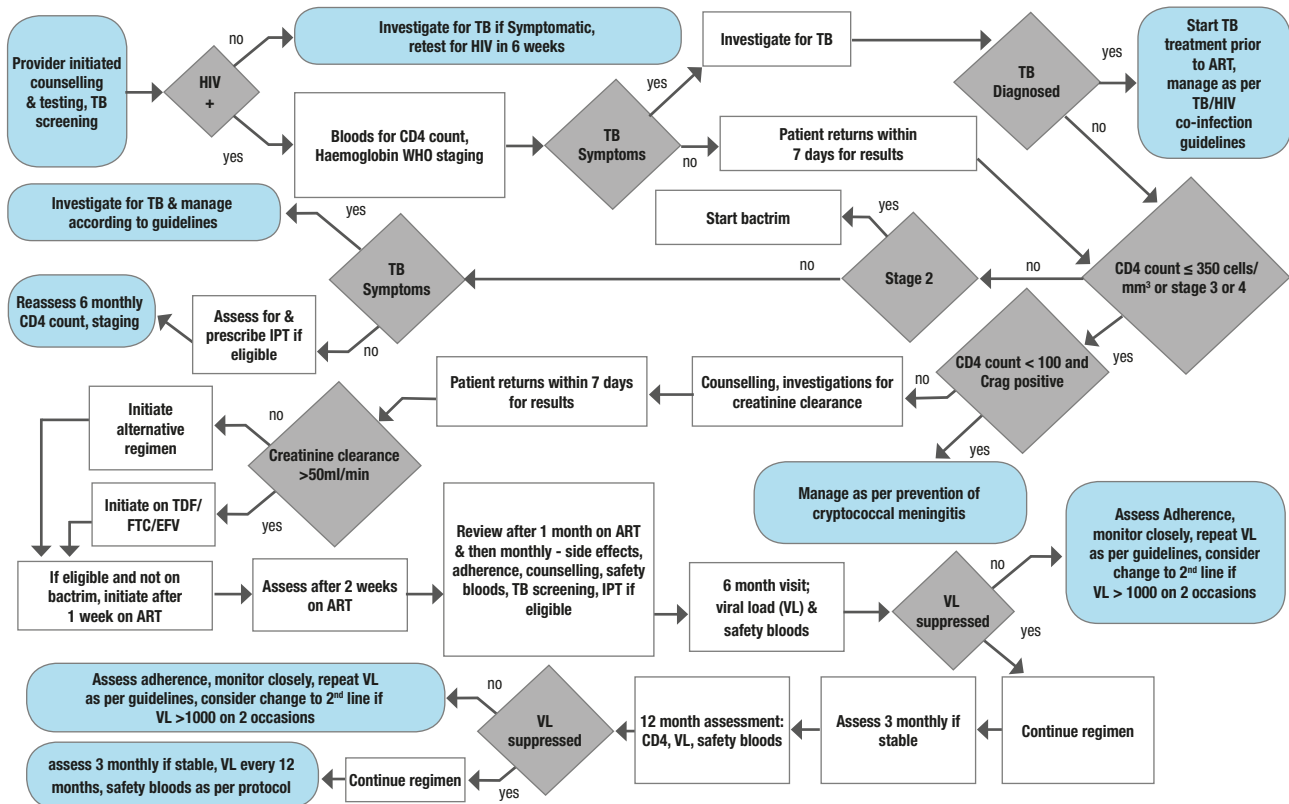


Process map of withdrawing cash from an automatic teller machine (ATM)





High level complex process map of adult ART*



*This diagram is included to illustrate a high level process map. It should not be used for clinical purposes.

When would you produce a process map?

Processes underpin much of the routine work we perform. Within a single organisation there will be multiple processes being performed at any one time. These processes often intersect at different points. They cannot be performed without support functions such as finance, human resources and procurement. **The combination of the processes and support functions that work together towards a common purpose are defined as a system.**

When we are failing to meet the expected standard for our work, it is usually because our processes are poorly designed. We can blame the workforce or appeal to them to “work harder”, but **if our process is not designed to get better results, these interventions are unlikely to lead to a sustainable improvement.**

In order to improve our processes we need to understand them. Many teams assume members are familiar with a process because they contribute some important

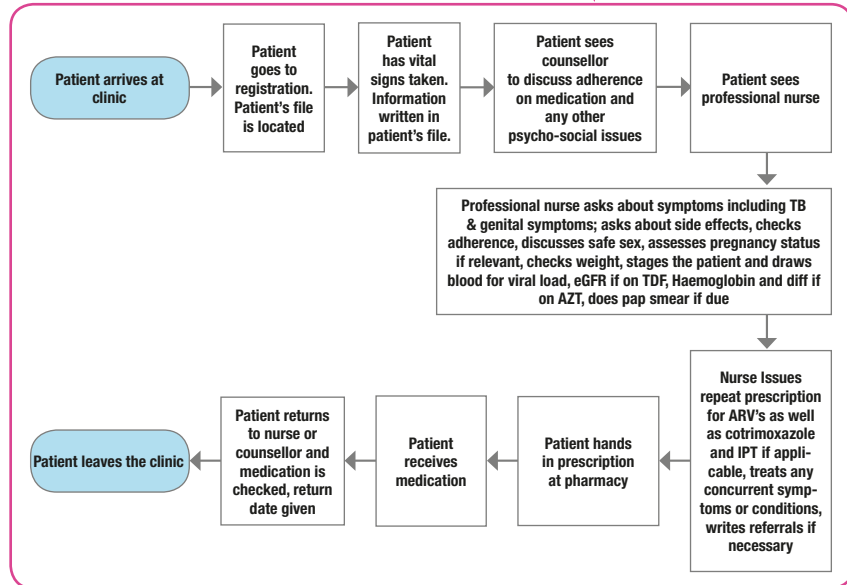
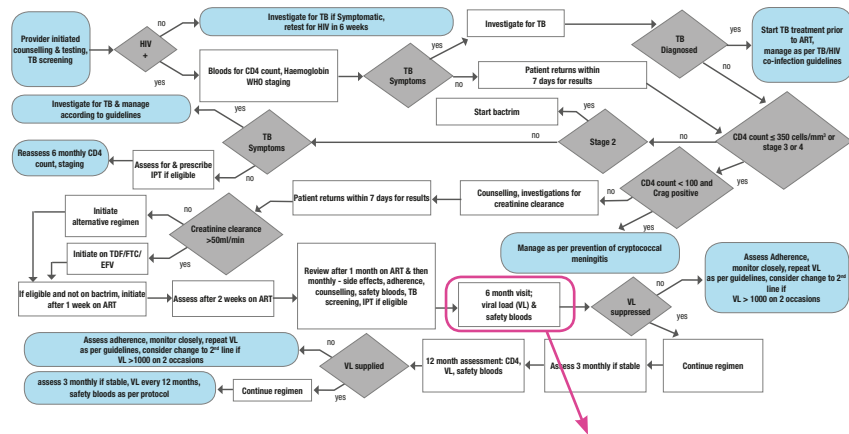
steps or tasks. But often individuals are unaware of what happens before or after they make their unique contribution. For example, a professional nurse may ask for some information when taking a patient's history that the vital signs nurse has already asked for but not recorded. If the focus of the process is a person, say, a patient, they often know more about how the process works than those delivering it. They are on the receiving end of all those activities. **Bringing together the people who contribute to a process along with the process recipient can be extremely illuminating.** If this group is tasked to describe and map the process, failures can quickly become apparent as the process is more clearly understood. If it is not possible to involve a customer in this activity, there are other ways of accessing their views. For example, common themes arising from customer complaints will signal where the process is failing from their perspective.





Mapping a process at different levels

The adult ART process map* outlined on page 5 represents a high level process map. It shows all the important steps (in rectangles) and decisions (in diamonds) from the point at which a patient tests for HIV through to them being initiated on treatment and their viral load being checked several months later. This illustrates the whole care pathway and could be used, for example, to identify where patients fail to return for further investigations or treatment. Yet any one of the steps in this high level process could be broken down into its constituent, detailed activities and tasks that would form a process in its own right. If we were to map the process involved in one of these steps (see outlined box) it could help us understand why the step is not being performed reliably.



* Note: These diagrams are included to illustrate high and low level process maps. They should not be used for clinical purposes.

Process improvement

Process mapping your current process is the equivalent of a baseline assessment. It doesn't in of itself tell you how to make improvements but it does help you understand where you are now. When using the tool in this way it is important that you map **what actually happens, not what is supposed to happen.** You can then review your map to look for opportunities to improve. Start by asking the following questions:

Do you have unnecessary steps?

Performing individual tasks in a process requires effort, time, money & materials. Single tasks also add to the overall time it takes to complete or move through the process. The removal of an unnecessary step usually leads to an improvement. Sometimes we are still performing tasks that have long-since become redundant. Asking a security guard who wants to check the contents of your car what they are looking for, often reveals that even if they don't know, they still wish to continue with the search. Often they can't tell me but still wish to conduct

the search! This is either a necessary step that is not being performed correctly or an unnecessary step and a waste of everyone's time. When the volumes of people going through a process are high, **a small saving in time made per person by removing an unnecessary step can add up to a considerable saving.** Unnecessary steps are also known as **non-value added steps** when the customer of the process receives no benefit from the task being performed. These steps, in particular, need to be reviewed to establish if they are really necessary.

Is there waste?

How much waste is there in our process? Waste can relate to time, resources, goodwill, etc. How much waste do we tolerate as a result of **duplication**? For example, how many times during a single visit to outpatients will a patient be required to give their name, identification number, cell

number and address? What about waste due to **re-work**; where tasks are being repeated because they **weren't done properly the first time around**? This can also be observed in outpatients where the results of tests have gotten lost or have been mis-filed leading to a request for another test and a wasted





outpatient slot. We can waste supplies (e.g. out-of-date drugs, drugs that are dispensed and not taken) time (e.g. checking and correcting errors) and people's belief in us (e.g. committing

to short waiting times but failing repeatedly). **There are significant opportunities to free up resources by addressing waste in our processes.**

Should you re-order steps?

Sometimes the steps in a process are essential but need to be provided in a different order for the process to perform optimally. Take the process in a primary care health facility where patients are being seen and treated for a sexually-transmitted infection (STI). After the professional nurse sees the patient, diagnoses the condition and suggests a course of treatment, the patient is ready to leave. However, a more holistic approach to their care would be to refer the patient for counselling and possibly testing to establish their HIV status. The problem is if this step is provided after the patient has been treated for their STI, they

are unlikely to cooperate. Changing the order of these steps by sending the patient for HIV counselling and testing before treatment can lead to a substantially better overall outcome.

Banks have re-ordered the steps associated with the withdrawal of cash to stop customers forgetting to take their bankcard. Originally the money used to be dispensed before the card was returned by the machine but too frequently customers forgot to wait for their cards. In changing the order of these final steps, customers now have to remove their card before they can access the cash they need.

Original step



Re-ordered step





Can you reduce hand-offs?

Every process has a focal point; it is the object or person at the centre of the process. In healthcare, this is often a patient or patient records/information. When we transfer that person or object from one practitioner to another or from one room to another or from one department to another **the transfer is called a hand-off**. For example, we could map a process showing the capture and transfer of essential clinical information starting at the point of hospital admission and ending when the patient is discharged and transferred back to primary care for follow up. One important hand-off in this process would be where information is passed from one shift of inpatient nurses to another. This happens once or twice in a 24 hour period

and always represents a risk; either that essential information relevant to the patient's on-going care is not shared with the new shift or the information is shared but not heard or understood. **Hand-offs represent risk of errors occurring**. In order to reduce that potential we need to **keep the number of hand-offs to a minimum**. This means incorporating as many tasks as possible into a single step in the process. This is not always possible (see section on alleviating pressure on a bottleneck). Alternatively, we need to set up mechanisms through which we keep the risk of error to a minimum. For example, we have a standard way of doing a shift "handover" that helps to improve communication.

Can you run steps in parallel?

The time it takes to complete a process may be important. If you are manufacturing goods, the quicker you are able to assemble parts into a final product that can be sold, the quicker you receive some revenue to offset the costs of materials and production. In

healthcare, reducing an overall process time creates opportunities to do other activities or spend more time with those patients who need it. For some processes, a reduction in time can significantly impact health outcomes. When someone has had a heart



attack, for example, the time it takes from them arriving at hospital to them receiving the correct treatment could determine whether they live or die. One way of shortening the overall process time is to explore the opportunity to **deliver tasks in parallel (at the same time) rather than**

providing them in sequence (one task after another).

For example, a clinician observes a child's general behaviour to gain an idea of their developmental stage while taking a history from the mother.

Steps in sequence



Steps in parallel



Can you identify and take pressure off the bottlenecks?



A bottleneck is a **step in the process that slows down the speed it takes to move through the whole process**. It is often provided by a limited resource (e.g. a specialist doctor, an expensive piece of machinery, a consulting room) and can be easily spotted as often queues form immediately before this step. A classic example of a bottleneck is the narrow section of an egg timer. It restricts how quickly sand can flow from one end to another and is designed to limit the flow to the time it takes to boil an egg. It doesn't matter how much sand is waiting to flow through the constriction or how much you shake the timer to try and increase the flow, it has just one speed through the bottleneck. It is rare to have just

one bottleneck in a process. There may be several (e.g. finding patients' records, a consultation with the doctor, getting drugs from the pharmacy). The speed at which the process performs will be dictated by the bottleneck that is the biggest constraint. For example, speeding up the time it takes to recover patients' records won't improve the process time if the biggest bottleneck in the process is waiting for drugs at the pharmacy. In order to make improvements in the flow of products, customers or patients through the process you need to **identify your biggest bottlenecks and find ways of speeding up the flow through them**.

Taking pressure off the **bottleneck**

Make sure the bottleneck is occupied only by work which is causing the constraint



Stop sending work to the bottleneck

If you can, divert work away from the bottleneck. This is what happens when we introduce a triage nurse into an outpatient clinic. Amongst other things, they determine which patients need to see a doctor and which, instead, could be seen by a professional nurse.

Ensure there are no delays at the bottleneck

It doesn't make sense to have your bottleneck waiting to provide its services. In outpatients, there is no point in the doctors starting their work at 7.00 am in the morning if the patients have not yet been registered, received their patient record, had their vital signs taken and been triaged by a nurse. Sometimes delays occur because all the essential components that are necessary for the bottleneck to perform his or her job are not available. For example, a doctor is chasing around looking for test results in order to manage the patient in their consulting room. These delays need to be eliminated for the process to operate as well as possible.

Make sure the bottleneck is occupied only by work which is causing the constraint

If a doctor is the bottleneck, it doesn't make sense for the doctor to be performing tasks that others who have more time could perform. For example, relevant patient education can be provided by a more junior member of staff before the patient sees the doctor. We call this task-shifting. This can create more hand-offs which we have already learnt are a potential source of error. There can be a difficult balance to reach between minimising hand-offs and making sure the bottleneck is occupied only with work causing the constraint.

Shorten the time it takes the constraint to complete its task (increase throughput)

If we can reduce the time it takes for the bottleneck to perform its function we can speed up the flow through the process and in doing so increase the throughput of the process. For example, a doctor could be supported in their consulting room by an interpreter to facilitate



communication where language between the patient and doctor is a barrier. An administrative clerk could complete forms and record notes under the direction of the doctor to speed up the consultation time.

Increase capacity at the bottleneck

This is often the first thing that is suggested to improve the performance of processes. “We need more staff, more equipment, more rooms”. This may be true but **often through improved process design it is possible to get**

much more out of existing resources without having to overwork them. A famous and rather unpopular study in the UK showed that as more and more Orthopaedic Surgeons were appointed to try and reduce waiting times for hip and knee replacements, waiting times remained stubbornly long. The shortage of surgeons was assumed to be the bottleneck but when their capacity was increased, there was no related increase in operating time.

Other applications of a process map

So far we have looked at using a process map to illustrate the process as it currently is. There are two other common uses in healthcare. The first is to produce a process map after you have made improvements in order to demonstrate how the process is now supposed to operate. This is done to try and standardise the running

of the process and reduce variability in performance. A second approach is to map the process as it should ideally be performed. You can then make comparisons between the ideal and the actual and start to make improvements towards achieving the ideal.

A process map can be used to illustrate:

1. Current situation

2. Situation after intervention

3. Ideal situation

Facilitating a process mapping exercise

- › Before you facilitate the production of a process map, try and understand the process and design the exercise accordingly. Anticipate where some of the best opportunities for improvement may lie and plan the start and end points and the level of detail you need to map in order to expose these
- › Process mapping should ideally be done with the people who are involved in delivering the process and possibly a customer of the process. They are the best people to describe what really happens and often have the motivation and authority to test out small changes to try and secure improvements
- › An easy way to set up a process mapping exercise is to stick a long line of flipchart paper up on a wall. Get participants to gather around the paper. Agree the start and the end point for the part of the process you want to map and the how much detail you need to go into. Invite people to call out steps in the process in the order that they occur. Where there is agreement that the named step should be included, get the person who first described it to write the step on a post-it note. Then stick the post-it notes on the flipchart paper. The advantage of using post-it notes is that if there are differences of opinion about the order of steps, if an important step is missed or the group decides a step shouldn't be included you can easily make changes until everyone is in agreement. If you have square post-it notes you can stick these at a 45° angle to give you a diamond for the decision points
- › If the group you are facilitating is large, ask a co-facilitator to gather up the completed post-it notes so you can stay at the front facilitating the discussion and attaching the post-it notes to the paper
- › When facilitating a process mapping exercise for a single team, you will usually be focussing on a common process. At other times, however, you may be asked to develop a process map that is illustrative and is a blend of a number of different organisations' processes. This is more complex and as a facilitator you will be aiming to represent those steps and an order that the majority of participants recognise and own



Process Mapping Exercise, Project 5's Alive!, Ghana

MODULE 1
HOW TO USE THE MODEL FOR
IMPROVEMENT

MODULE 2
HOW TO DEVELOP IDEAS FOR CHANGE
THAT MAY LEAD TO AN IMPROVEMENT

MODULE 3
HOW TO PRODUCE AND ANALYSE
A PROCESS MAP

MODULE 4
HOW TO SELECT MEASURES TO KNOW
YOUR CHANGE IS AN IMPROVEMENT

MODULE 5
HOW TO TEST A CHANGE USING THE
PLAN-DO-STUDY-ACT CYCLES

MODULE 6
HOW TO PLOT AND INTERPRET
DATA OVER TIME USING
ANNOTATED RUN CHARTS

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HOW TO RUN AN
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IMPROVEMENT COLLABORATIVE

MODULE 9
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SPREAD IMPROVEMENT

MODULE 10
HOW TO USE PSYCHOLOGY TO HELP
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**MODULE
four**

4

HOW TO
Select measures
to know your
change is an
improvement



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HOW TO GUIDE FOR QUALITY IMPROVEMENT



*In God we trust,
all others bring data*

Hastie et al, 2009, The Elements of Statistical Learning

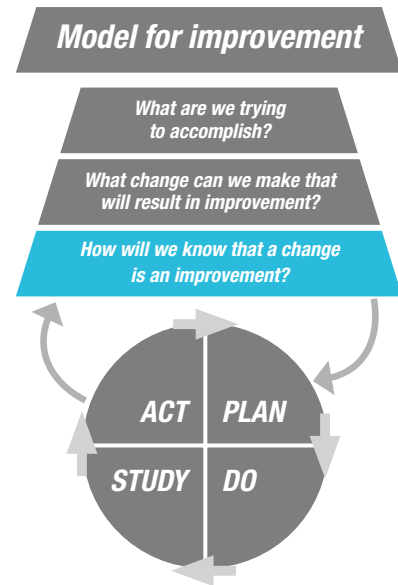


Module four

HOW TO SELECT MEASURES TO KNOW YOUR CHANGE IS AN IMPROVEMENT

In this HOW TO guide we cover:

- » Measures for an improvement project 3
 - › Aim and outcome measures 3
 - › Change ideas and process measures 3
 - › Balancing measures 5
- » Measures for improving a key step in the overall process 7
- » Measures for Plan-Do-Study-Act cycles 8
- » Data elements, indicators, numerators and denominators 10
- » Defining what you want to measure 11



Source: Associates in Process Improvement



Measures for an improvement project

Aim and outcome measures

When you are designing an improvement project you begin by setting an aim. For example, “I aim to lose 5 kgs in weight in 7 weeks”. In order to be able to know if you’ve made an improvement you need to be able to identify a measure that tells you whether you

have achieved your aim. **This is called an outcome measure and relates to the aim.** So when trying to lose weight, your outcome measure could be weight in kgs.

EXAMPLE of outcome measures for two different improvement projects

	Project 1	Project 2
Aim	Makhetti Subdistrict aims to reduce the transmission of HIV from mothers to their babies by 6 weeks of age from 7% to 3% in 18 months	Nkhosi village aims to reduce home-based deliveries from on average 2 to <1 per month by July 2014
Outcome measure	HIV positivity rates of HIV-exposed babies tested for polymerase chain reaction (PCR) at 6 weeks of age per month	The number of home-based deliveries per month in Nkhosi village

Change ideas and process measures

You then need to start thinking about what changes you can make that could lead to an improvement. So returning to our example, you might decide to put yourself on a strict diet eating no more than 1200 calories a day. In order to be able to answer the question “did the change lead to an improvement?” you need to look at your outcome measure (weight in kgs) and whether you actually performed the change

or step you intended to and how reliably. Did you stick to your diet? In order to measure this you could record the number of calories you consume each day. **Measures associated with your change are called process measures** because these changes are often related to key steps in the process that is designed to achieve your aim.



EXAMPLE of process measures for two different improvement projects

	Project 1	Project 2
Aim	Makhetti Subdistrict aims to reduce the transmission of HIV from mothers to their babies by 6 weeks of age from 7% to 3% in 18 months	Nkhosi village aims to reduce home-based deliveries from on average 2 to <1 per month by July 2014
Outcome Measure	HIV positivity rates of HIV-exposed babies tested for polymerase chain reaction (PCR) at 6 weeks of age per month	The number of home-based deliveries per month in Nkhosi village
Change Ideas	<p>Testing pregnant women for HIV at their first antenatal visit</p> <p>Starting those women who are HIV infected but not already taking antiretrovirals on a Fixed Dose Combination</p> <p>Re-testing HIV uninfected women every 12 weeks during their pregnancy</p> <p>Providing nevirapine to HIV-exposed babies</p>	<p>The local health clinic decides to invite male partners of pregnant women to attend an antenatal (ANC) appointment during which the midwife will emphasise the risks associated with home deliveries and the need for the couple to make preparations for a delivery at the health centre</p>
Process Measures	<p>HIV testing rates at the first antenatal visit</p> <p>Initiation rates for HIV infected pregnant women not already on antiretrovirals</p> <p>Re-testing rates every 12 weeks after first antenatal visit for HIV uninfected women</p> <p>Proportion of HIV-exposed babies who receive nevirapine</p>	<p>The number of male partners invited to attend an ANC appointment</p> <p>The number of male partners who came to the appointment</p> <p>The number who received counselling on delivery risks and preparations for a health facility birth</p>



Balancing measures

Finally, there may be other consequences associated with making the changes that are important to know about. They may occur in another part of the system that is not the focus of your improvement work. If these consequences are positive, you may want to know about them in order to understand how extensive the improvements associated with your change are. If they are negative, this information helps in answering the question “did the change lead to an improvement?”. You may have improved one part of the process or system while creating a real problem elsewhere.

An easy way of understanding these **unintended consequences** is to think about the side effects you can experience when taking a particular drug. Side effects are not the therapeutic properties of the drug but additional changes that can occur when we take it. The side effects can be positive (e.g. more energy, improved appetite) or can be negative (e.g. drowsiness, nausea). **The changes we make during improvement projects can have side effects.** Sometimes you can anticipate these and measure to see if they occur. Returning to our original example, side effects associated with going on a strict diet could be feeling tired at work, needing more sleep, buying less food. To measure these, you may decide to record how many productive hours of work you do in a

day, the number of hours you sleep per day or how much you spend on groceries. **These measures are called balancing measures.**

For every improvement project, you will want to identify a set of **outcome, process and balancing measures** and wherever possible, obtain some data related to these measures *before* you start making any changes. These **baseline measures** tell you how you were performing before you tried to make improvements.



EXAMPLE of balancing measures for two different improvement projects

	Project 1	Project 2
Aim	Makhetti Subdistrict aims to reduce the transmission of HIV from mothers to their babies by 6 weeks of age from 7% to 3% in 18 months	Nkhosi village aims to reduce home-based deliveries from on average 2 to <1 per month by July 2014
Outcome Measure	HIV positivity rates of HIV-exposed babies tested for polymerase chain reaction (PCR) at 6 weeks of age per month	The number of home-based deliveries per month in Nkhosi village
Change Ideas	<p>Testing pregnant women for HIV at their first antenatal visit</p> <p>Starting those women who are HIV infected but not on antiretrovirals on a Fixed Dose Combination</p> <p>Starting those women who are HIV infected but not on antiretrovirals on a Fixed Dose Combination</p> <p>Re-testing HIV uninfected women every 12 weeks during their pregnancy</p> <p>Providing nevirapine to HIV-exposed babies</p>	The local health clinic decides to invite male partners of pregnant women to attend an antenatal (ANC) appointment during which the midwife will emphasise the risks associated with home deliveries and the need for the couple to make preparations for a delivery at the health centre
Balancing Measures	<p>Stock outs of Fixed Dose Combination drugs</p> <p>Waiting times in the clinic for patients who are not pregnant</p>	Frequency of visits to the health clinic for children <1 years old from Nkhosi village



Measures for **improving** a **key step** in the overall process

Sometimes when our improvement projects are big, we break them down into smaller “chunks” to make the work more manageable. For those of you familiar with Improvement Collaboratives (see HOW TO Module 8), these smaller chunks often relate to the topics covered in a single learning session and action period. Imagine you were designing an improvement project that was seeking to reduce the transmission of HIV from mothers to their babies. We know there are a number of important process steps that must be performed reliably to ensure transmission rates are extremely low. These steps relate to the Prevention of Mother to Child Transmission (PMTCT) care guidelines. Improving performance in any one of these steps could, for a period, become a mini project in its own right. What if one primary healthcare clinic in the project, Pacassa Clinic, decided it wanted to increase its HIV testing rates at the first antenatal (ANC) visit from 75 to 100% within 6 months as a step in reducing overall transmission rates? Because this is now Pacassa’s aim, its **outcome measure** for a period would be HIV testing rates at first antenatal visit and its **process measures** would relate to any changes it introduced that were designed to help increase testing rates.



Q: How do you eat an elephant?
A: One bite at a time...

Measures for Plan-Do-Study-Act (PDSA) cycles

PDSAs are small, short experiments (see HOW TO Module 5). Like other experiments, you need to identify a representative sample (e.g. 10 patients, one ward round), introduce a change and then see what happens to the sample as a consequence of the change.

Just like designing an improvement project, **you need to identify at least outcome and process measures and possibly balancing measures for these PDSA cycles.**

Every PDSA cycle should have an aim. This could be similar to the overall improvement project aim but while

testing a change idea on a small scale you **focus only on your sample.** **EXAMPLE** if you decided to lose weight and wanted to test the idea of eating no more than 1200 calories per day, you might decide to try this just for one week to begin with. In this instance, your **PDSA aim** could be to lose one kg of weight in one week. Your **PDSA outcome measure** would be weight (in kgs) lost during that week. Your **PDSA process measure** could be how many days of that week you ate no more than 1200 calories or the average number of calories per day you consumed over the week.

Aim: I aim to lose 5 kgs in weight in 7 weeks

Change Idea:	Scale for First PDSA:	PDSA Aim:	PDSA Outcome Measure:	PDSA Process Measure(s):
Eating no more than 1200 calories per day	1 week	Lose 1 kg of weight in 1 week	Weight (in kgs) lost during week	<ul style="list-style-type: none"> » How many days during week I ate no more than 1200 calories OR » Average number of calories per day I consumed during week





NOTE data collection for PDSA measures often has to be set up as a specific activity **TIP** how long you initially test a change idea for is determined by how long it will take to detect an improvement if the change is beneficial. There would be no point in testing your diet for one day as it would be unlikely you would detect a change in weight after this period, even if the diet was working. **If your initial sample size is too small, you may not be able to show an improvement even if it is present. If it is too big, you can waste time, money and good will trying something that is not working.**

If you see some early evidence of success after an initial small-scale test, you will continue to test your change, adapting it as necessary and increasing the scale. Eventually, your sample size will become as big as “everyone” or “every time”. At this point, your PDSA outcome measure may be the same as something you are already measuring routinely e.g. for management information systems and you abandon your special arrangements for measuring this.

In some instances, the aim for your PDSA is very different from the overall improvement project aim. **EXAMPLE** Pacassa Clinic is working on HIV testing rates during the first ANC visit as part of an overall aim to reduce HIV transmission from mothers to their babies. Their **PDSA aim** could be to test 100% of all women who are seen for a first antenatal visit on Monday 20th June. Their **outcome measure** would be the proportion of women attending a first ANC visit on this date who were tested for HIV. If their change idea is to provide HIV counselling and testing before palpating the mothers, their **process measure**

for the PDSA would be the proportion of the women seen for first ANC on 20th June that were counselled and tested before being palpated.

An easy way to remember what the **process measures are for a PDSA is “how do we measure if we did the change we said we were going to do?”**.

EXAMPLE of PDSA aims and measures

Project aim	To reduce home-based deliveries in Nkhosi Village from 2 to less than 1 a month by July 2014
PDSA aim	To ensure all 5 women participating in the PDSA give birth at a health facility
Outcome measure	Proportion of the women involved in the PDSA who gave birth at a health facility*
Change idea	To invite the male partners of these women to attend an ANC visit and discuss with them the risks of giving birth at home and preparing for a health facility delivery
Process measure	Proportion of the 5 womens' male partners who got an invitation to attend ANC, the proportion who came and the proportion who received the planned counselling
Balancing measure	None

* Note that it will take some time before the outcome of this test is known if the women selected for the PDSA have not been pregnant for very long. The intervention takes place during ANC and it will not be until they give birth that it is possible to measure the outcome of this change. One way of making the PDSA shorter is to select women for the test who are of late gestational age (8 months pregnant).

Data elements, indicators, numerators and denominators

What do these mean and why do they matter?

The simplest way to measure is to count how many. For example, you could count how many women you tested for HIV during their first ANC visit. In the South African healthcare system, this is known as a **data element**.

Imagine on Wednesday you tested 8 women and on Friday only 4. Has your performance gone down? The answer is “I don’t know”. Until we know how many women attended for a first ANC appointment on both days and needed an HIV test we can’t answer this question.

Imagine on Wednesday 16 women should have received a test and on Friday only 6. Is our performance going up or down?

The answer is UP because:

On Wednesday we tested 8 out of the 16 women who should have been tested; therefore our testing rate was 50%. On Friday we tested 4 out of the 6 women who had a first ANC visit so our testing rate was 66%.

When we make a calculation like this that compares who should have received the service with who got the service we call the value **an indicator**. It is usually presented as a percentage.

The easy way to remember this is to think of the following calculation:

$$\frac{\text{number of people receiving the service}}{\text{number of people who should have received the service}} = \text{indicator (x 100 for \%)}$$

The number who received the service (the top of the fraction) is known as the **numerator**, the number who should have gotten the service (the bottom of the fraction) is known as the **denominator**.

In the example above, the numerator is the number of woman who attended their first ANC appointment and were tested for HIV; the denominator is the number of women who attended their first ANC appointment and whose HIV status was unknown or negative at their last test.



Defining what you want to measure

When undertaking an improvement project or PDSA it is important to gather data on at least our outcome and process measures to be able to answer the question “did the change lead to an improvement?”. Often the people gathering this data are not those who decided what the measures should be. It is therefore important to clearly define these measures. **EXAMPLE** when trying to lose weight, should we be weighing ourselves at the same time every day? If so, the definition of our measure needs to state this. What about weighing ourselves with or without our clothes on? So the **operational** definition of our measure of weight in kgs could be “weighing yourself at 07:00 without any clothes on”.

The same is true in healthcare. For many of the data elements and indicators gathered by national departments of health, operational definitions of measures are stated. These need to be followed in order for the same data elements or indicators to be compared over time and comparisons made across different parts of the healthcare system. **EXAMPLE** in South Africa, the indicator “HIV testing rates at the first ANC visit” includes a denominator that measures only those women whose HIV status is negative or not known. Women who are already known to be HIV-infected are excluded. Fixed dose combination (FDC) initiation rates have a denominator that includes all those women testing HIV positive at their first ANC visit and those who were already known to be HIV infected but not on antiretrovirals.



How would you measure a pineapple?¹

Sounds easy? Maybe not.

Are you interested in measuring the pineapple's:

- » circumference (the distance around the fruit)?
- » Its height (do you include the stalk or not)?
- » Its firmness?
- » Its weight (before or after removing its inedible outer skin)?

How easily could you describe any of these measures to 10 other people so that they could measure the pineapple in exactly the same way and come up with the same answer?

One important rule in measurement is to clearly define what you should be measuring so that things are measured consistently, by different people and over time.



¹ Source: Richard Scoville, PHD, IHI Improvement Advisor

MODULE 1
HOW TO USE THE MODEL FOR
IMPROVEMENT

MODULE 2
HOW TO DEVELOP IDEAS FOR CHANGE
THAT MAY LEAD TO AN IMPROVEMENT

MODULE 3
HOW TO PRODUCE AND ANALYSE
A PROCESS MAP

MODULE 4
HOW TO SELECT MEASURES TO KNOW
YOUR CHANGE IS AN IMPROVEMENT

MODULE 5
HOW TO TEST A CHANGE USING THE
PLAN-DO-STUDY-ACT CYCLES

MODULE 6
HOW TO PLOT AND INTERPRET
DATA OVER TIME USING
ANNOTATED RUN CHARTS

MODULE 7
HOW TO RUN AN
IMPROVEMENT TEAM MEETING

MODULE 8
HOW TO DESIGN AND RUN AN
IMPROVEMENT COLLABORATIVE

MODULE 9
HOW TO SUSTAIN AND
SPREAD IMPROVEMENT

MODULE 10
HOW TO USE PSYCHOLOGY TO HELP
SECURE AND SUSTAIN IMPROVEMENTS

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MODULE
five

5

HOW TO
Test a change
using the
Plan-Do-Study-
Act cycles



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“

It doesn't matter how beautiful your theory is, it doesn't matter how smart you are. If it doesn't agree with experiment, it's wrong

Richard P. Feynman

”



THE AURUM
INSTITUTE

HOW TO GUIDE FOR QUALITY IMPROVEMENT

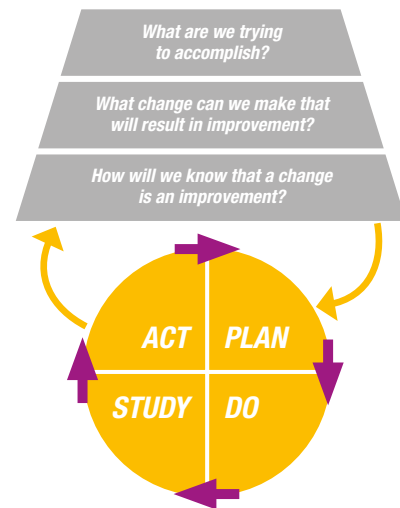
Module five

HOW TO TEST A CHANGE USING THE PLAN-DO-STUDY-ACT CYCLES

In this **HOW TO** guide we cover:

» Why test?.....	4
» Components of the Plan-Do-Study-Act (PDSA) cycle?.....	6
» Things to remember when using PDSAs.....	9
» Multiple tests.....	10
» Recording PDSAs.....	11
» Top tips for planning and conducting PDSAs.....	12
» Example of a series of PDSAs.....	13

Model for improvement



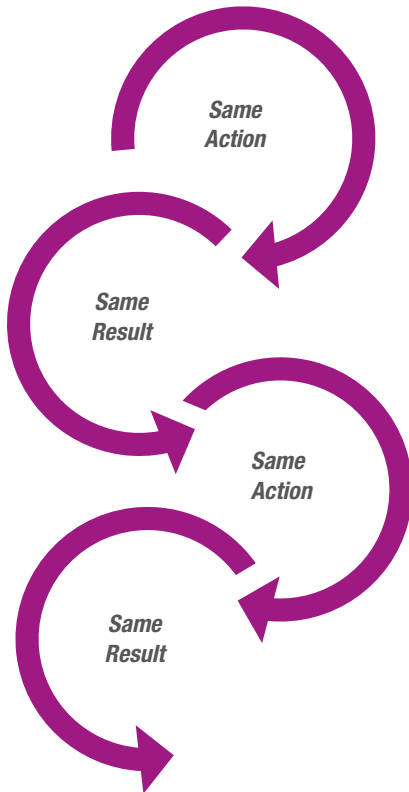
Source: Associates in Process Improvement



*“Theories might inspire you,
but experiments will advance you.”*

Amit Kalantri

Why test?



When we are trying to make improvements we have to make changes. If we continue to **do the same thing over and over, we will get the same results**. The problem is **we don't always know whether a change will lead to an improvement**.

When should we test?

- › We have a change in mind but it's **unproven**; we've just thought of it. We don't know of anyone else who's tried it and therefore whether it is going to be successful
- › We know of others who've introduced the change and achieved great results but we **don't know whether it will work for us**
- › The change **involves other people who are not quite so enthusiastic** about doing something different. They may be afraid of it not working and any possible negative consequences
- › The **consequences of failing would be significant**. We can't afford to implement something without knowing it will work

EXAMPLE OF 'WHY TEST?'

Imagine you decided you wanted to make some extra money on the side by selling DVDs. You are pretty sure that potential customers are keen on romantic comedies so you invest 80% of all your start-up funds in a great range of these movies. After a week you've sold only 3. You are about to give up when a friend suggests you should try selling action DVDs. Using half of the remaining funds you have, you buy 5 action movies and these are sold within a day. You are now kicking yourself for not having tested the market before you made your initial investment



The advantages of testing are:

We can run a small experiment trying out the new idea at the same time as doing what we normally do. It is not too disruptive if it doesn't work



We can check if it works as well for us as its worked for others



We don't have to convince lots of other people that our idea is a good one. If we test it out on a small scale, we can work with people who are willing to have a go



We can get rid of any teething problems before we implement



We don't need lots of additional resources



We can check that the change works under different conditions



We can build evidence about whether it is an improvement. This increases our confidence and knowledge about the change

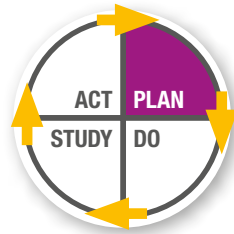


Other people can learn from the test and if its successful they are more likely to want to try it



Components of the **Plan-Do-Study-Act** cycle

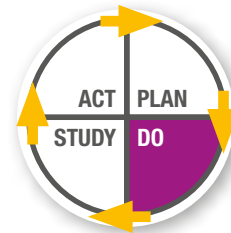
The Plan-Do-Study-Act (PDSA) cycle provides a framework for running our tests **designed to tell us if the idea or change leads to an improvement.**



- › what you **predict** will happen and why
- › how you are going to gather **data** to tell you whether you did the change you intended to do and if, as a consequence, the outcome was better than usual (see HOW TO Module 4)

During the “**PLAN**” phase you decide:

- › exactly **what** you are going to do
- › **when** and **how** you are going to do it
- › under what **conditions** – in early test cycles you would choose the most favourable conditions for success but as you adapt the idea and/or increase the scale of testing you will deliberately try the change out under more challenging/ different conditions to see if you can still get it to work
- › **who** will be involved
- › **how long** or on **how many** subjects you are going to conduct your test or mini-experiment



Once you have planned your PDSA, you need to “**DO**” it. During this period you will want to **record** how easy it was to introduce the change, who got it, what were the outcomes and any additional **observations and data** that could help you decide whether the change is a helpful one.

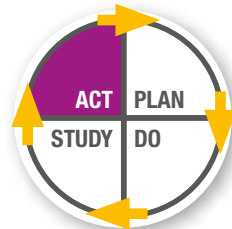




Having carried out your experiment it is important that you **“STUDY”** your findings to see what the data are telling you. Involve all those who participated in the test so that they can add their perspectives to this assessment. **Compare what actually happened** to what you predicted would happen. This section of the PDSA is essential and often missed. It is important to be **deliberate about documenting your learning** from the test in order to make a sound decision under “Act”.

Finally, you need to **“ACT”**. What are you going to do next? Here you have a number of choices:

- › **abandon the change** – the evidence suggests it is not an improvement and you can’t think of any way in which you could get it to work more effectively
- › **adapt the change** – it is showing some promise but there were some adjustments you could make to your original idea that would make it better
- › keep the change as it is but **increase the scale** of your experiment and test again – changes sometimes work well on a small scale but need to be altered slightly when you increase the scale. You won’t know this until you’ve tested it on a bigger scale
- › keep the change as it is but **test under different conditions** – you may have got great results under certain conditions, but are they replicable across other conditions e.g. on a busy Monday morning, when you are a member of staff down?
- › once you have tested the change on a large scale and under a range of conditions you may be ready to **adopt** it (i.e. implement as a permanent part of a process). **NOTE** you should not go from a small scale test to adopting the change. It will need to be tested under different conditions and at larger scales before you will be ready to adopt it



Description of each stage in a PDSA cycle

ACT PLAN

Decide what to do next:

- Adapt the change and test again on a small scale?*
- Increase the scale and test again*
- Test under different conditions*
- Abandon the change?*
- Adopt after testing at scale and under different condition*
- Plan your next cycle*

Plan the test. Who's involved? What is the change? Where and when are you going to do it? Under what conditions? For how long will you test before you review (study)? On what scale will you test (sample size)? Do you need permission? Do you know your baseline performance? What do you predict will happen? Remember to plan for collection of data during the test

STUDY DO

Stop and review. What happened? What's the data telling you? Is this what you were expecting to happen? Summarise *what was learned*

Carry out the plan. Document what happened (*process measures*) and any *unexpected observations*



Things to remember when using PDSAs

- › You are testing a new idea because you want to make an improvement. **Be clear about what you are trying to improve. How can you measure it?** This is your **outcome measure**.
- › Before testing, assess how well you are currently doing against your outcome measure. This is known as your **baseline**.
- › Before testing, think about what you **predict** will happen when you run your test. This is like stating your hypothesis before doing research. Write your predictions down. This should include what you anticipate will happen and why. What is the theory behind your prediction? You can then compare what actually happened with what you thought would happen during the “Study” phase of your PDSA.
- › Your first test should be on a **small scale** e.g. one hour, five patients, one outpatient clinic.
- › Make sure you record whether everyone you chose to receive the change (your **sample**) **got the change**.
- › Check what the **outcome was** for these people. Remember, the outcome relates to the thing you are trying to improve e.g. if you are trying to reduce consultation times, you will measure and record consultation times for the patients in your sample.
- › **Compare the outcome for your sample with your baseline** e.g. your average consultation times.
- › Once you’ve run your test, looked at your data and determined whether there is any evidence the change idea led to an improvement. Decide whether there are any **adjustments** you could make that would **make it even better**. If so, introduce these changes and run the test again on a small scale.
- › If the idea appears to be giving you favourable results and you can’t think of anything that could make it better, run the test again on a **larger scale** e.g. for half a day, on 20 patients, all outpatient clinics for a whole week.



Multiple tests

As part of your initial PDSA cycle, you will decide if the change is showing some evidence of an improvement. If it is, you may need to adapt it to get it to work even better.

With each adaptation you will run another PDSA cycle usually using the same scale as the previous cycle.

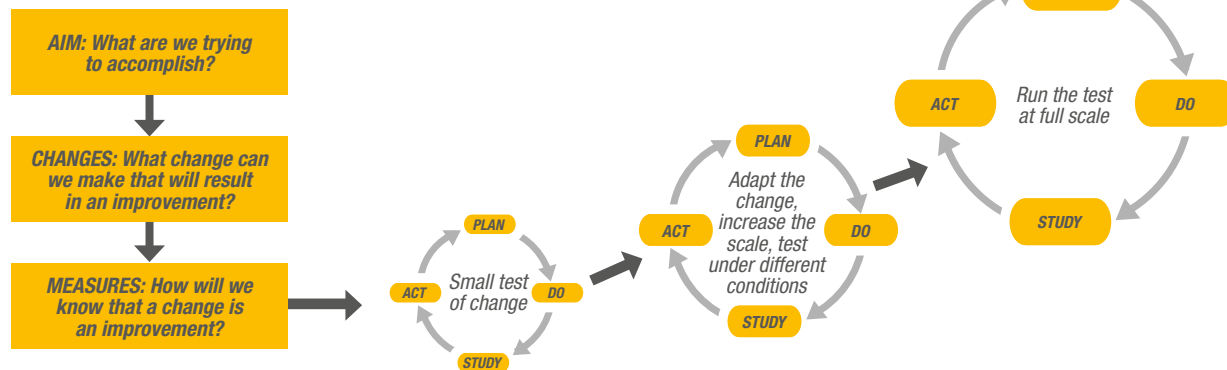
Once you are happy the change is working well and no further changes are necessary, you increase the scale and test again.

As you increase the scale you may need to make further adaptations to the idea

you are testing. The change in scale may automatically expose the change to a range of new conditions (e.g. by increasing the testing time to 5 days you are now introducing the idea on a busy Monday morning or the night shift). If this doesn't happen, deliberately expand your testing to include different conditions. Make adaptations as necessary. You **continue to run PDSA cycles** adapting, increasing the scale and testing under different conditions **until you have good evidence that the change works.**

Now you are ready to implement! Be aware that at this point everyone who will be affected by the change will need to sign up to doing something differently. Some could be resistant and you may need to help them understand the benefits of the change using evidence you've been able to gather as you've tested and collected data. You will also need to make permanent any temporary support structures (e.g. ordering of different volumes of supplies) that have enabled the change to be performed.

Rapid change cycles(PDSAs)



PDSA cycles are short (usually <1 day to 1 month) and typically follow a sequence from initial test to implementation



Recording PDSAs

It is a good idea to record your PDSAs. A number of different templates have been designed for this purpose (see example below). You may prefer to develop your own. Remember to use a new template for each PDSA.

The overall aim: <i>[Write here your overall aim – what you are trying to achieve, by how much, by when]</i>					
The PDSA aim: <i>[Write here what outcome you are trying to achieve as a result of testing your change during this PDSA cycle]</i>					
The change idea: <i>[Clearly state the change idea you intend to test]</i>	<table border="1"><tr><td>ACT <i>[Record what you decide to do – adapt, increase scale, test under different conditions, adopt, abandon?]</i></td><td>PLAN <i>[Describe the plan for your test. Who will do what, how, when, for how long, on how many people, under what conditions? What data will you record & how? Do you have baseline data?]</i></td></tr><tr><td>STUDY <i>[Document your discussion in reviewing your test]</i></td><td>DO <i>[Describe what happened when you ran your test. What results did you get?]</i></td></tr></table>	ACT <i>[Record what you decide to do – adapt, increase scale, test under different conditions, adopt, abandon?]</i>	PLAN <i>[Describe the plan for your test. Who will do what, how, when, for how long, on how many people, under what conditions? What data will you record & how? Do you have baseline data?]</i>	STUDY <i>[Document your discussion in reviewing your test]</i>	DO <i>[Describe what happened when you ran your test. What results did you get?]</i>
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STUDY <i>[Document your discussion in reviewing your test]</i>	DO <i>[Describe what happened when you ran your test. What results did you get?]</i>				
	The measures (outcome and process): <i>[Here you should describe the outcome measure that tells you whether you've achieved your aim and the process measure that tells you whether you did the change you intended]</i>				
The prediction: <i>[Write here what you think is going to happen during your test and why]</i>					

Top tips for planning and conducting PDSAs



- » When you start testing on a very small scale, you **measure whether your sample received the change and what the outcome was for them**. You may want to design some easy ways of recording this, such as a check-sheet or table.
- » **As you increase your scale** e.g. every patient seen this month, **you may find that your regular data capture tools are already recording the outcome data you need** and you can stop collecting it separately. You will still need to measure whether everyone in your test received the change they were supposed to as this is rarely recorded routinely.
- » **Don't leave it too long before you start.** Your design doesn't need to be perfect. You will have a chance to make changes after your first test.
- » **Don't test for too long.** Your test cycle should not run for more than a month and initially it is likely to continue for only a few hours or days. You don't want to continue testing something that isn't working. It wastes money, time and good will.
- » Be aware **there may be a delay in seeing an improvement** in the outcome.
 - 🔗 **EXAMPLE** you show 5 pregnant women a video explaining the risks of giving birth at home in an attempt to increase health facility based deliveries. Now you have to track those same women to find out where they gave birth, the outcome you are interested in. This could take several months. One way of reducing the time between making the change and seeing the effect is to choose a sample that will shortly be experiencing the outcome. In this example, you could test the video on 5 women who were 8 months pregnant and then you'd only have to wait a month before you knew where they gave birth.

🔗 EXAMPLE of a check sheet

No. of women of child-bearing age attending clinic	No. of women of child-bearing age screened for pregnancy	No. of women screened positive for pregnancy, tested	No. of women having pregnancy test found to be pregnant	No. of newly identified pregnant women offered ANC appointment	No. of newly identified pregnant women seen for first ANC	No. of these women seen for first ANC <20 weeks pregnant



Example of a series of PDSAs

□ First PDSA in a series

The overall aim: to increase the proportion of women attending their first antenatal care (ANC) appointment who are less than 20 weeks pregnant from 34% (March to August) to 60% by 31st December 2014

The PDSA aim: to increase the proportion of women attending their first ANC appointment who are less than 20 weeks pregnant on Tuesday 1st October from the current baseline of 34% to 60%

The change idea:

Clerk screens for pregnancy all the women of child bearing age who visit the clinic on 1st Oct. Vital signs nurse to test those who are suspected of being pregnant. Encourage all women who are pregnant to have their 1st ANC appointment

ACT PLAN

Adapt the idea. Assign an auxiliary nurse to assist the vital signs nurse. Test again for 1 day

Clerk to check women of child-bearing age & issue screening form. Record no. of women & forms issued & completed. Vital signs nurse to test urine of those who screen +ve. Record no. who screened +ve, have a pregnancy test & are pregnant. Trained nurses to provide 1st ANC consultation on all newly tested pregnant women. Record no. of these 1st appointments & the gestational age of all women having unplanned ANC consultations on that day

STUDY

Outcome better than baseline. Vital signs nurse needed help. Was not able to do both jobs alone

(8 unplanned pregnancies <20 weeks ÷ 12 unplanned pregnant patients = 66%)

DO *32 were screened, 20 screened +ve. 19 had a pregnancy test, 12 were pregnant, all had 1st ANC, 8 were <20 weeks, as were 3/8 of the planned 1st ANC consultations.*

The PDSA measures:

Outcome – proportion of women who attended the clinic on 1 Oct. and had an unplanned 1st ANC appointment who were <20 weeks pregnant

Process – proportion of women of child-bearing age screened for pregnancy, proportion screened positive who had a pregnancy test, proportion who were pregnant had a 1st ANC appointment

The prediction: All women of child-bearing age will be screened, 98% who screen positive will agree to have a pregnancy test because its free, 90% of the pregnant women will be seen for a 1st ANC appointment because some will be too shocked or too busy to take this next step and 60% of all women seen for 1st ANC on 1st Oct will be <20 weeks gestational age

Important observations from first PDSA

- › This is the first cycle so the test is on a small scale – just for one day
- › There are several elements to the change idea – each one needs to be measured (see process measures)
- › As we are testing an idea, we need to use only the data from the people involved in our test.

- The denominator is therefore only the first unplanned ANC visits and not the total ANC visits (planned and unplanned)
- › Compare the outcome measure on the day of testing with the baseline to establish if the change is showing early evidence of improvement

- › Vital signs nurse struggled with workload as a result of the change. Need to address this before the scale is increased – someone is assigned to support her
- › Because the idea has been adapted, the next test is on a small scale

📌 Second PDSA in a series

The overall aim: to increase the proportion of women attending their first ANC appointment who are less than 20 weeks pregnant from 34% (March to August) to 60% by 31st December 2014

The PDSA aim: to increase the proportion of women attending their first ANC appointment who are less than 20 weeks pregnant on 7th October from the current baseline of 34% to 60%

The change idea:

Clerk screens for pregnancy all the women of child bearing age who visit the clinic on 7th October. Vital signs nurse with help from auxiliary nurse to test those who are suspected of being pregnant. Encourage all women who are pregnant to have their 1st ANC appointment

ACT PLAN

Increase scale – make sure there are enough pregnancy testing kits available before testing again.
Test for 1 week

Clerk to check women of child-bearing age & issue screening form. Record as for previous PDSA. Vital signs nurse, assisted by an auxiliary nurse, to test urine of those who screen positive. Record as for previous PDSA. Trained nurses to provide 1st ANC consultation to all newly tested pregnant women. Record as on previous PDSA

STUDY

Ran out of pregnancy testing kits. Outcome – 75%. Vital signs nurse was able to attend to all patients & test urine for pregnancy with support
(9 unplanned pregnancies <20 weeks ÷ 12 had first ANC appointment = 75%)

DO 37 women were screened, 25 screened +ve, 24 agreed to a pregnancy test. Only 19 were tested because ran out of testing kits. 13 were pregnant, 12 had 1st ANC appt. & 9 were <20 wks. as were 2/6 of the planned 1st ANC appts.

The PDSA measures:

Outcome – proportion of women who attended the clinic on 7 Oct. and had an unplanned 1st ANC appointment that were <20 weeks pregnant

Process – proportion of women of child-bearing age screened for pregnancy, proportion screened positive who had a pregnancy test, proportion who were pregnant had a 1st ANC appointment

The prediction: All women of child-bearing age will be screened, 95% who screen positive will agree to have a pregnancy test because its free, 95% of the pregnant women will be seen for a 1st ANC appointment because some will be too shocked or too busy to take this next step and >60% of all unplanned women seen for 1st ANC on 7th Oct will be <20 weeks gestational age. Vital signs nurse will be able to manage the extra workload with support

Important observations from second PDSA

- › The aim now incorporates a new date for testing but the target is still 60% based on the results of the previous cycle (66%)
- › The change idea has been modified to include the auxiliary nurse assisting the vital signs nurse
- › There are only 6 days between the first and the second PDSA – this helps to maintain the momentum of testing and reviewing
- › There are some changes to the prediction based on the results of the previous PDSA
- › There is no change in the PDSA measures and data collection
- › During the test they ran out of pregnancy testing kits. Its clear there is a need to address the support structures to enable this change to be fully effective but fundamentally the change is the same so the scale is increased



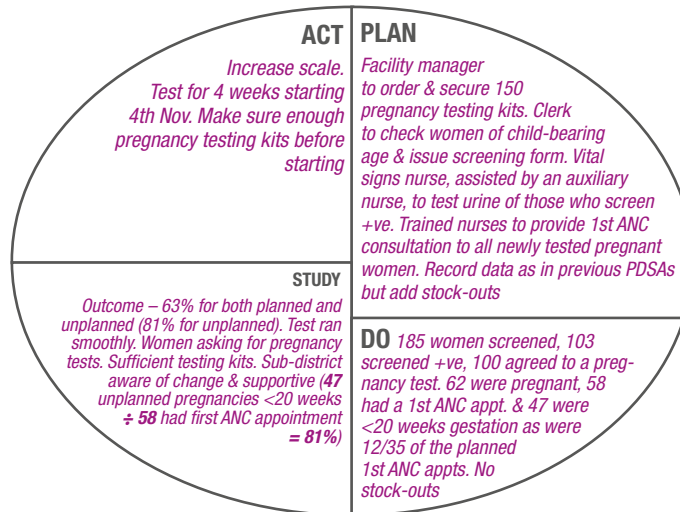
Third PDSA in a series

The overall aim: to increase the proportion of women attending their first ANC appointment who are less than 20 weeks pregnant from 34% (March to August) to 60% by 31st December 2014

The PDSA aim: to increase the proportion of women attending their first ANC appointment who are less than 20 weeks pregnant during the week commencing 21st October from the current baseline of 34% to 60%

The change idea:

Clerk screens for pregnancy all the women of child bearing age who visit the clinic for 1 week starting 21st Oct. Test those who are suspected of being pregnant. Encourage all women who are pregnant to have their 1st ANC appointment. Ensure sufficient pregnancy testing kits are ordered & available before starting PDSA



The PDSA measures:

Outcome – proportion of women attending the clinic during the week of 21st Oct. who had an unplanned 1st ANC appt. & were <20 weeks pregnant

Process – proportion of women of child-bearing age screened for pregnancy, proportion screened positive who had a pregnancy test, proportion who were pregnant & had 1st ANC appt. Stock-outs of pregnancy testing kits

The prediction: All women of child-bearing age will be screened, 95% who screen positive will agree to have a pregnancy test because its free, 95% of the pregnant women will be seen for a 1st ANC appointment & >60% of all unplanned women seen for 1st ANC this week will be <20 weeks pregnant. May have large order of pregnancy testing kits queried by subdistrict

Important observations from third PDSA

- › The aim now incorporates the new testing period but the target is still 60% based on the results of previous cycles
- › The change idea has been modified to include the pre-ordering of pregnancy testing kits

- › There is a 13 day gap between the end of the last PDSA and the start of this PDSA to allow time for ordering and securing the pregnancy testing kits
- › It is anticipated the increase in this order may generate some questions from the subdistrict. This is included under the predictions

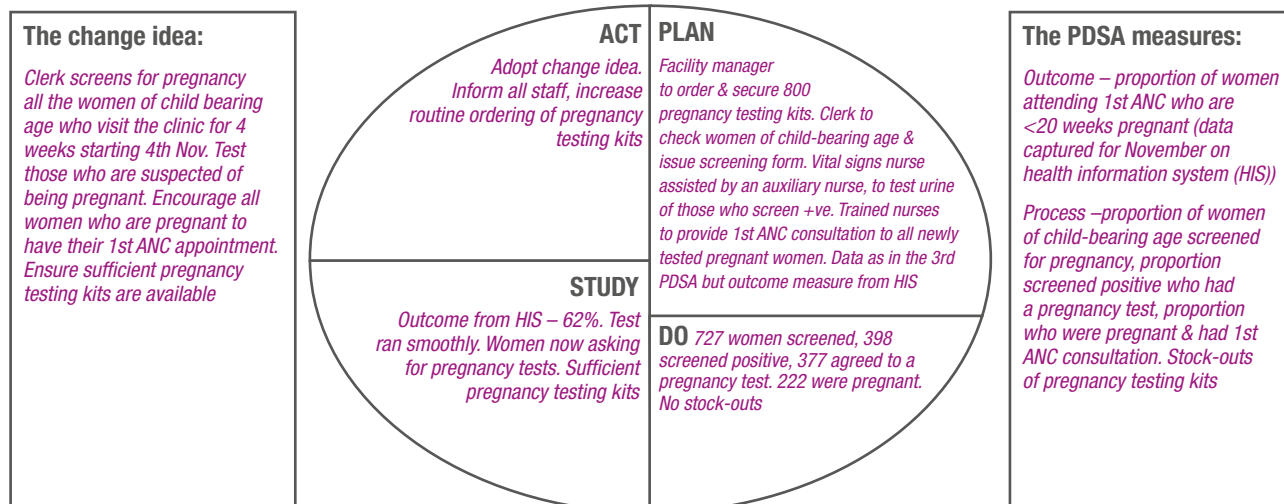
- › Stock-outs of pregnancy testing kits have been added to the PDSA process measures
- › Subdistrict made aware of change being tested. As the scale of changes increase it is advisable to inform those who may be directly or indirectly affected

- › After a successful testing cycle with no “glitches” and continued evidence of improved outcomes, it is time to increase the scale further. In this instance, increasing the scale to 4 weeks will test the idea under most conditions

📌 Fourth PDSA in a series

The overall aim: to increase the proportion of women attending their first antenatal care (ANC) appointment who are less than 20 weeks pregnant from 34% (March to August) to 60% by 31st December 2014

The PDSA aim: to increase the proportion of women attending their first ANC appointment who are less than 20 weeks pregnant during November from the baseline of 34% to 60%



The prediction: All women of child-bearing age will be screened, 95% who screen positive will agree to have a pregnancy test, 95% of the pregnant women will be seen for a 1st ANC appointment & >60% of all women seen for 1st ANC this month will be <20 weeks pregnant.

Important observations from fourth PDSA

- › The PDSA aim is the same as for the third PDSA although now “current” baseline is just referred to as the baseline. After testing the change for one week (third PDSA) an improvement may be detectable in routine measures so the original baseline prior to any testing should be used as a comparison. The time period referenced in the aim relates has changed
- › The change idea is the same as for the third PDSA although the time period has changed
- › Because the test is now running at full scale, HIS data can now be used.
- › HIS does not differentiate between planned and unplanned first ANC visits. Because we are now using HIS data, the denominator is no longer unplanned first ANC visits, but total first ANC visits
- › The measures are the same as for the third PDSA but now the outcome measure can be taken from the health information system (HIS) monthly statistics for November
- › After three cycles, the prediction of the outcome has changed to >60%
- › With support from the subdistrict, the supply of pregnancy testing kits is not anticipated to be a problem and therefore there is only a week between completing the third PDSA and starting the fourth
- › The outcome confirms predictions and the test runs smoothly
- › The change is ready to be adopted. All members of staff are delighted in the improvement they have made. So is the subdistrict who has committed to continually providing greater numbers of pregnancy testing kits as per recent orders. Changes in the numbers ordered now need to be routinely built into work processes

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MODULE 9

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SPREAD IMPROVEMENT

MODULE 10

HOW TO USE PSYCHOLOGY TO HELP
SECURE AND SUSTAIN IMPROVEMENTS

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**MODULE
six**

6

HOW TO
Plot and
interpret data
over time using
annotated
run charts



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“

*What gets measured,
gets managed*

Peter Drucker

”



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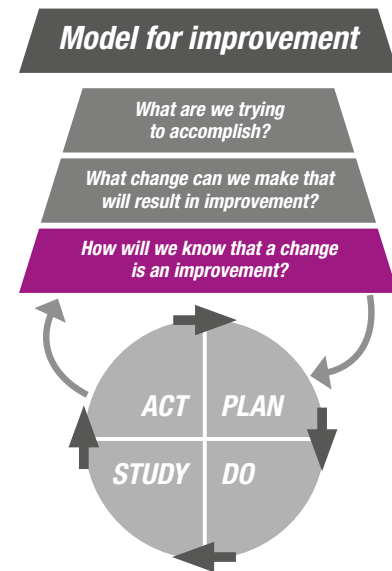
HOW TO GUIDE FOR QUALITY IMPROVEMENT

Module six

HOW TO PLOT AND INTERPRET DATA OVER TIME USING ANNOTATED RUN CHARTS

In this **HOW TO** guide we cover:

»	Introduction.....	3
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Source: Associates in Process Improvement



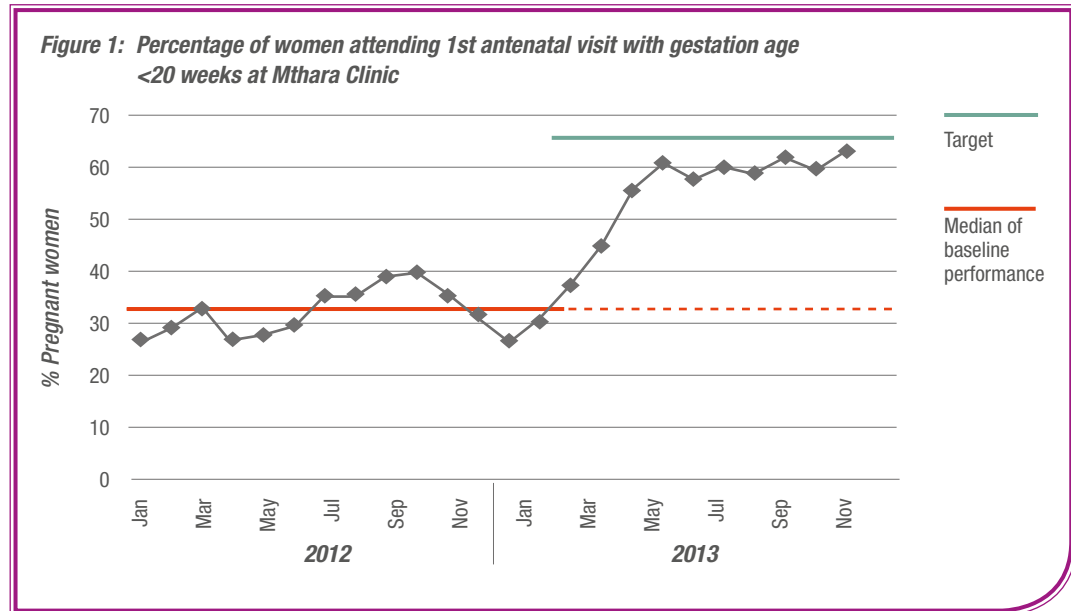
Introduction

Run Charts present data in a given order, usually over time. When you track performance over time it is possible to establish with a high degree of confidence whether there has been improvement. Knowing this is essential when you are trying to work out what changes are leading to an improvement (see HOW TO Module 1). As you introduce and test out different changes and continue to plot performance against your aim, you are able to answer the question “Did the change lead to an improvement?” by analysing the shape and height of the graph before and after testing. Run charts are therefore an important tool within the improvement practitioner’s toolkit. With experience, you can deduce a great deal about a given process by examining a well-constructed run chart.



‘Call me nuts, but I think this graph we’ve based our 5-year strategy on has been hung sideways’

EXAMPLE of a run chart.



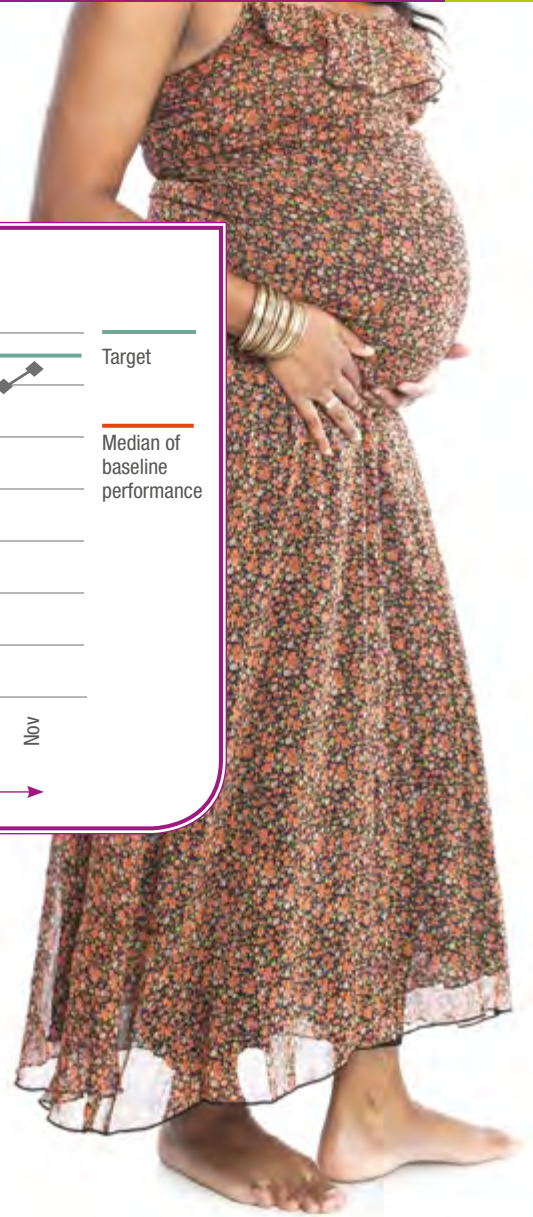
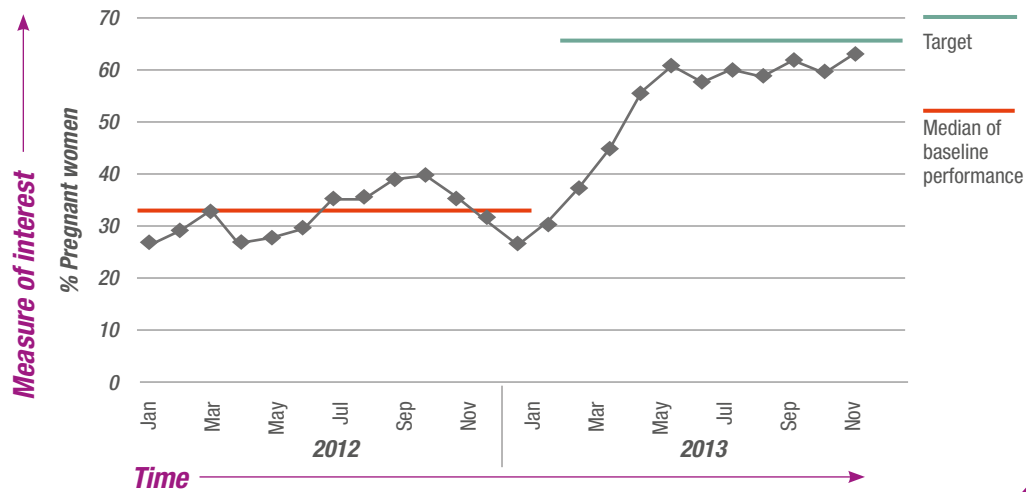
In Figure 1, we can see the performance of a clinic in providing first antenatal care visits to women less than 20 weeks pregnant, recorded over time. The red line indicates the central line of tendency, or median of the clinic's performance before it started to try and make improvements (Feb 2013). The green line indicates the target it is trying to achieve.

Run charts are easy to produce, easy to interpret and enable you to understand not only the **typical performance (median)** of a process over time but the extent to which it fluctuates above and below this centre line.

When you are learning how to plot run charts it is important to remember that **usually time runs along the horizontal or x axis and the measure you are interested in tracking is plotted along the vertical axis or y axis** (see Figure 2).



Figure 2: Percentage of women attending 1st antenatal visit with gestation age <20 weeks at Mthara Clinic



Annotated run charts

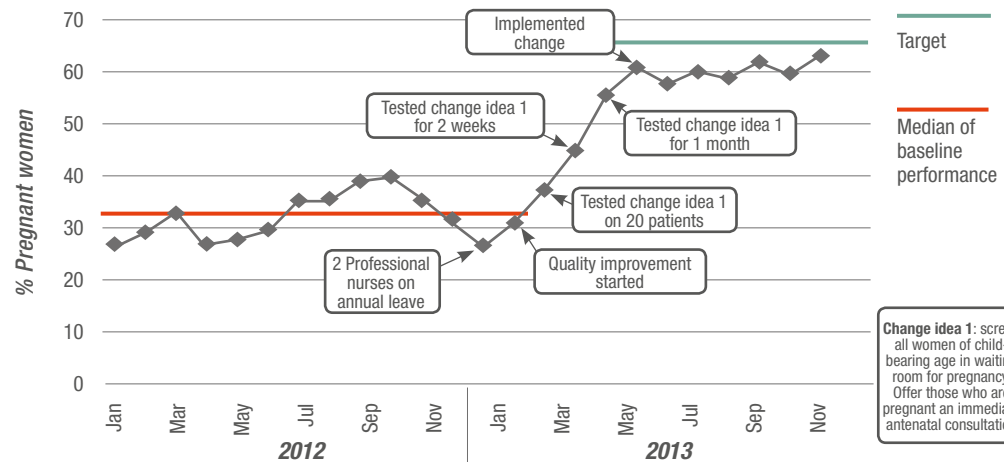
Annotate means to add notes that provide explanation or comment. It is a fancy word to describe a label. So an **annotated run chart** is a run chart with notes added that assist in interpreting the graph. When we are looking to make improvements, we are particularly interested in

understanding what happened shortly before we detect an improvement or deterioration in performance.

EXAMPLE figure 3 shows the same run chart as previously, but this time with annotations.

Annotate:
to add
notes

Figure 3: Percentage of women attending 1st antenatal visit with gestation age <20 weeks at Mthara Clinic





Measure of central tendency for a run chart: mean versus median

Many of us were taught at school that in order to calculate the “middle value” of a series of numbers you added up all their individual values and divided by the amount of numbers you had. What many of us didn't realise was this is just one way of calculating the middle value, or measure of central tendency. There are other ways. The calculation we have just described gives us a value known as the **arithmetical mean or mean** for short. It is also sometimes called the average.

For run charts, we need to display the measure of central tendency, called the **median**. The median is very easy to calculate. You line up all the values in either ascending or descending order and then find the middle number. The value of the middle number is the median. When you have an even amount of numbers there will be two values in the middle. Take these values, add them together and divide by 2 to give you your median.

Figure 4: Calculating the mean and the median

MEAN	MEDIAN
Formula	
$\frac{X1 + X2 + X3 + X5 + X6}{6}$	Place the numbers in order of their value, either getting bigger or smaller. Locate the middle number $X1 + X2 + X3 + X5 + X6$
Example 1: take the numbers 2, 3, 1, 6, 5, 5, 4, 8, 2, 3, 9, 4, 4	
$\frac{2+3+1+6+5+5+4+8+2+3+9+4+4}{13}$ = 4.3	1, 2, 2, 3, 3, 4, 4, 5, 5, 6, 8, 9 = 4
Example 2: take the numbers 20, 22, 32, 12, 19, 20, 15, 18, 29, 13	
$\frac{20+22+32+12+19+20+15+18+29+13}{10}$ = 20	12, 13, 15, 18, 19, 20, 20, 22, 29, 32 = $\frac{19+20}{2}$ = 19.5

Interpreting a run chart

We have already discussed how annotation can assist in trying to answer the question from the Model for Improvement! “How will we know that a change is an improvement?” If our performance gets better soon after we introduced a change we often attribute the improvement to the change. There are, however, much more systematic ways of assessing whether an improvement has really occurred that are based on probability theory (the mathematics that looks at random and non-random occurrences). This is done through the application of **run chart rules**:

Rule 1 – Shift

Rule 2 – Trend

Rule 3 – Runs

Rule 4 – Astronomical Data Point

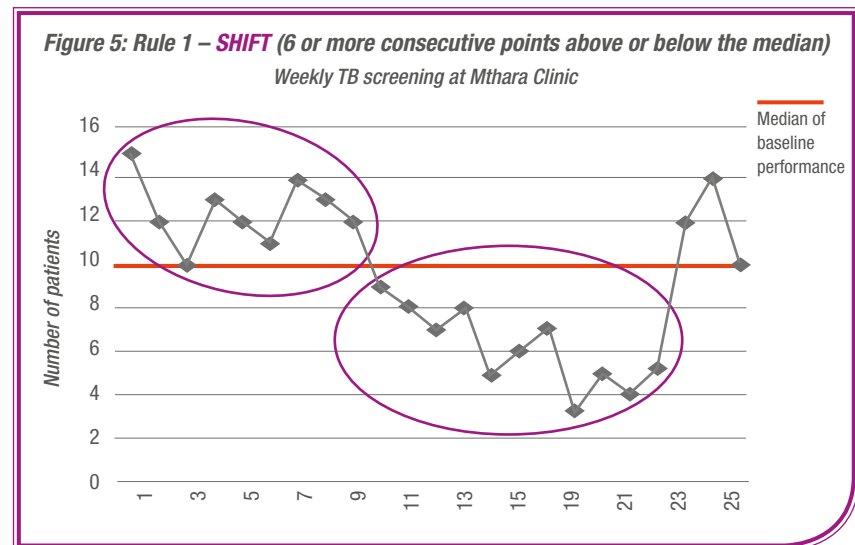
Rule 1 – Shift

Rule 1 looks for **six or more consecutive data points either all above or all below** the median line. This is known as a **shift**. A shift suggests a non-random pattern of data. If a value falls on the median line you should ignore it and continue counting.

EXAMPLE figure 5 shows the application of Rule 1. During weeks 1 to 9 we have a shift which suggests performance is higher during this period than we would have expected for this process. We have another

shift during weeks 10 to 22 when we see a marked deterioration in performance. These patterns suggest the process that generated our performance during weeks 1 to 9 is not the same as the process that produced the results we see during weeks 10 to 22. If we introduced a change around week 9 we might reasonably conclude the change did not lead to an improvement

NOTE at least **10 data points** are required to use this rule.



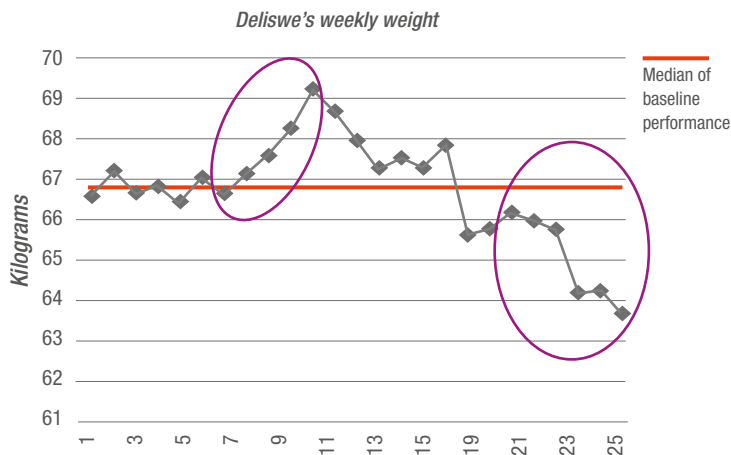


Rule 2 – Trend²

Here we can ignore the median line and simply look for **5 or more consecutive data points either going up or going down**. This pattern of data is known as a **trend**. If two data points have the same value, count only one of them as part of your trend. **TIP** the first point you count (highest or lowest in the trend) is number one of the five or more points you are looking for **EXAMPLE** in Figure 6, you can see that we have two trends. One starts at week 7 and the other at week 20. One of these is an improvement. We can only determine which by knowing whether Deliswe is looking to gain weight or lose it.

NOTE where rules 1 and 2 are met, there is a 95% or more chance that the data patterns observed are as a result of changes and not just random occurrences.

Figure 6: Rule 2 - **TREND** (5 or more consecutive points going up or down)



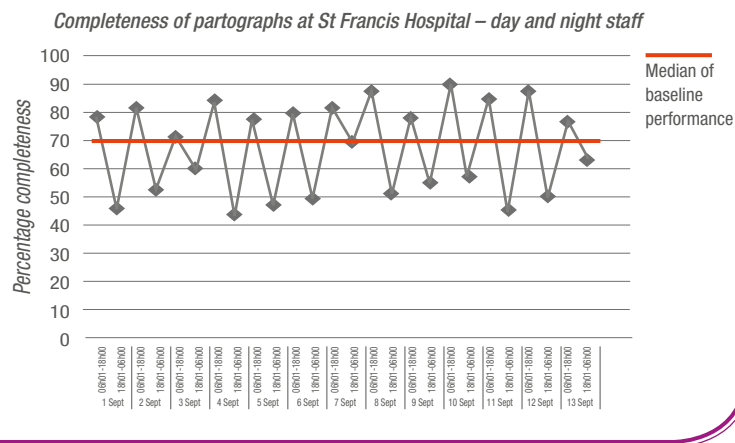
2 Olmstead, PI, *Distribution of Sample Arrangements for Runs Up and Down*, *Annals of Mathematical Statistics*, Vol 17, pp.24-33, March, 1945 in Provost, L & Murray, S, *The Data Guide – Learning from Data to Improve Health Care*, Associates in Process Improvement and Corporate Transformation Concepts, Texas, 2007

Rule 3 – Runs

This rule relates to **runs**. Runs are a **series of data points that fall either above or below the median**. To calculate the number of runs in a graph you **count how many times the lines connecting data points cross the median line and then add 1**. Data that is showing normal, random patterns will cross the median with a predictable frequency. **When runs occur too frequently or too infrequently (as defined by table 1 on page 11) we can be confident that these patterns are not due to random fluctuations, i.e. a change has occurred.**

EXAMPLE in Figure 7, data crosses the median line very frequently. Here we have the performance of the day and night staff completing partographs over a period of 13 days. The reason we have so many runs is we appear to have very different levels of performance across the two teams of staff. The day shift is consistently performing better than the night shift. This could be due to differences in knowledge, commitment, workload, etc. Whatever the reason, data that produces so many runs is unlikely to have been created randomly. How can we be certain? We have to work out if we have too many runs as defined by rule 3.

Figure 7: Rule 3 – RUNS (too few or too many)



How do we know if we have too many or too few runs?

Firstly, we have to count the runs. In our example, the lines that connect data points cross the median line 23 times. We then add 1 to give us our number of runs (24). Then we have to add up how many data points there are in total excluding any points that fall directly on the median line. In Figure 7, there are 26 data points but as one falls directly on the median line, we exclude it therefore making the total 25. Now we refer to a set of tables (see Table 1³) to work out whether the frequency of runs is appropriate. Firstly, find the row that relates to the number of

data points you have. Then look at the lower and upper limits for the number of runs you should have. **If your number falls outside of these limits rule 3 applies and you have non-random data patterns occurring.** In the case of the day and night shift, the upper limit of runs for 25 data points is 18. We have 24 so rule 3 applies. The data we are observing is non-random. Indeed, it is being generated by two different processes; the process operated by the night shift and the process being operated by the day shift.

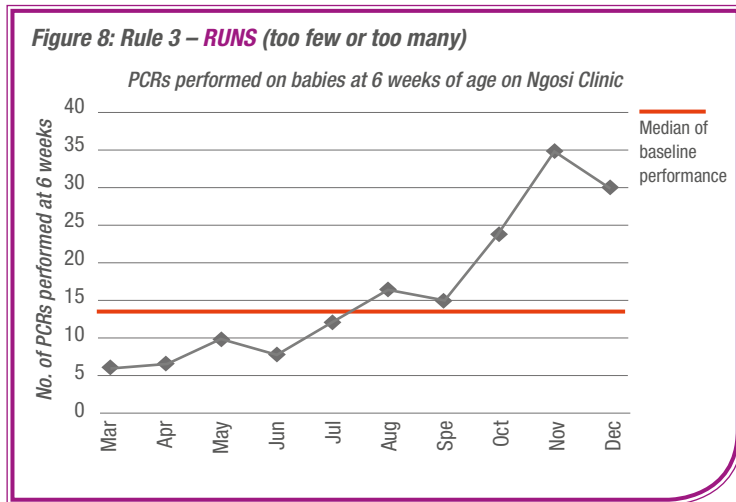
3 Swed, Frieda S. and Eisenhart, C. (1943) "Tables for Testing Randomness of Grouping in a Sequence of Alternatives." *Annals of Mathematical Statistics*. Vol. XIV, pp. 66-87, Tables II and III



Table 1: Runs too few or too many?

Total no. of data points that do not fall on the median	Lower limit for no. of runs (< this no. of run is “too few”)	Upper limit for no. of runs (> this no. of runs 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
19	6	15
20	6	16
21	7	16
22	7	17
23	7	17
24	8	18
25	8	18
26	9	19
27	10	19
28	10	20
29	10	20
30	11	21

Figure 8: Rule 3 – RUNS (too few or too many)



EXAMPLE have a look at Figure 8; how many total data points are there, excluding any that fall on the median line? How many runs are there? Refer back to the table and decide if rule 3 applies. Is there evidence of improvement?⁴

NOTE at least 10 data points are required to use this rule.

Answer to example

Runs: 1+1=2
 Data points: 10
 Lower limit: 3
 Upper limit: 9
 Rule 3 applies as outside lower limit

4 There are 10 data points and 2 runs. There are therefore “too few” runs suggesting a non-random pattern of data and evidence of improvement

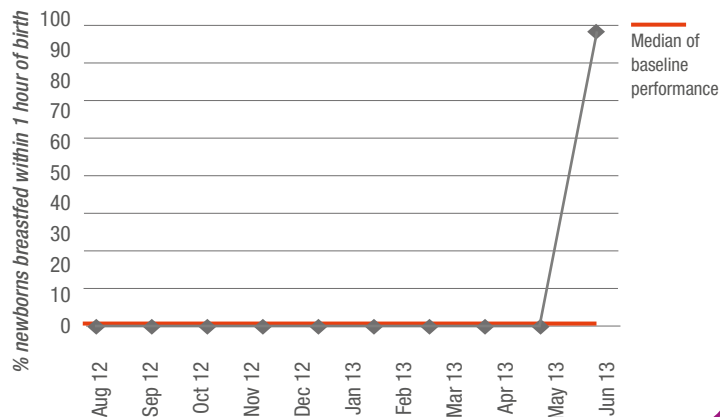
Rule 4 – Astronomical data point

For **rule 4** to apply, there must be an **astronomical data point**; a very **obviously different value** that everyone reviewing the chart would agree was extraordinary. This rule often applies when improvement work has just begun and the knowledge of what activity should be undertaken is suddenly understood and applied. It can lead to an instant improvement.

EXAMPLE figure 9 illustrates this. It represents the performance of a hospital that used to separate mothers from their babies after birth. When the staff realised this was not best practice, there was an immediate and dramatic increase in the performance of breastfeeding within one hour.

Figure 9: Astronomical data point

Percentage of newborn babies breastfed within 1 hour of birth at Tanda Hospital





Other run chart designs

Comparing baseline data

In the first run chart we looked at (Figure 1), the median line was calculated using only the **baseline data**. This is a sensible way of presenting a run chart when you are gathering data on an on-going basis, are expecting improvement and don't want to have to keep re-calculating the median with the addition of every new data point. In such an instance, it is helpful to continue drawing the original median line through the new data

but as a **dotted or dashed line suggesting that the value of this median does not include values added after the solid line ends** (Figure 10). As you see signs of improvement, you can apply the run chart rules using the original median in order to determine if your changes are leading to an improvement. If this becomes evident, you may decide to recalculate the median using data points plotted after the change was introduced (Figure 11).

Figure 10:

Percentage of women attending 1st antenatal visit with gestation age <20 weeks at Mthara Clinic

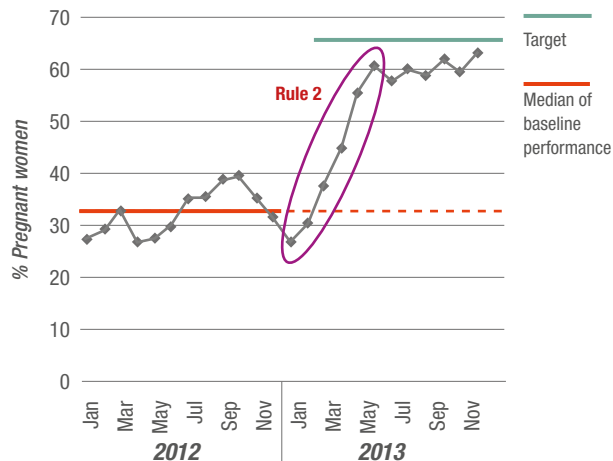
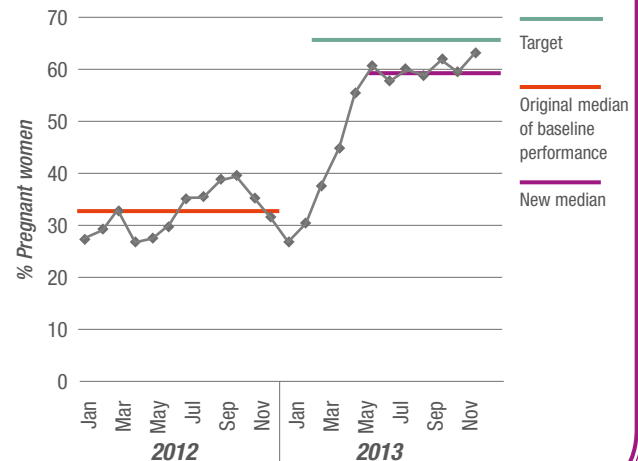


Figure 11:

Percentage of women attending 1st antenatal visit with gestation age <20 weeks at Mthara Clinic

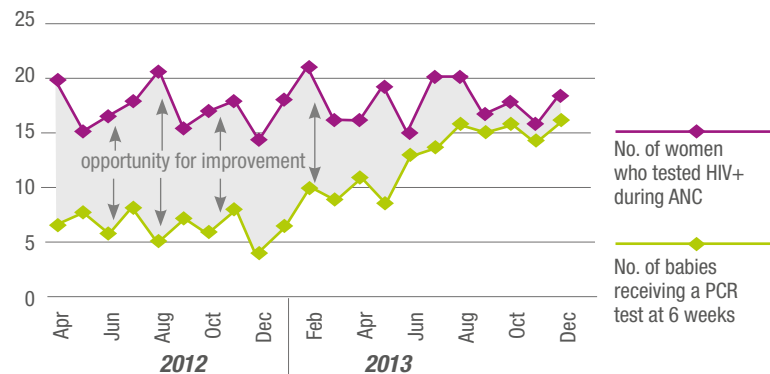


Plotting denominators and numerators

In all the run charts presented so far, a single parameter or measure of interest has been plotted over time. Sometimes this has been a number (e.g. number of PCRs performed on babies at 6 weeks) and sometimes a percentage (e.g. percentage of women attending 1st antenatal visit with gestation age <20 weeks). Where we have shown data as a percentage, we have already done a calculation that divided the numerator (people who got the service) by the denominator (people who were eligible for the service) and multiplied this by 100. (For more information on calculating percentages, see HOW TO Module 4). We can, however, **separate out denominators and numerators and plot these on the same run chart**. When data is represented in this way, the aim of the improvement activity is to **close the gap between the numerator and denominator** (see Figure 12).

Figure 12: Plotting numerator and denominator on the same run chart

No. of babies receiving PCRs at 6 weeks compared with No. of women testing HIV+ during ANC at Mthara Clinic



Plotting outcomes and process measures

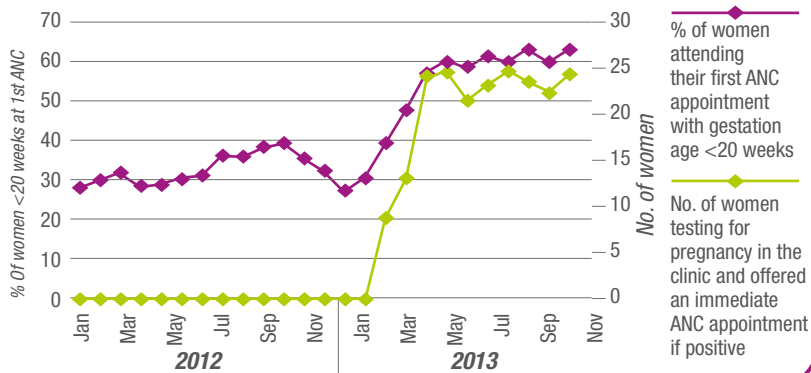
When we are trying to demonstrate improvement has occurred it is powerful to plot the measure that shows whether we are achieving our aim (outcome measure) alongside the measure that captures whether we were doing the change idea we planned to do (process measure). **EXAMPLE** in Figure 13, the percentage of women attending their first antenatal appointment who are less than 20 weeks pregnant is

plotted alongside the numbers of women who had a positive pregnancy test and immediately attended an antenatal appointment (the change idea). **The similarities in the shape of both of these curves increases our confidence that the change idea is likely to have contributed to the improved performance.** For more information on different types of measures, see HOW TO Module 4.



Figure 13: Plotting outcomes and process measures on the same run chart

Early booking for 1st antenatal appointment with introduction of pregnancy screening at Mthara Clinic



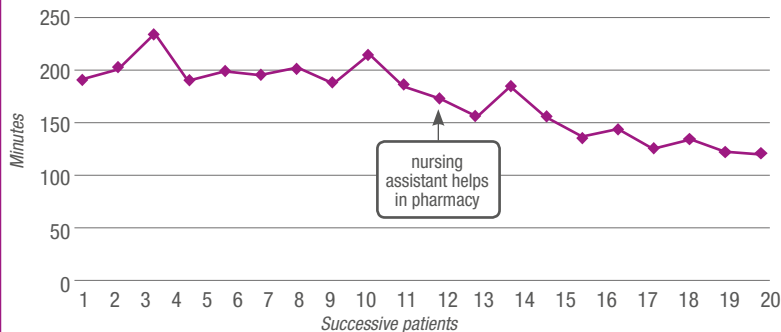
Plotting individual patients

In the introduction, we said run charts “present data in a given order, usually over time”. In all the examples we have looked at so far, data has been presented over time. It is, however, possible to use a run chart to present data ordered in a different way. One format commonly used in healthcare is to **plot the experience of successive patients to see how the service provided to individuals improves over time.**

EXAMPLE in Figure 14, the graph shows the visit time of patients returning for a routine appointment to receive repeat antiretroviral medication. As with other run charts, we could calculate the median time, apply the run chart rules and assess whether the change has led to an improvement.

Figure 14: Plotting individual patients

Total visit time for successive patients attending Salena Clinic for routine follow-up to collect antiretrovirals



Displaying run charts

It is simple and very effective to monitor the progress of improvement projects using annotated run charts. Improvement teams should keep up-to-date charts for all their key indicators. This doesn't require special graph paper or knowledge of spreadsheet (e.g. Excel) or graphics software. Graphs can be drawn on flipchart paper and displayed on a wall. It can be very motivating if teams commit to making these graphs very visible

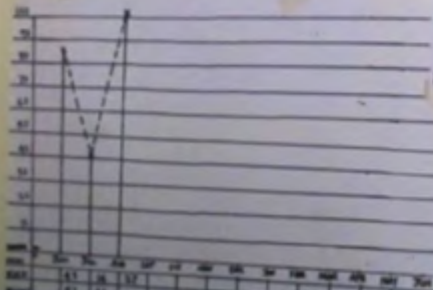
to their customers. If the work is going well customers will see this and team members can feel rightfully proud. If the desired improvement is not being seen, there is a heightened sense of accountability and commitment to persevere in testing new change ideas.

Run charts can also communicate to other members of staff not participating in testing

changes. They demonstrate that the work is progressing and its impact is being objectively assessed. This is a great way to firstly raise awareness, then interest and, in the long term, commitment. **The greater the inclination of all staff towards a new idea, the easier it will be to implement once testing has run its course.**

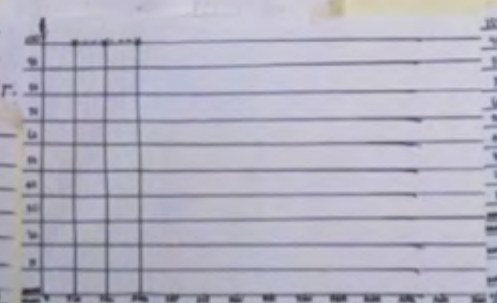
NAME OF HEALTH FACILITY: MIKAKATI
1. LENO: WAKU KUJIBESHA IDADI YA AKINA MAMA WANAOROKA DAMU NYINDEI LIKENI BAADA YA KUJIFUNGUWA KUTOKA 0-50%

2. MIKAKATI: KURIA ELIMU YA AFYA KUHUSU UCHUMBU WA MBK KWA AKINA MAMA WADAWAZITO.
- WENZA WAO PIA YAPATE ELIMU YA KUTOKA KUHUSU TAP. NGO HII.



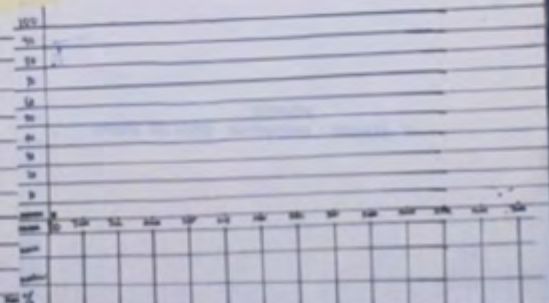
1. LENO: KUJIBESHA IDADI YA AKINA MAMA WANAOROKA DAMU NYINDEI LIKENI BAADA YA KUJIFUNGUWA KUTOKA 0-50% JUN - SEPT 2012.

2. MIKAKATI: KURIA ELIMU YA AFYA KWA AKINA MAMA WADAWAZITO NA MAMA WANAOFUNGUWA KUHUSU HUDUMA YA KUPIMZIKA NDANI YA MASA 24, BAADA YA KUJIFUNGUWA.



1. LENO: KUJIBESHA IDADI YA AKINA MAMA WANAOROKA DAMU NYINDEI LIKENI BAADA YA KUJIFUNGUWA PPH POST PARTUM HAENDORRIBI GE. 50% HADI DEC 2012.

2. MIKAKATI: KUTQA ELIMU YA AFYA KWA AKINA WADAWAZITO WOTE WAJIFUNGUWE KIRO CHA HUDUMA ZAHATI, KIRO CHA AFYA HOSPITALI HAWA YA MAMA 20%



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HOW TO RUN AN
IMPROVEMENT TEAM MEETING

MODULE 8
HOW TO DESIGN AND RUN AN
IMPROVEMENT COLLABORATIVE

MODULE 9
HOW TO SUSTAIN AND
SPREAD IMPROVEMENT

MODULE 10
HOW TO USE PSYCHOLOGY TO HELP
SECURE AND SUSTAIN IMPROVEMENTS

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**MODULE
seven**

7

HOW TO
Run an
improvement
team meeting



The Aurum Institute would like to acknowledge and thank the authors, Cathy Green (Institute for Healthcare Improvement) and Lauren de Kock (Aurum Institute) for their insight, dedication and vision.

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HOW TO GUIDE FOR QUALITY IMPROVEMENT

“

*Never doubt that a small group
of thoughtful, committed
people can change the world.
Indeed, it is the only thing that
ever has*

Margaret Mead

”

Module seven

HOW TO RUN AN IMPROVEMENT TEAM MEETING

In this **HOW TO** guide we cover:

» Introduction.....	3
» Who should be in an improvement team?.....	4
» Top tips for an improvement team facilitators.....	5
» Annexure 1: Sample agenda for an improvement meeting.....	8



Introduction

While improvement activity can be done by someone working alone, it is often undertaken as part of a team. **Improvement teams are beneficial in that they:**

increase the knowledge and wisdom that contributes to the analysis of the problem you are trying to solve



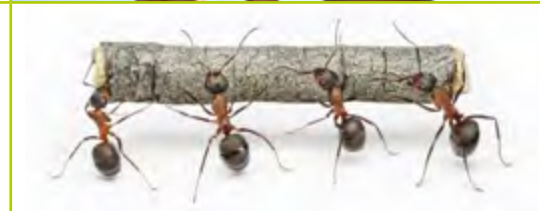
increase the diversity of potential ideas you identify that may help lead to an improvement



broaden the engagement with and commitment to your improvement activity



share some of the workload



Who should be in an improvement team?

- › People who **work in and contribute to the process** you are trying to improve e.g. nurses, lay counsellors, a domestic worker.
- › People with enough **knowledge to understand the implications** of any changes made in the system and who are senior enough to authorise small tests of change (PDSA cycles) e.g. professional nurses, doctors, a manager.
- › Representatives from **all of the staffing groups involved** in the process e.g. doctor, nurse, manager, midwife, nursing assistant, data capturer.
- › Someone who represents the **customer** and their experiences. There may already be oversight committees or marketing groups from which such individuals can be drawn e.g. a recent patient who has experienced the process of interest.
- › A **senior leader** who can authorise the team's activity, help remove obstacles when they occur, represent the work to other senior managers in the system and to whom the team is accountable. This person doesn't necessarily have to regularly attend improvement team meetings e.g. facility manager, subdistrict manager, hospital chief executive.
- › People who are enthusiastic about making improvements.



Improvement team meeting taking place at J Dumane Clinic, Gauteng, South Africa

Once an improvement team has been formed, it needs to **meet regularly**. These meetings are more effective if they are facilitated by someone with some expertise in improvement methodology. This person could be one of the team members or it may be someone who is assisting in the improvement project and whose job it is to help support the team (for example, an improvement coach or mentor working for a Non-Governmental Organisation NGO).



Top tips for improvement team facilitators

- › One of your **biggest challenges will be to get people together. Be sympathetic about members' other time commitments but be firm.** Accept not everyone in the team will be able to make every meeting but try and get as many to attend as possible.
- › Encourage **regular meeting times.** This helps the team remember they have a meeting and if they've chosen the date and time they are more likely to commit to meet. **Before the close of a meeting, agree a date and time for the next meeting.**
- › **Be prepared and organised.** Know what the team has been working on since you last met. Know its aim, the change idea it is testing, when it is due to review the test, the selected measures and its current performance. In summary, **know where the team was, where it is and where it wants to be!**
- › **Give lots of encouragement and praise.** People are working hard and setting aside time to make improvements. Remember we hear and recall criticism more than we hear and remember praise. You can rarely give too much praise. Encourage staff members when a change idea has failed. They have helped themselves and others learn what doesn't work.
- › **Be respectful of time.** Check how much time you have at the beginning of the meeting. By exception, negotiate if you need a little more but stick to the time you've agreed.
- › Try and **keep interruptions to a minimum.** If necessary, **designate one member of the team to deal with urgent issues** if they arise.
- › **Encourage everyone to contribute.**





- › **Get someone else to take the minutes/action notes.** This increases commitment to the actions identified. If you are not a member of the team, you will need to **keep your own notes** so that you can remember what was agreed when you are preparing for the next meeting. Ensure that there is an accessible place where the minutes are kept so that all team members can review them if they forget what they've committed to do.
- › Make sure the meeting **focusses on the most recent performance data**. You need this to answer the question "has the change led to an improvement?". If you need to gather additional data for your own records, do this before or after the meeting so that you don't waste other peoples' time. A quick way of capturing data is to **take photographs of any data records you need**. You can then transcribe these later. Make sure you ask permission and keep data confidential.
- › Always **listen out for change ideas that are likely to lead to improvements**.
- › **Steer the team away from moaning**. If there's a problem and it's relevant to the aim, help them to generate a change idea to address it.
- › **If the team feels overwhelmed** with all the changes they need to make, **encourage them to work on them one at a time**.
- › Encourage teams to **plot their data on run charts** if this hasn't happened in between meetings. Take photos of these if you need them for your records. Usually the data captured in the run charts are outcome measures associated with the improvements you are trying to make. These are often not collated and plotted until the end of every month. While the team is testing ideas on a small scale (e.g. on one day), these run charts are unlikely to be able to help you answer the question "did the change lead to an improvement?" because measures taken over a month will not be able to detect an improvement during a small-scale test, even if it has occurred. It will be important that the team documents and discusses

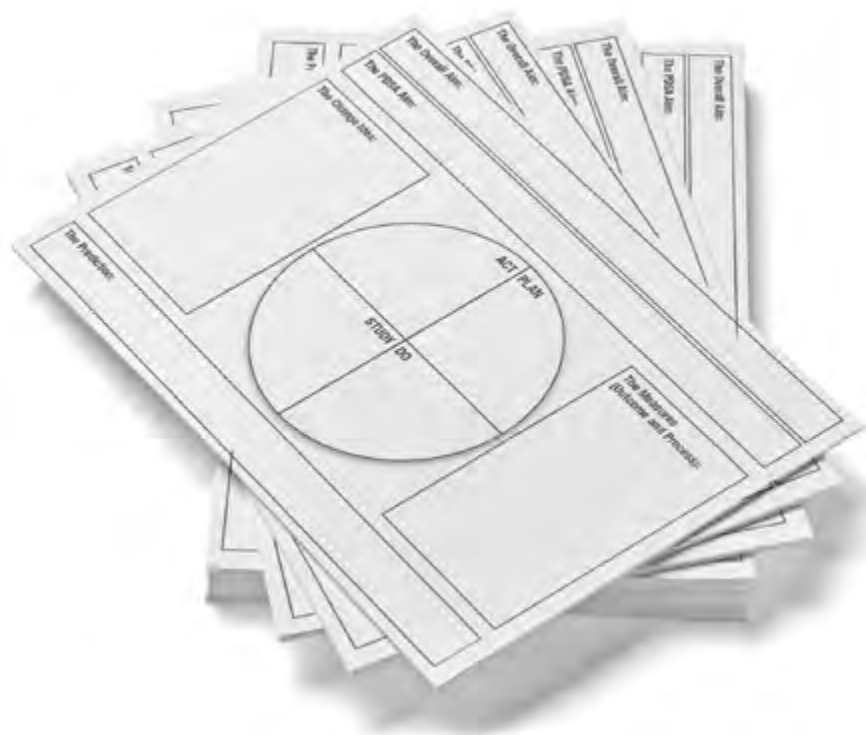


the process and outcome measures recorded for each PDSA cycle it is running in order to be able to decide what to do next in the “Act” part of the PDSA. (see HOW TO Module 4).

- › When it is time to start working on a new improvement topic or generate new change ideas for your current aim, **utilise improvement tools such as process mapping or the fishbone** (see HOW TO Module 2). This increases the effectiveness of the ideas selected and models how to use the tools. You can “teach” these tools as you lead the team through their use.
- › **Plant successful ideas from other places if the team is getting completely stuck** in thinking of new change ideas. This needs to be very subtle as we know from the psychology of change people are more willing to participate in the process of change if they feel in control (see HOW TO Module 10). Turning statements that describe a given change into a series of questions that nudge people towards the answer is an important skill for an improvement facilitator.
- › When starting a new PDSA cycle, encourage teams to **record their aims, measures, change idea, predictions and plan on a PDSA recording template** (see HOW TO Module 5). Revisit this during the next meeting and get members to complete other sections of the same template.
- › Bring **energy and optimism** to the meeting. Be led by data but constantly affirm that improvement is possible.

Remember, as you facilitate you are teaching others how to apply improvement methods and engage a team in this activity. **You are modeling behaviour; the team will watch and learn from you.**

- › **Secure commitment to action.**
- › **Whenever time allows, take the opportunity to discretely teach improvement methodology.** This allows the team to develop its own expertise and enables members to work independently on improving performance.



Annexure 1 -

Sample agenda for improvement meeting

(Directions to facilitator in italics)

Date:

Time:

1. Duration of meeting

Establish how much time you have

2. Reminder of aims

3. Update on change ideas

Recap on the change idea(s) they've been testing

4. Update on PDSA(s)

Recap on the PDSA(s) the team was working on or planning. This information should have been recorded in the notes you made of their last meeting and their own minutes/notes. Get an update on progress if you haven't been involved in the test. If they haven't started to test, check their plan and encourage them to agree a start date

5. Review your data

You are looking for evidence of improvement. If they have completed a PDSA cycle, review the data collected during the test. If the test covers a whole month, some of these data may have been routinely collected and collated. Check whether any decision has been made under the "Act" section of the PDSA and if the data supports this decision. If no decision was made, encourage the team to make one. Check if there are plans to modify the change before it is tested again based on the learning from the previous PDSA

6. Plan the next test of change

If the previous idea was abandoned, identify a new change idea using appropriate improvement tools. Otherwise, plan the next test based on the decision made under "Act"

7. Review the run charts

You are interested in run charts relating to aims they've previously been working on and their current improvement topics. Help them plot new data points if necessary. Check if successful changes are still being implemented in old topics where performance improvements have not been sustained

8. Action plan

Be clear you and the team members have recorded important decisions and actions from the meeting

9. Date and time of next meeting

MODULE 1
HOW TO USE THE MODEL FOR
IMPROVEMENT

MODULE 2
HOW TO DEVELOP IDEAS FOR CHANGE
THAT MAY LEAD TO AN IMPROVEMENT

MODULE 3
HOW TO PRODUCE AND ANALYSE
A PROCESS MAP

MODULE 4
HOW TO SELECT MEASURES TO KNOW
YOUR CHANGE IS AN IMPROVEMENT

MODULE 5
HOW TO TEST A CHANGE USING THE
PLAN-DO-STUDY-ACT CYCLES

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HOW TO PLOT AND INTERPRET
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MODULE eight

8

HOW TO
Design and run
an improvement
collaborative



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“

...collaboratives produced clear gains in compliance with standards and proved effective for scaling up best practices.

...Collaboratives created communities of practice where individual health workers felt empowered to improve care and connected to others and to a greater mission

Catsambas et al, 2008¹

”

Module eight

HOW TO DESIGN AND RUN AN IMPROVEMENT COLLABORATIVE

¹ Catsambas, T.T, Franco, L.M., Gutmann, M., Knebel, E., Hill, P. 2008. *Evaluating Health Care Collaboratives: The Experience of the Quality Assurance Project Collaborative Evaluation Series*. Published by the USAID Health Care Improvement Project. Bethesda, MD: University Research Co., LLC (URC).

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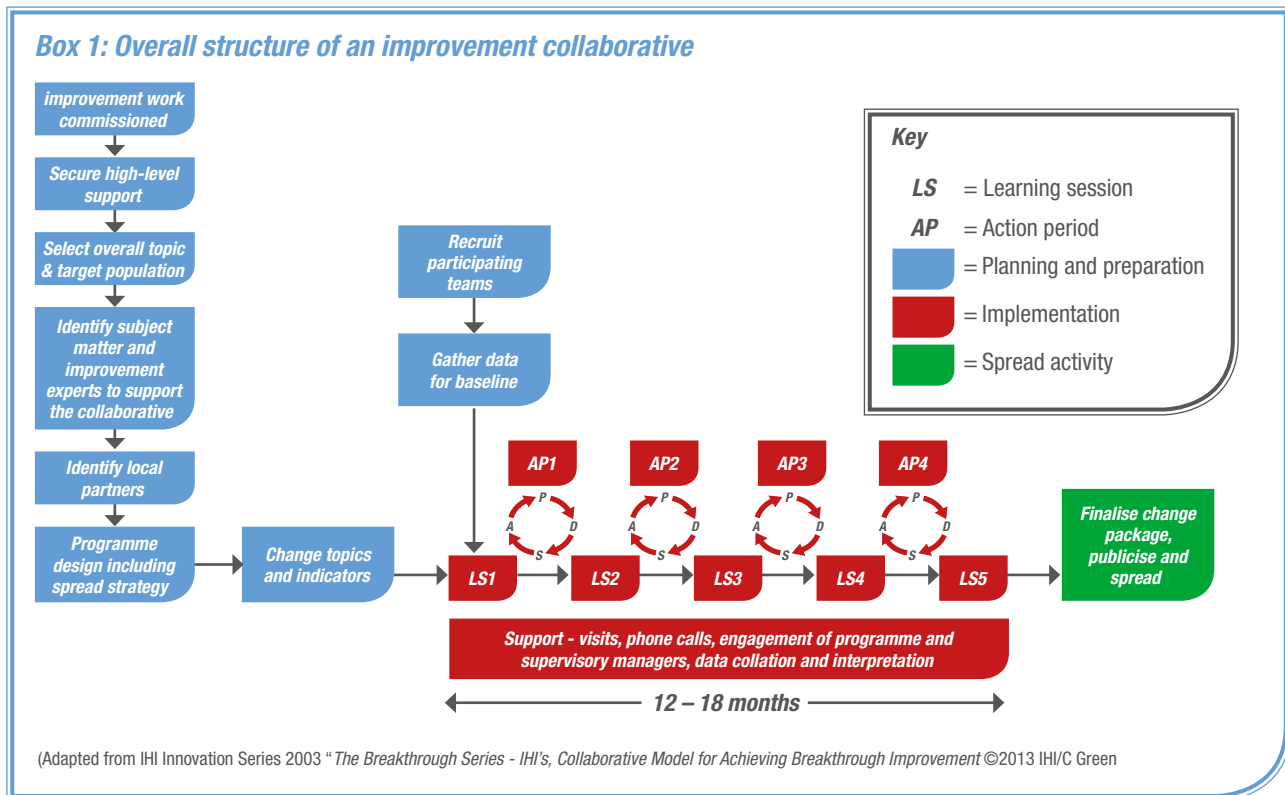
Introduction

Improvement methodology can be applied at individual, team, organisational and systems levels to help achieve fundamental and lasting improvements in performance. Many who have applied this methodology have found the magnitude, speed and reach of improvement is enhanced if the activity is organised using a programme design known as a **Learning Collaborative, Improvement Collaborative** or **Breakthrough Series**. This approach, first developed by the Institute for Healthcare Improvement in 1995, has been adapted and evolved to accommodate ever-changing advances in technology and communications. The description of the collaborative model outlined in this guide reflects extensive experience and learning from its application within healthcare systems in low and middle income countries.



The overall structure of an improvement collaborative

The Improvement Collaborative has a clear structure with an essential planning phase (depicted in blue in Box 1 below), an implementation period of between 12 to 18 months (shown in red) and finally spread activity (shown in green). If you are unlikely to be involved in designing a collaborative, you may want to skip forward to the section entitled “The preparation phase” on page 11.



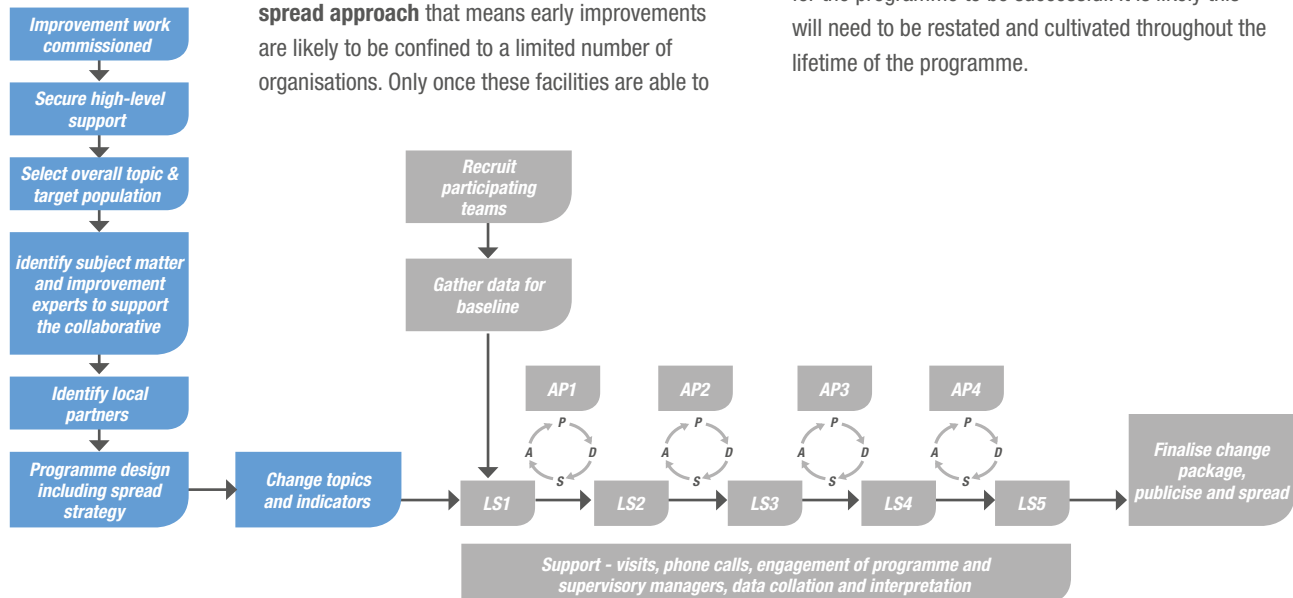


The planning phase

Often an Improvement Collaborative is commissioned by someone, possibly a funder or a government department. In such instances, the methodology and approach has been prescribed and doesn't need to be negotiated. At other times, the commissioner is looking for improvements in performance but the means by which they are secured is left open to those offering their services. In the latter scenario, **the case for running a collaborative may need to be made**. Funders are often impatient to see results over a wide geographical area in a short space of time. **The collaborative framework promotes a piloting and spread approach** that means early improvements are likely to be confined to a limited number of organisations. Only once these facilities are able to

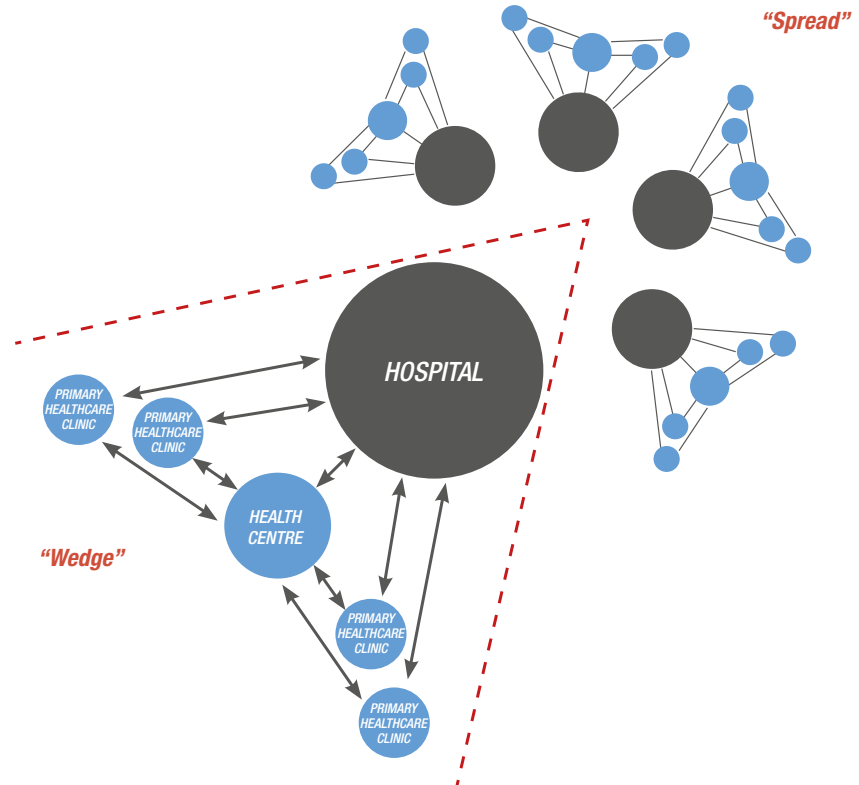
demonstrate how they secured improvements are results quickly spread across a much wider area. It is helpful if this phasing of results is understood at the outset.

For the result of the collaborative to be sustained and potentially replicated, it is important that **the work is owned and integrated into mainstream services and infrastructure**. If a non-governmental organisation (NGO) is selected to run the collaborative, it should be **explicit about the role and commitment required of healthcare leaders, managers and front-line staff** for the programme to be successful. It is likely this will need to be restated and cultivated throughout the lifetime of the programme.



The collaborative's overall topic and the target population are often given but it is vital to ensure neither are too broad initially. **The topic should be substantial enough to warrant a 12-18 commitment of time and resources but it should be coherent** e.g. reducing maternal mortality or integrating TB and HIV services, not a loose grouping of disconnected aims, e.g. increasing HIV testing at the first antenatal visit and improving cervical smear testing rates and reducing the incidence of sexual transmitted infections (see Box 2). If the commissioner insists that several topics need to be progressed simultaneously, consider running separate collaboratives for each topic in different geographical areas and then spread the learning from each collaborative across the remaining system. **Topics should reflect the priorities of leaders and the passion of front-line healthcare workers.** If the topic and geography are not prescribed, collaborative designers should be guided by national priorities, current performance, differentials in performance and the consequences of poor performance (e.g. mortality and morbidity).

The way collaboratives are typically set up is in a “wedge and spread” configuration.



The wedge, comprising a hospital and its cluster of referring clinics, is often where the early work is piloted. Having tested and compiled a list of successful change ideas in the designated topic area, the learning from the “wedge” is spread to other clusters

of hospitals and their respective referral systems.

Where time does not permit exhaustive piloting before spreading to a broader population, it is possible to create some overlap between these two activities.



Box 2: Why do collaboratives work on a focused topic and not disparate problems?

Collaboratives encourage a “deep dive” into a given topic area. To do this they establish a faculty of advisors that include leading specialists in that topic who support teams in bridging the gap between research evidence/known best practice and current performance. Multidisciplinary teams who participate in the collaborative are also drawn from front-line staff with specialist knowledge in the topic and a vested interest in making improvements. If a collaborative includes topics from disparate areas, there is rarely sufficient time to assemble and harness this support and commitment to achieve breakthrough results before these teams are stood down in order to progress to the next topic. Analysis and interventions are likely to be much more superficial.

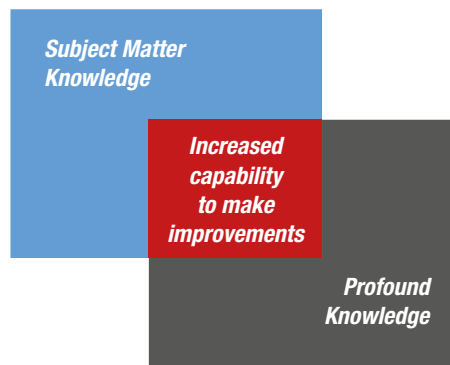
In addition, teams will be brought together for only brief periods to solve a problem related to their areas of responsibility and then disbanded. As a consequence, collaborative participants fail to establish a sense of cohesion and commitment that fosters trust, mutual learning and determination to succeed. Temporary teams will usually be novices in improvement methodology when they come together and will need to be taught the basics in order to effectively test out new ideas. They will not have enough time and support however to become self-sufficient in applying the methodology before they need to make way for a new team formed to tackle the next topic.

Finally, it is difficult to support sustainability across multiple topic areas, particularly when teams are no longer attending collaborative workshops and actively participating in the testing of new ideas.

The testing of change ideas will usually follow a prescribed order, often moving systematically through the care pathway that underpins the overall topic area. Once a collection of interventions has been piloted, it is possible to spread these whilst the “wedge” continues working to secure improvements in the next part of the care pathway. **CHALLENGE** piloting and spreading simultaneously requires significant resources. It takes longer to secure improvements when piloting unproven change ideas than it does testing and implementing ideas whose efficacy is known. A sufficient time-lag needs to be built into these two activities to ensure there are always some new, tested ideas to spread.

Deming (1900-1993), one of the founding fathers of quality, argued that in order to make improvements you needed to bring together “Profound Knowledge²” – see figure 3 below (an understanding about systems,

Figure 3³



2 Deming, W.E., 1995. *The New Economics for Industry, Government and Education*. MIT

3 Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W, Norman, C.L. & Provost, L.P., 2009. *The Improvement Guide – A Practical Approach to Enhancing Organisational Performance*. 2nd ed. Jossey-Bass, San Francisco, USA



variation, psychology and the theory of knowledge) with “Subject Matter Knowledge”. When beginning to design a collaborative, it is helpful to **assemble such a group of experts who will act as advisors for the duration of the programme**. This group is sometimes referred to as a “faculty”. **Subject matter experts can help identify known best practice** from the research literature and their personal experiences. **Improvement experts can assist in the design of the collaborative and troubleshoot as the programme is implemented**. Improvement experts may be drawn from a **collaborative project team responsible for the day-to-day organisation and running of the collaborative**. The faculty will use a combination of performance data, research findings, known best practice and root cause analysis to help **identify a list of interventions or change topics that need to be reliably executed for improvement to be secured** in the overall topic. These change topics will

direct the work of the piloting teams. They will seek to improve their performance in these areas through the testing of change ideas (see HOW TO Module 2 and HOW TO Module 5). This list of interventions is sometimes referred to as a “change package”. At this stage the change package is incomplete. **It documents what interventions need to be performed reliably, but not how this is possible within a given context**. A comprehensive change package includes tested change ideas that have been proven to enable the change topics to be performed reliably (see box page 23).

Once change topics have been identified, a set of indicators needs to be developed that measure the overall success of the collaborative (outcome measures) and progress in each change topic (process measures). Often, performance in many of these areas is already monitored through management information systems. Data collection is time-consuming so, wherever possible,

EXAMPLE of a change package – piloting phase

Collaborative topic - reduction of maternal mortality

High leverage interventions or change topics	Change ideas to reliably execute interventions (how)
Skilled delivery	?
Active management of 3rd stage of labour	?
Prophylaxis antibiotics for c-section	?
Detection and treatment of Pre-eclampsia	?
Partograph use	?



it is advisable to tap into existing data systems even though this may mean some compromise between what is considered the ideal measure and what is already being captured. There are further advantages to this approach. If the measures selected are already being recorded, it should be possible to access baseline data showing how the collaborative participants are currently performing and the variability of this performance over time. In addition, as the management information system is used to source data for the collaborative, its accuracy often improves. This is a welcome by-product of the collaborative activity.

Once the change topics have been identified it is possible to design the implementation phase of the collaborative. This phase comprises a series of workshops (known as **learning sessions**) where representatives from each participating facility come together to share their learning and prepare to work on new change topics. After each workshop there follows a period of activity where change ideas are tested and progress in securing improvements is monitored. The time between workshops is known as the **action period** and usually last between 3-4 months. As a rule-of-thumb, teams can usually only manage to make improvements in two change topics within a single action period. Therefore, the length of the implementation phase is usually determined by how many change topics need to be introduced before overall improvement can be expected. **EXAMPLE** if you have 10 key change topics you are likely to need 5x3 months to secure overall improvement.

How long should you run a collaborative for?

The implementation phase of a collaborative will usually run for 12-18 months. Considerations that will influence this include:

- » **Political drivers and financial constraints.** *The length of time you have may be dictated to some extent by political directives and finances. It is important to manage expectations of what is achievable by when. If necessary you may have to scale down ambitions around the overall topic if time constraints are non-negotiable.*
- » **Maintaining momentum.** *The collaborative design helps sustain energy and commitment while front-line teams are testing new change ideas and coming up with improvements. After about 18 months many teams lose their energy and need a break. It is therefore possible to run a collaborative for too long.*
- » **Number of key interventions or change topics.** *Realistically teams testing new ideas will be able to work on about 2 topics per workshop and subsequent action period (3-4 months). So the length of the overall implementation phase is determined, to a large extent, by the number of essential change topics you need to address and the length of time it will take for these changes to impact on your overall collaborative aim.*
- » **Spread strategy.** *How you plan to spread your successful change package may determine how long you can afford to be piloting changes. You have more flexibility if you start spreading change ideas tested at the beginning of the programme whilst the piloting of later change topics is still on-going. But this is a complex programme design and needs to be adequately resourced for it to be successful.*

For the collaborative activity to be owned and sustainable, the programme needs to be embedded in the healthcare delivery system. This does not, however, preclude the involvement of external organisations. If you are already part of the delivery system you may want to identify NGO partners who are willing to assist in the collaborative's activities. For example, during the implementation phase, workshops have to be organised and improvement teams visited. Organisations operating outside of the mainstream system may be able to offer financial support and expertise to facilitate this activity. If, however, you have been tasked with running a collaborative and sit outside of the system (e.g. you work for an NGO), it is essential that you establish close partnerships with local, district and provincial managers and leaders. The collaborative topic should already have been agreed with these individuals. **You now need their full engagement in supporting and learning from the programme.** This ensures they are equipped to spread the learning and success once the piloting phase of the collaborative is complete and they can replicate the activity in other topic areas. Unless leaders and managers from within the system emphasise the importance of

the collaborative, it will be very difficult to secure the commitment of front-line staff. They will need to prioritise this work in order to achieve results. Ideally, by the end of the programme, there will be a small team of local managers who can set up and run their own collaborative with only limited external support.

It is usually the express intention of collaborative commissioners and designers to spread the learning and opportunities for improvement beyond those organisations engaged in the initial piloting and production of a comprehensive change package. There are a range of spread strategies available to facilitate this (see HOW TO Module 9) from informal approaches that rely on spontaneous communication through social networks to highly organised and resourced campaigns. The approach should be identified before the collaborative begins so that the outputs of the implementation phase are prepared appropriately and the infrastructure and skill necessary to support the spread phase is mobilised.



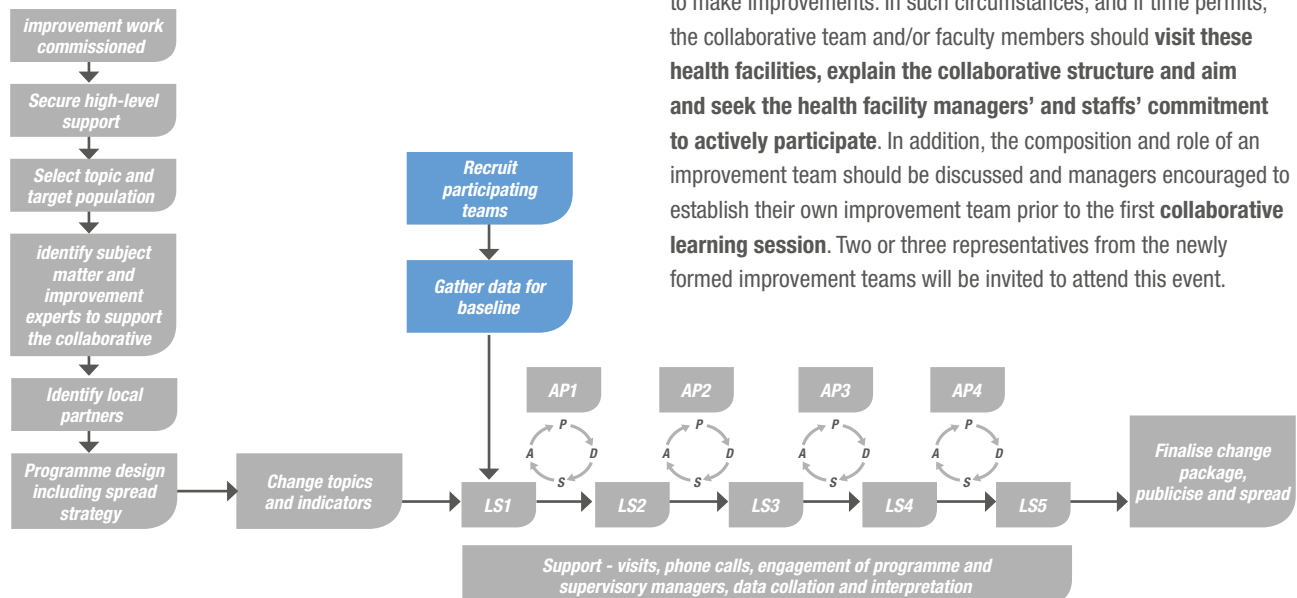


The preparation phase

When running a pilot or “prototyping” Improvement Collaborative, the number of participating organisations is usually determined by the capacity of the collaborative project team to support them as they test ideas. Traditionally, in the US and other Western countries, this support was offered through peers and at a distance through group email discussions and teleconferencing. These forms of support are rarely successful in healthcare systems that lack access to or familiarity with more sophisticated telecommunications networks. Indeed, experience suggests there is **no substitute for regular face-to-face visits by an improvement expert to every participating healthcare facility**. This is particularly true in the first six months of the implementation phase when improvement teams are learning the methodology and may need encouragement to follow through on tests of change they

planned during learning sessions. For momentum and activity to be sustained, **visits should ideally be once every two weeks**. Gaps between visits of more than 4 weeks are likely to have a detrimental impact on progress during an action period.

Once the size of the collaborative has been agreed, the participating facilities need to be selected. As mentioned previously, this is often a “wedge” comprising the hospital and its referring health facilities or it can be those facilities falling within a given regulatory unit or geographical area (e.g. a health sub-district or district). Health leaders will usually want to choose where the work is done and, as such, participating organisations are often volunteered rather than volunteer. This can be problematic if health facilities don’t know what they have been volunteered for and don’t necessary have any great enthusiasm to make improvements. In such circumstances, and if time permits, the collaborative team and/or faculty members should **visit these health facilities, explain the collaborative structure and aim and seek the health facility managers’ and staffs’ commitment to actively participate**. In addition, the composition and role of an improvement team should be discussed and managers encouraged to establish their own improvement team prior to the first **collaborative learning session**. Two or three representatives from the newly formed improvement teams will be invited to attend this event.



Improvement teams

The work of the collaborative within participating facilities is led and coordinated by an improvement team. It is responsible for overseeing the testing of change ideas and recording and reviewing data in order to determine if changes are leading to an improvement and improvements are being sustained. Ideally every improvement team will have the following membership although in smaller organisations several roles may be performed by the same individual:

- » **Systems or Clinical Leader.** This individual should be senior enough to understand and take responsibility for the consequences of testing new ideas. They are often a doctor, senior nurse or other healthcare professional. As such they don't always have much time to devote to the improvement effort and are supported by a Day-to-Day Leader.
- » **Day-to-Day Leader.** This person will help to maintain momentum and pace within the team. They often assume the responsibility for following up on actions that have been agreed. They are likely to have more capacity than the systems or clinical leader and may therefore be more junior in position. They will often

be passionate about the work and can emerge as improvement experts by the end of the collaborative.

- » **Technical Experts.** These are people familiar with the processes and systems that underpin service delivery in the collaborative's topic area (e.g. a midwife, vaccination nurse, registration clerk, counsellor).
- In addition to these roles, the improvement team should include:
- » **Representatives from different staffing groups.** In order to understand the current and potential contributions of different staffing groups, it is helpful to have a representative from each on the improvement team. They can also be helpful in communicating its work to colleagues and securing support for testing changes.
 - » **Data Clerk or Data Manager.** As data is so fundamental to the work of the team, it is sensible to have someone responsible for data capture, collation and interpretation actively engaged in the improvement work.

- » **Patient Representative.** As improvements should always revolve around the needs and expectations of the patient, it is essential to find a way to feed in their views. One way of doing this is to have a patient representative on the team. This individual may need some support in making contributions and understanding that their role is to represent patients in general and not simply their own views and experiences.


Improvement teams also need to be supported by a senior individual who fulfils the following role:

- » **Project Sponsor.** The Project Sponsor will have executive responsibilities and represents the work of the improvement team at executive meetings. They also have the authority to remove obstacles and commit resources that may otherwise prevent the team from making progress. Whilst they may not attend team meetings, they will be regularly briefed on progress and will hold the team to account for its activities.



Another important step during the preparation phase of the collaborative is the gathering of **baseline data**. This should be for **all relevant outcome and process measures**. These data should be collated for the collaborative as a whole (an aggregate of individual organisations' performance) and for individual facilities. The former provides an overview of the collaborative's current performance and will help in the setting of ambitious but realistic aims for the programme data on. Individual organisational performance allows the project team and faculty to spot any facilities that are out-performing the rest. This often signals differences in practice and presents an opportunity to identify successful change ideas.

These measures should be displayed as monthly run charts whenever possible.



'Another important step during the preparation phase of the collaborative is the gathering of baseline data.'

What do you do if you have no baseline data?

Where data exists but it has not been extracted or collated – you can request that participating facilities gather these data before the start of learning session one and either release it to the collaborative project team in advance OR bring it to the first learning session. If the latter is agreed, time will need to be allocated to collate and analyse these data during the meeting.

Exceptionally, the collaborative project team may be able to undertake this activity with permission from the participating facilities but often there is insufficient resource within the team to do so.

If the collaborative project team has not been able to engage with participating facilities prior to learning session one, the first action period may be spent gathering and collating these data along with testing changes. As the data has already been recorded, the baseline will not be contaminated by the introduction of new change ideas.

Where data has not previously been gathered before – firstly consider whether there are any alternative measures that are available and could stand as a reasonable proxy. If not, you will need to ask facilities to start gathering relevant data for approximately one month and presenting this as either daily or weekly totals depending on the frequency of occurrences. This data collection will ideally be done prior to the first learning session and analysed as described above. Alternatively, it will need to be done in the initial phase of the action period prior to the introduction of any changes.

The implementation phase

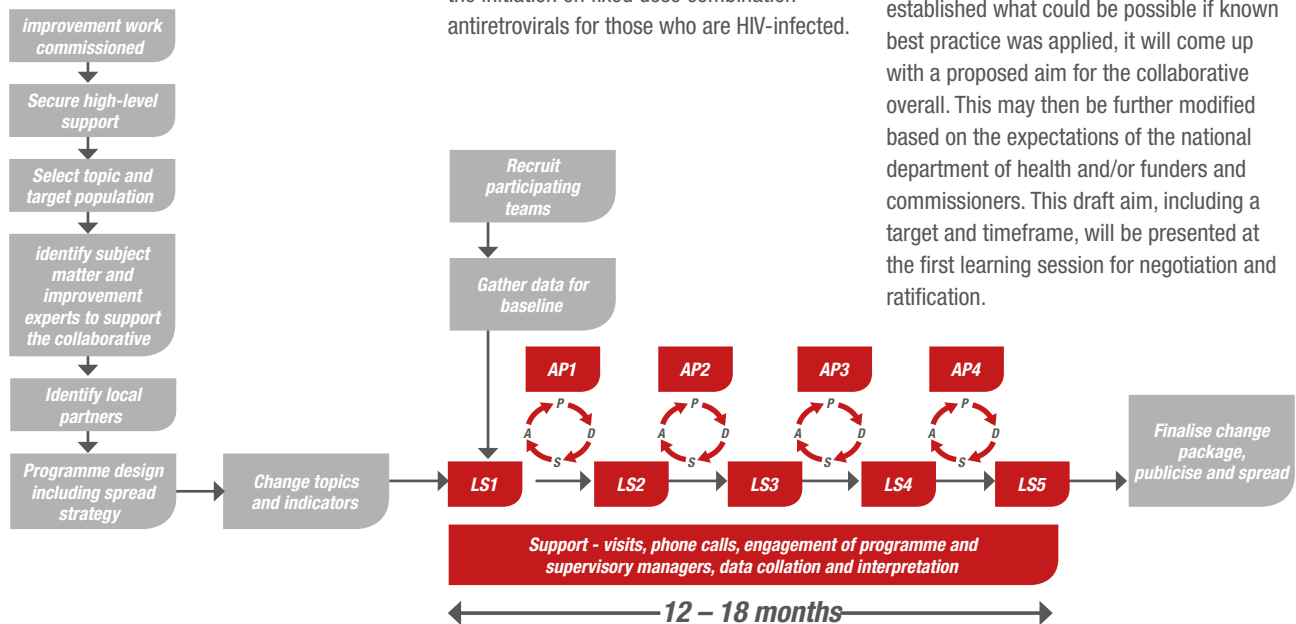
Preparation for learning session one

One of the strengths of the collaborative model is its capacity to **engage multidisciplinary teams from different health facilities in working towards an ambitious, shared overall aim**. This is further enhanced by directing teams to work on the same change topics at the same time. Before learning session one, the change topics need to be assigned to specific learning sessions. Then at each

learning session, new change topics are introduced and participants invited to choose which topics they will focus on for the following action period based on their current performance. **EXAMPLE** for a collaborative looking to eliminate the transmission of HIV from mother to baby, learning session one might introduce the change topics of early booking for antenatal care (ANC), HIV testing at 1st ANC visit and the initiation on fixed dose combination antiretrovirals for those who are HIV-infected.

Most teams only have the capacity to work on two topics in any one action period but more than two topics may be introduced per learning session to provide alternatives to facilities already performing well in one of the topics. The analysis of baseline data will have alerted the project team to this scenario.

Collaboratives have a common overall topic for improvement. Once the faculty has reviewed current performance and established what could be possible if known best practice was applied, it will come up with a proposed aim for the collaborative overall. This may then be further modified based on the expectations of the national department of health and/or funders and commissioners. This draft aim, including a target and timeframe, will be presented at the first learning session for negotiation and ratification.





How to match change topics to learning sessions

- » **Limit the number of new topics to 2 per facility per learning session/action period.** This may mean offering 3-4 new topics so that teams can choose at least 2 based on their current performance.
- » **Follow a logical order, wherever possible.** For example, following a care pathway through from beginning to end. However, see caveats below.
- » **Facilitate some “early wins”.** When teams are learning improvement methodology it is encouraging for them to see some big improvements in the early stages of testing. Some change topics are more difficult to test than others. These should be introduced in later learning sessions.
- » **Introduce high impact topics early.** Improvements in some change topics can have a disproportionate impact on the overall collaborative outcome. It is sometime helpful to introduce such changes early to demonstrate to funders and sponsors that the work will yield benefits.
- » **Introduce topics that will take time to show impact early.** For some change topics, the impact on the overall outcome takes time to be detected in measures; for example, giving iron supplements in ANC to reduce maternal mortality. These topics should be introduced sooner rather than later so that their full impact can be seen by the end of the collaborative.

Learning session one

The process of securing buy-in and commitment to the collaborative and its overall aim is an important early step in the first learning session. Participants need to understand why the collaborative topic is important, what their current performance is, the consequences for patients in them “doing nothing”, and the opportunities for improvement based on what is known about best practice. A very powerful way of securing commitment to improvement is to get a patient to describe what it is like to be on the receiving end of services as they are currently provided. Once this case has been made, **the aim statement for the overall collaborative needs to be shared and agreed or modified.** Unless participants own the collaborative aim they will not feel responsible for achieving it.

Once the aim has been agreed, the collaborative framework, change topics and measures need to be outlined. Expectations of participating organisations should be re-stated along with the project team’s commitment to supporting improvement teams during the action periods.

After this point, the agenda for learning session one starts to converge with the latter part of subsequent learning sessions. For each of the 3-4 new change topics being introduced, measures will be proposed, current performance reviewed, best practice highlighted and a proposed target and timeframe for improvement suggested. Representatives from each facility will discuss, negotiate and agree **collaborative aims for the new change topics and set themselves the same or a more ambitious aim depending on their current performance.** The teams are then introduced to the Model for Improvement⁴ (see HOW TO Module 1) and other improvement

4 Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W., Norman, C.L. & Provost, L.P., 2009. The Improvement Guide – A Practical Approach to Enhancing Organisational Performance. 2nd ed. Jossey-Bass, San Francisco, USA

tools (see HOW TO Module 2) that will assist them in analysing their own performance, what changes they could make that may lead to improvement and how to test one of these using the Plan-Do-Study-Act (PDSA) methodology (see HOW TO Module 5).

Representatives from each improvement team should leave the learning session having:

- › signed up to active participation in the learning collaborative
- › agreed to the overall collaborative aim
- › agreed which two change topics they will be working on in the following action period
- › agreed the collaborative aims for the new change topics introduced at the session
- › decided what their organisation's aim will be for each of these change topics
- › identified a change idea for at least one of the change topics
- › developed a plan to carry out their first PDSA cycle to test the efficacy of their change idea
- › agreed to establish an improvement team if one hasn't already been formed
- › agreed by when the improvement team will meet and how frequently thereafter
- › committed to brief all facility staff on the learning session, including aims, the change idea they selected and the plan for testing this change

For a suggested sample agenda for learning session one, see Annexure 1.



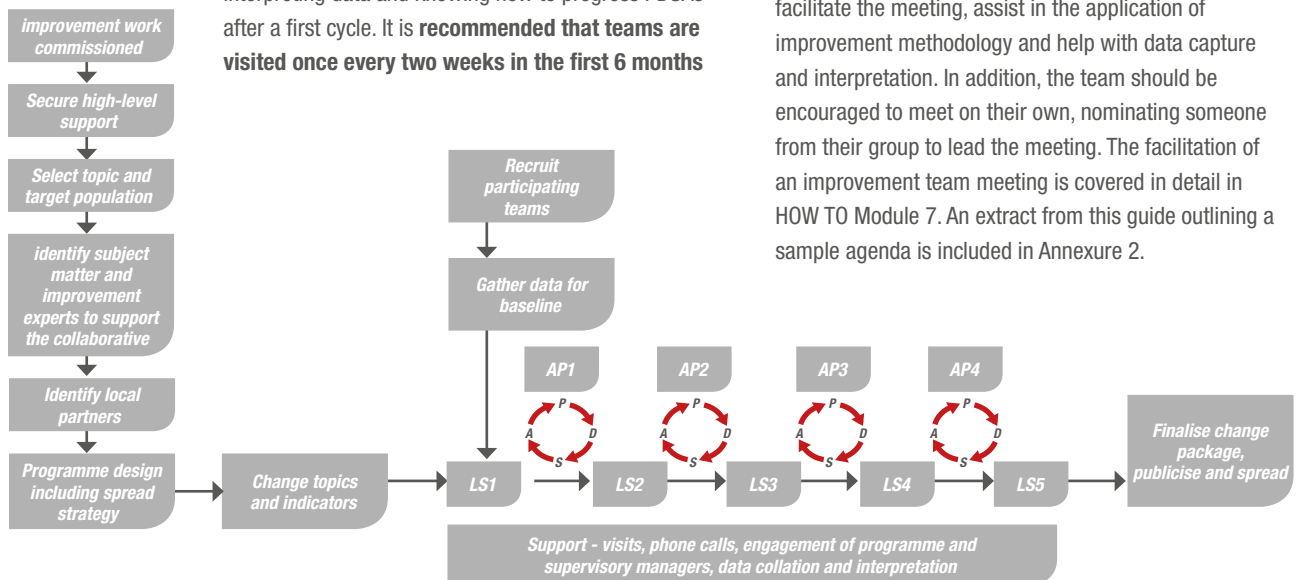


Action periods

Learning sessions help energise teams and facilitate shared learning; **action periods are when the work of improvement is done**. They usually last for 3-4 months during which time improvement teams from participating facilities test out change ideas and monitor their progress in the change topics they committed to work on. The momentum and rhythm of this work is usually dictated by a combination of **regular improvement team meetings and support in the form of visits by an improvement expert, usually a member of the collaborative project team**. Many improvement teams in the early stages of a collaborative need help in gathering, presenting and interpreting data and knowing how to progress PDSAs after a first cycle. It is **recommended that teams are visited once every two weeks in the first 6 months**

of the collaborative. It is imperative that there is a visit within two weeks of the learning session to help resolve any difficulties and ensure the work is being progressed. If visits once every 2 weeks are impossible, a telephone call can replace an occasional visit. This, however, will not have the full impact of a face-to-face meeting.

Ideally visits from a collaborative project team representative will coincide with a scheduled improvement team meeting. Where no meeting has been arranged, the visit should prompt such a meeting. On these occasions, the improvement expert may facilitate the meeting, assist in the application of improvement methodology and help with data capture and interpretation. In addition, the team should be encouraged to meet on their own, nominating someone from their group to lead the meeting. The facilitation of an improvement team meeting is covered in detail in HOW TO Module 7. An extract from this guide outlining a sample agenda is included in Annexure 2.



Role of an improvement team during action periods

- » **Meet regularly, at least once every two weeks.** *These meetings will ideally coincide with a visit from a member of the collaborative project team.*
- » **Plan and review PDSA cycles.** *The primary role of the improvement team is to coordinate the testing of change ideas in their agreed change topics to secure improvement. They should test single ideas repeatedly, adapting as necessary, increasing the scale of testing and testing under different conditions until they are ready to implement. If a single change idea leads to some improvement but leaves them short of achieving their stated target, an additional change idea needs to be identified and tested. This process is repeated for two change topics in every action period.*
- » **Track process and outcome measures.** *In addition to capturing and reviewing data for PDSA cycles, the team will need to keep up-to-date run charts for all the measures associated with the collaborative's overall aim and the individual change topics they are working on. This will include topics that were improved in previous action periods. An important part of sustaining improvement is to keep on measuring to check that performance does not deteriorate.*
- » **Problem-solving.** *In order for effective change ideas to be identified, the team will need to analyse why there is a shortfall between their current performance and their agreed target.*
- » **Prepare to present their work at the next learning session.**

When the collaborative project team works for a NGO, one of its on-going objectives needs to be **the engagement of healthcare managers in the activities of the collaborative**. This has a number of benefits. It helps to ensure the work of the improvement teams is understood and supported when a member of the project team cannot be on-site, it facilitates the transfer of skills and knowledge in improvement methodology and it makes sustainability and spread much more likely. **Managers who are responsible for supervising participating organisations and those who have the collaborative topic area in their portfolio of responsibilities should be encouraged to join the project team's regular visits.** This may include the project sponsor. Over time, these managers may agree to attend some of the improvement team meetings on their own. **They should also be invited to attend and participate in learning sessions.**

At the beginning of an action period, most improvement teams will only be comfortable testing one change idea in a single change topic. After they have run a number of PDSAs, they should have the capacity to start working on the second topic area. The improvement team meeting mid-way through the action period needs to include this in the agenda. Additional time will need to be allocated for the generation of change ideas using one of the improvement tools.

During the last visit of an action period, the project team member needs to assist improvement teams in preparing to present their work at the forthcoming learning session. There are lots of interesting ways to facilitate the sharing of learning during this workshop, but all are assisted by the presentation of activity in a standardised way. A suggested template for this is offered in Box 3.



Box 3: Standard template for feeding back improvement activity during action periods

- › Name of clinic
- › What was your aim?
- › What did you decide to do differently (change idea)?
- › What were you measuring to see if the change was leading to an improvement?
- › What was your performance before you made the change?
- › What were your results (run chart)?



Learning session two plus

The format of learning sessions two and all subsequent sessions (two plus) is similar to learning session one with a few notable exceptions:

- › the case for the overall collaborative does not need to be made again; the **case for new change topics does**
- › the first part of the learning session is devoted to **reviewing the work of improvement teams in the preceding action period**. They are encouraged to describe the change ideas they've tested and the results they have achieved. The project team/faculty should already know which change ideas have been successful based on a review of individual facilities' data and, as such, are well placed to draw out learning for the wider group. This

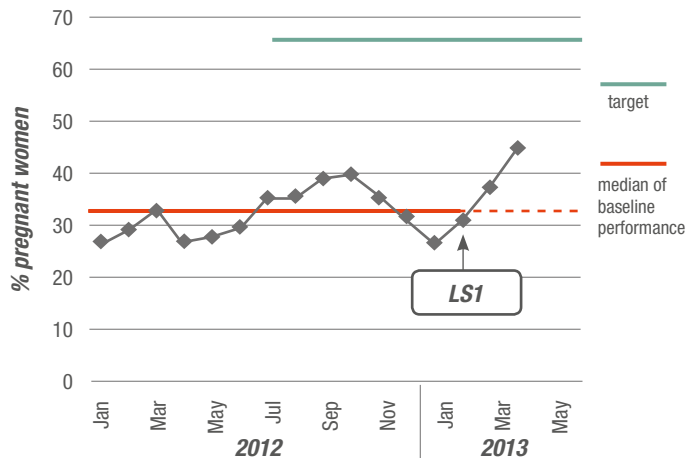
data and the information shared form the beginnings of a spread change package that will include a list of successful change ideas for each change topic. **It is important to note what didn't work as well as what did; an understanding of both are important for learning.**

One of the frustrations of having short action periods is there will often be only a maximum of three monthly data points tracking performance after the introduction of a change (see Figure 1 page 20). When interpreting run charts (Rules 1, 2 & 3) (see HOW TO Module 6) **we need at least five data points after the introduction of our change to detect evidence of improvement**. When monthly data is therefore presented from the previous action period, it is impossible to state conclusively that improvement has occurred. At best, the project team and faculty can offer **encouragement that there are early indications of improvement; a more definitive response is not possible until more data is available**. One way to circumvent this is to encourage teams to



Figure 1

Percentage of women attending 1st antenatal visit with gestation age <20 weeks at Mthara Clinic



plot weekly outcome data for their change topics during the early stages of testing new ideas. This, however, places more demands on the front-line staff and in practice can be difficult to achieve:

- › data showing the progress of the collaborative in achieving its overall aim is presented alongside process measures for all change topics already introduced, including those from the last action period. This should be an aggregate of the results of all participating facilities
- › once the work of the previous action period has been shared and learning points emphasised, improvement team representatives need to decide what to do next in these old topic areas. If they have already achieved their aims, they need to apply actions designed to implement and sustain the changes (see HOW TO Module 9). If they haven't reached their aim they will need to choose another change idea to test in the next action period. Often they can select a successful idea from one of those already presented during the action period feedback

The second half of learning sessions two plus follows a similar format to the latter part of learning session one. The case for new change topics needs to be made, **measures and aims** agreed, teams need to select **topics** they will be working on based on their current performance, **change ideas** need to be generated and the “**Plan**” section the PDSA template of their first test needs to be completed. For more details and a sample agenda for learning session two plus, see Annexure 3.



Final learning session

The final learning session is sometimes merged with the launch of the spread phase. It is, however, important to reflect on learning and progress before looking ahead. As with other learning sessions, teams should share the results of the PDSAs performed in the previous action period and successful change ideas be noted. In addition, the progress of the collaborative in achieving its overall aim and the aims for specific change topics should be presented and celebrated. This is a great opportunity to invite managers and senior leaders to hear about the collaborative's achievements and have them acknowledge the many front-line healthcare workers who have contributed. If a target population for spread has already been identified, key representatives from this group can also be invited so that they can hear first-hand the collaboratives successes and experience the energy and sense of accomplishment.

As successful change ideas are implemented during the piloting phase, plans will have been made at facility and collaborative level to monitor performance on an on-going basis to ensure improvements are sustained. This role now needs to be performed independently by managers at the clinic, subdistrict, district, provincial or national level, depending on the geographical reach of the collaborative. Those who will assume this responsibility need to understand their role. Systems need to be put in place to ensure they have ready access to a “dashboard” of high level indicators that will act as an early warning system if performance begins to deteriorate.

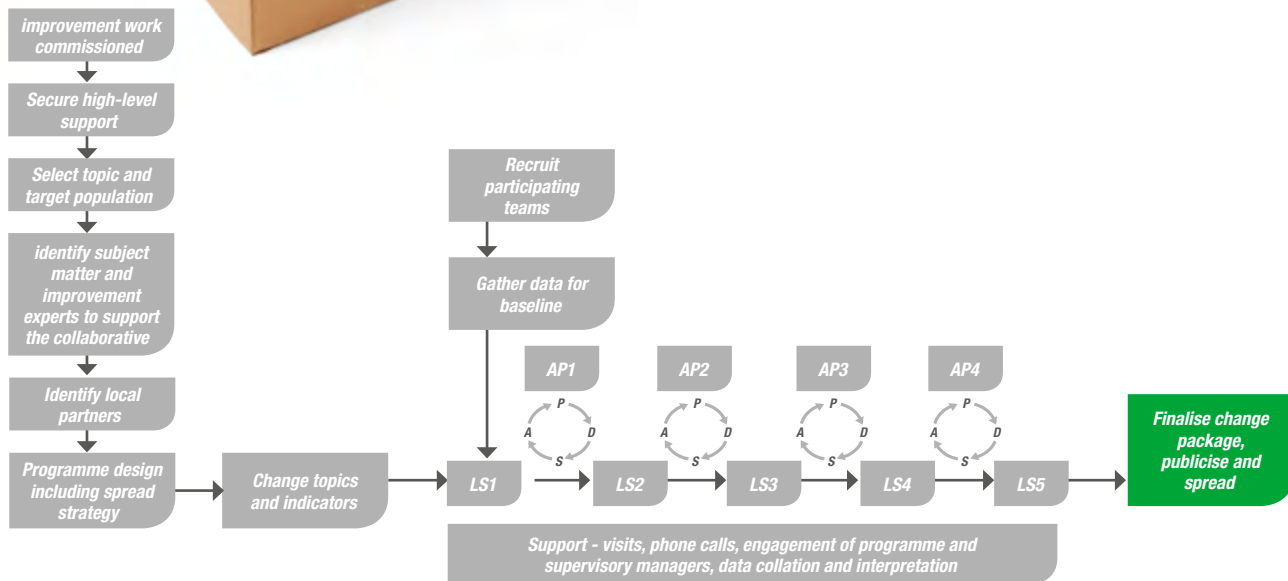
In addition to this managerial oversight, improvement teams should be encouraged to assume responsibility for the on-going monitoring of performance indicators in all the change topics they have worked on as well as the collaborative's overall aim. They should also be challenged to apply the learning and improvement methodology to other health topics relevant to their patients and themselves.





The spread phase

Spread is simply about the transfer and adoption of new ideas or products across a population. In the spread phase of the collaborative, the new ideas that have been shown to secure improvements are shared with others. They, in turn, are encouraged to test the ideas for themselves to see if they can also achieve improvements in their performance. HOW TO Module 9 covers this topic in more detail. Here we are going to touch on only four main elements: “What are we spreading?”, “How are we describing the improvement?”, “Who are the messengers?”, and “What is our mechanism for spread?”.





What are we spreading?

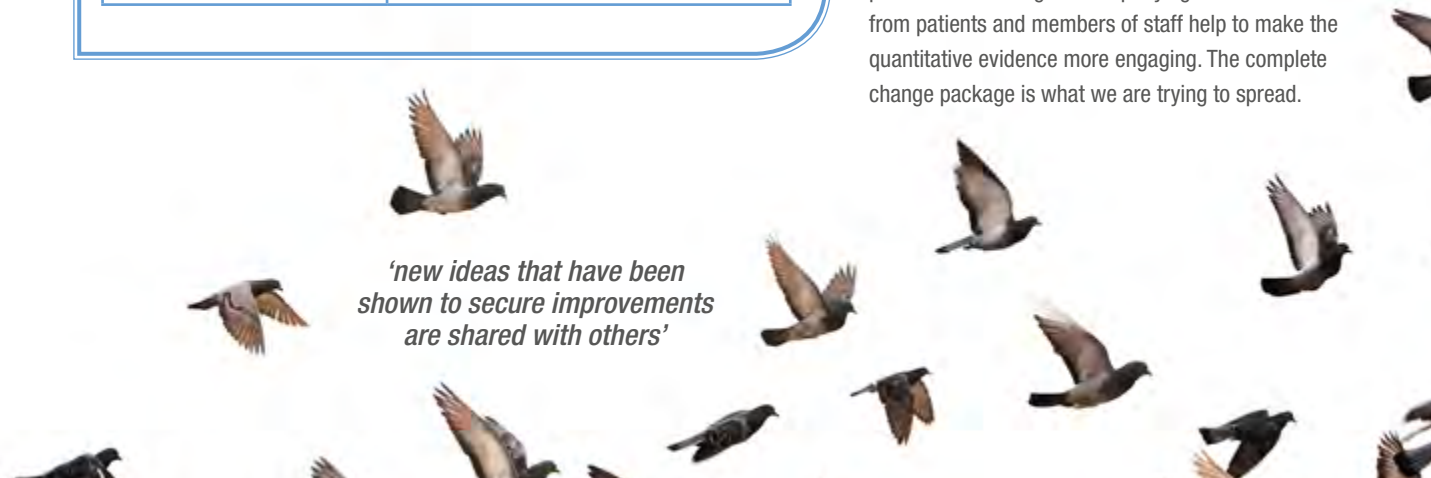
Box 4:

EXAMPLE of part of change package - spread phase

Collaborative topic - reduction of maternal mortality

High leverage Interventions or change topics (what)	Change ideas to reliably execute interventions (how)
Skilled delivery	Patient SMSs the midwife when first in labour, transportation organised by the midwife
	Providing porridge to women after they've given birth
Active management of 3rd stage labour	Getting a relative to dry the baby while oxytocin is given
	Pre-fill syringe
	Woman massaging her own uterus

Earlier we described the piloting change package that contained a list of change topics which shaped the initial activity of a collaborative. During the course of the implementation phase, teams test change ideas and gather data to establish which ideas lead to improvement. By the end of this period, a more comprehensive change package can be compiled outlining both the change topics identified by the faculty as important in securing overall improvements (“whats”) and the change ideas (“hows”). The illustration presented in Box 4 only picks up two change topics but shows the package is now populated with a description of successful change ideas. In addition to this, the change package should be able to demonstrate the change ideas’ impact on performance through accompanying run charts. Stories from patients and members of staff help to make the quantitative evidence more engaging. The complete change package is what we are trying to spread.



‘new ideas that have been shown to secure improvements are shared with others’

How are we describing the improvement?

“Messaging” is really important in preparing for spread. **We need to describe changes in such a way that they appear simple to try, their advantages over current practices are clear, they resonate with people’s values and needs and they are testable (can be introduced and then withdrawn).** This may be part of or a supplement to the change package. Statements about relative

Who are the messengers?

We can learn a lot from advertising when trying to spread new ideas. Who are the people that marketing agencies select to promote products? They fall into two key categories: **people we look up to and people who look like us.** The endorsement of a change idea by the Minister of Health, would be extremely effective in promoting its spread through the public healthcare system. In the absence of a messenger who others look up to, we need to identify people who look like those we are targeting. This is relatively easy when we are spreading ideas across similar populations. For example, a clinic team

advantages may need to be crafted according to the target audience. Advantages as perceived by a manager may be different to those seen through the eyes of a doctor or a counsellor. We may need to develop a number of “messages” depending on who we are trying to communicate with.

from Limpopo who has been successful in achieving the national target for recruiting women at less than 20 weeks for a 1st antenatal visit are very effective messengers in promoting the change package to other clinic teams. However, the composition of the team needs some consideration. If a key change idea requires support from the facility manager, a counsellor and the professional nurse, it is this group of staff that needs to be convinced by the change. Your clinic team recruited to spread the change idea should therefore include representatives from these staffing groups.

‘We may need to develop a number of “messages” depending on who we are trying to communicate with’





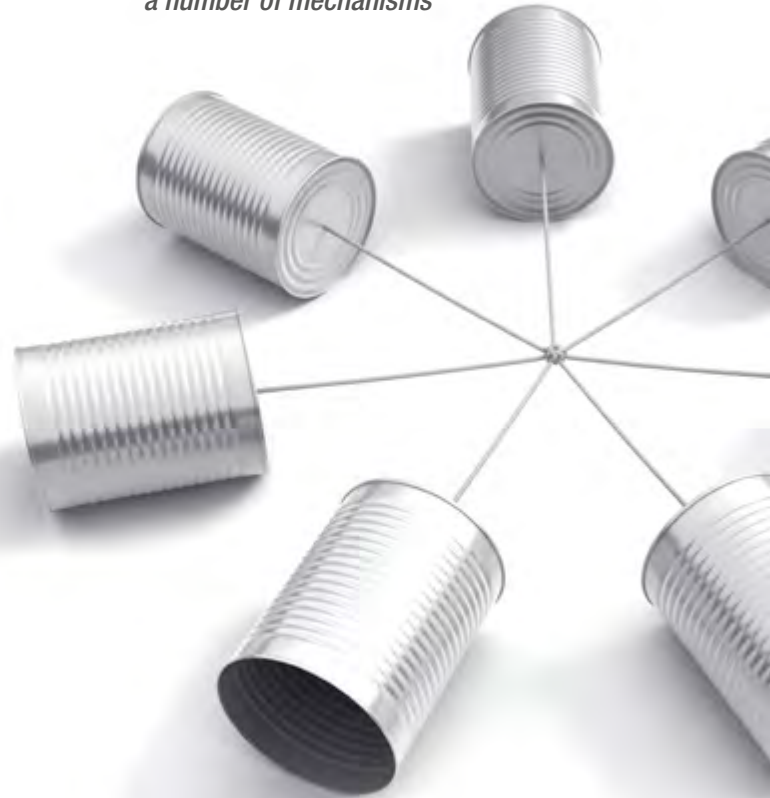
What is our mechanism for spread?

Spread can happen through a number of mechanisms. At one extreme, change could be mandated, at another, it spontaneously occurs through natural social systems. The mechanism (or strategy) for spread needs to be agreed during the planning phase. There are a few things worth considering when agreeing on the approach:

- › a good idea usually spreads spontaneously but it can take a long time
- › ideas, as they spread, may need to be modified for them to work effectively in different organisations. It is helpful therefore to teach the Plan-Do-Study-Act cycle to teams being encouraged to adopt a change package
- › when formal spread strategies are deployed, for example, a spread collaborative, improvements in performance are visible much more quickly than during the piloting phase. This is because change ideas have already been shown to be effective and only need adopting/ adapting by the spread population to see their impact
- › systems-wide changes that do not have to rely on individual decisions to adopt can achieve significant coverage with minimal resources. The disadvantage of this approach is there may be no commitment to the change, only compliance which then has to be policed

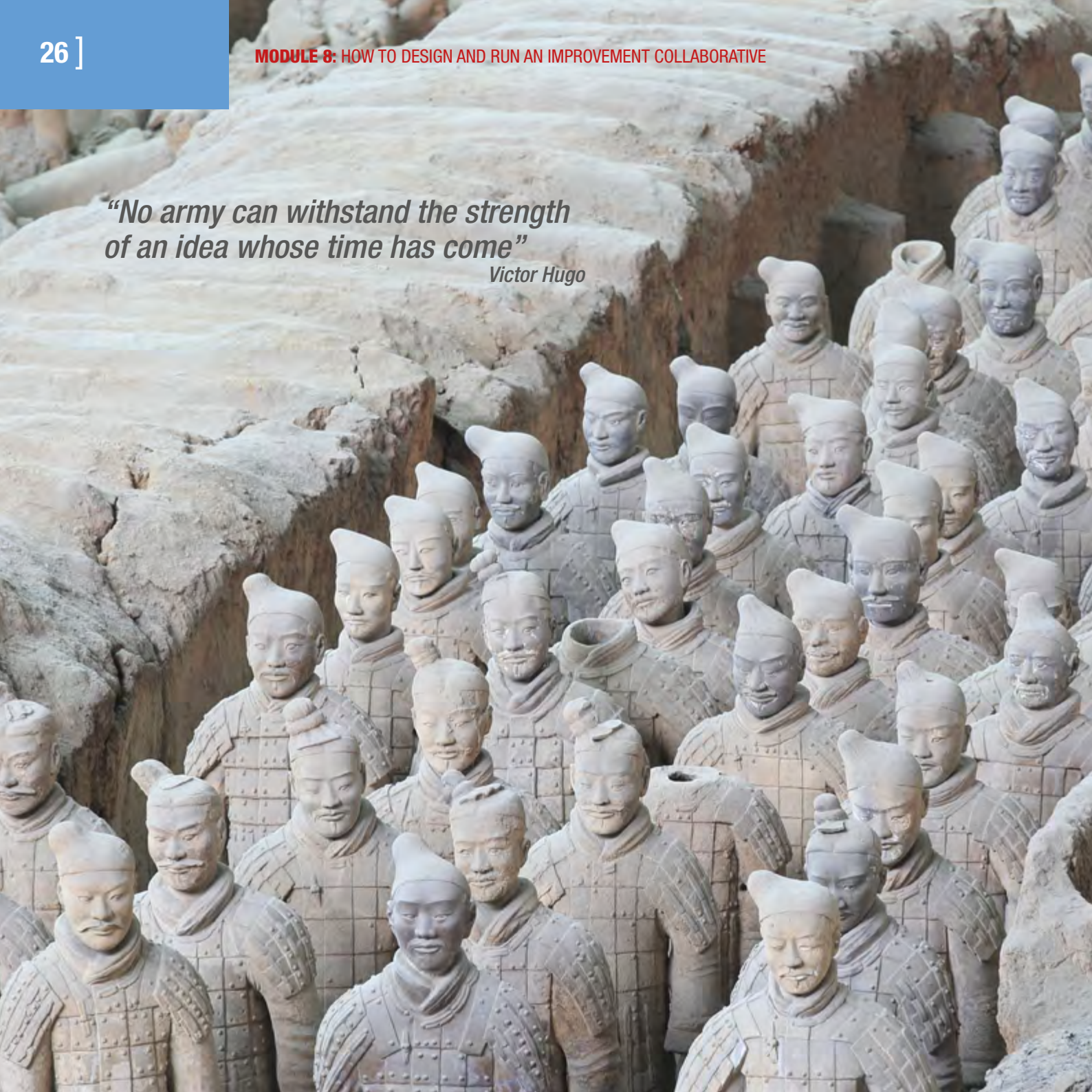
For more information on mechanisms for spread see HOW TO Module 9.

'Spread can happen through a number of mechanisms'



*“No army can withstand the strength
of an idea whose time has come”*

Victor Hugo





Annexures

Annexure 1 – Sample agenda for learning session one

*NB –Text in blue describes suggested content and should not appear in the final agenda.
The wording in square brackets [] needs to be customised for each particular collaborative.*

Date:

Time:

1. Welcome and introductions

2. Introducing the learning collaborative

This should be an endorsement of the collaborative by a senior leader.

3. Why? [insert the collaborative overall topic e.g. “maternal mortality”, “diabetes”]

Need to make the case for why improvement in the topic is important. This will include a review of current performance, the implications of not making improvements for patients, their families, the wider community and the staff themselves, any political imperatives and what is possible based on the application of known best practice. This may be done by a senior member of the faculty.

4. What to expect

Need to outline the collaborative framework, how long the implementation phase of the collaborative will go on for, its key elements (learning sessions and action periods), the expectations of participating organisations and their improvement teams, the support provided by the project team and the benefits of the collaborative (shared learning and support).

5. Agreeing on the collaborative's overall aim

The draft aim developed by the faculty should be shared and explained. There should be plenty of time available for concerns to be expressed and changes to be negotiated.

6. Introducing change topics and proposed measures

An overview of all change topics and proposed measures should be presented. Then the meeting will focus on just those topics to be covered in learning session one and its subsequent action period. Hopefully measures will be readily available through health information systems but if this is not the case, a means by which past, current and future performance can be measured will need to be discussed.

7. Current performance in [change topics for learning session one]

Assuming these data are available, the aggregated performance of the group should be shared with everyone and facility staff be given their performance data in a hand-out. They can then use these data to decide which topics they should work on based on their current performance. Data should be presented in the form of run charts that ideally show at least 12 months of historic data. If data is not already available, a plan needs to be agreed with facilities to obtain this either through the review of existing registers or by recording current performance for a month before the introduction of any change ideas.

8. Introduction to the model for improvement

See HOW TO Module 1.

9. Agreeing change topic aims for learning session one

Assuming data has been available in advance, a member of faculty should proposed targets and the timeframe for those change topics to be improved upon during the forthcoming action period. These need to be discussed, modified if necessary, and finalised. Individual facilities should also identify aims for themselves that are at least as ambitious as the agreed collaborative aims. This will be determined, in part, by their current performance.

10. Showcasing best practice in change topics

If any of the collaborative participants are already doing well in any of the change topic areas this is an ideal opportunity to get them to present their data and explain how they have achieved these results. If there is no outstanding performance from within the group, faculty members can present examples of best practice from elsewhere in the country and beyond.

Just occasionally, it may be necessary to include some “refresher” training on what activities/clinical practice is prescribed by the national department of health in a given topic area.

11. Exploring the gaps between current performance and best practice

Here tools such as process mapping, fishbone or change concepts may be introduced to help understand causes and identify change ideas (see HOW TO Module 2).

12. Planning to test a change idea

The Plan-Do-Study-Act cycle needs to be explained in detail and teams encouraged to start planning their first test of change and documenting this activity.

13. Next steps and date of next learning session

Here expectations of the teams need to be restated and the support to be offered by the project team outlined. It is highly recommended that all teams are visited by a member of the project team within two weeks of the learning session.



Annexure 2 – Sample agenda for improvement meeting

NB – Text in blue describes suggested content and should not appear in the final agenda.

The wording in square brackets [] needs to be customised for each particular collaborative.

Date:

Time:

1. Duration of meeting

Establish how much time you have

2. Reminder of aims

3. Update on change ideas

Recap on the change idea(s) they've been testing

4. Update on PDSA(s)

Recap on the PDSA(s) the team was working on or planning. This information should have been recorded in the minutes of their last meeting. Get an update on progress if you haven't been involved in the test. If they haven't started to test, check their plan and encourage them to agree a start date.

5. Review the data

You are looking for evidence of improvement. If they have completed a PDSA cycle, review the data collected during the test. If the test covers a whole month, some of these data may have been routinely collected and collated. Check whether any decision has been made under the "Act" section of the PDSA and if the data supports this decision. If no decision was made, encourage the team to make one. Check if there are plans to modify the change before it is tested again based on the learning from the previous PDSA.

6. Plan the next test of change

If the previous idea was abandoned, identify a new change idea using appropriate improvement tools

7. Review their run charts

You are interested in run charts relating to aims they've previously been working on and their current improvement topics. Help them plot new data points if necessary. Check if successful changes are still being implemented in old topics where performance improvements have not been sustained

8. Action plan

Be clear you and the team members have recorded important decisions and actions from the meeting

9. Date and time of next meeting

Annexure 3 – Learning session two plus

NB –Text in blue describes suggested content and should not appear in the final agenda.

The wording in square brackets [] needs to be customised for each particular collaborative.

Date:

Time:

1. Welcome and introductions

2. Celebration of success

High level endorsement by senior leader of the collaborative's work to date.

3. Progress since last learning session

Present aggregate data for the collaboratives overall topic and change topics already introduced. Highlight evidence of improvement and improvement being sustained.

4. Feedback from facilities on progress during action period

How the feedback is organised will need to be agreed by the workshop designers. What is important is that change ideas tested are linked to data showing whether the change idea was successful. This is important learning for participants and needs to be captured to develop a spread change package.

5. Further actions

Teams need to agree on the next steps regarding “old” change topics. If they have achieved their aims, they need to plan how they will implement and sustain this performance. If they haven't, they need to select another change idea and plan to start testing it during the forthcoming action period.

6. Introducing the new change topics and proposed measures

Introduce new change topics for the forthcoming action period. Hopefully, relevant data will have been readily available through health information systems. If not, baseline data should have been gathered during the previous action period.

7. Current performance in new change topics

Assuming these data are available, the aggregated performance of the whole collaborative should be shared with everyone and facility staff be given their performance data in a hand-out. They can then use these data to decide which topics they should work on based on their current performance. Data should be presented in the form of run charts that ideally show at least 12 months of historic data.

**8. [Refresher on the model for improvement and/or other improvement tools]****9. Agreeing new change topic aims**

Assuming data has been available in advance, a member of faculty should propose targets and the timeframe for those change topics to be improved upon during the forthcoming action period. These need to be discussed, modified if necessary, and finalised. Individual facilities should also identify aims for themselves that are at least as ambitious as the agreed collaborative aims. This will be determined, in part, by their current performance.

10. Showcasing best practice in change topics

If any of the collaborative participants are already doing well in any of the change topic areas, this is an ideal opportunity to get them to present their data and explain how they have achieved these results. If there is no outstanding performance from within the group, faculty members can present examples of best practice from elsewhere in the country and beyond.

Just occasionally, it may be necessary to include some “refresher” training on what activities/clinical practice is prescribed by the national department of health in a given topic area.

11. Exploring the gaps between current performance and best practice

Here tools such as process mapping, fishbone, change concepts or provocations may be introduced to help understand causes and identify change ideas (see HOW TO Module 2).

12. Planning to test a change idea

The Plan-Do-Study-Act cycle needs to be explained in detail and teams encouraged to start planning their first test of change and documenting this activity.

13. Next steps and date of the next learning session

Here expectations of the teams need to be restated and the support to be offered by the project team outlined.

MODULE 1
HOW TO USE THE MODEL FOR
IMPROVEMENT

MODULE 2
HOW TO DEVELOP IDEAS FOR CHANGE
THAT MAY LEAD TO AN IMPROVEMENT

MODULE 3
HOW TO PRODUCE AND ANALYSE
A PROCESS MAP

MODULE 4
HOW TO SELECT MEASURES TO KNOW
YOUR CHANGE IS AN IMPROVEMENT

MODULE 5
HOW TO TEST A CHANGE USING THE
PLAN-DO-STUDY-ACT CYCLES

MODULE 6
HOW TO PLOT AND INTERPRET
DATA OVER TIME USING
ANNOTATED RUN CHARTS

MODULE 7
HOW TO RUN AN
IMPROVEMENT TEAM MEETING

MODULE 8
HOW TO DESIGN AND RUN AN
IMPROVEMENT COLLABORATIVE

MODULE 9
HOW TO SUSTAIN AND
SPREAD IMPROVEMENT

MODULE 10
HOW TO USE PSYCHOLOGY TO HELP
SECURE AND SUSTAIN IMPROVEMENTS

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THE AURUM
INSTITUTE

**MODULE
nine**

9

**HOW TO
Sustain
and spread
improvement**



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THE AURUM
INSTITUTE

HOW TO GUIDE FOR QUALITY IMPROVEMENT

“

That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Inventions then cannot, in nature, be a subject of property.

Thomas Jefferson

”

Module nine

HOW TO SUSTAIN AND SPREAD IMPROVEMENT

In this HOW TO guide we cover:

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Introduction

Improvement methodology encourages localised, small-scale testing of new ideas to establish their efficacy. For ideas that show evidence of improvement, testing will ideally be the first step in a process that ultimately leads to high impact change ideas being established across the wider system. The key steps in this process are outlined below:



In HOW TO Module 5 we outlined the advantages of **testing new ideas for improvement before implementing them**. Once an idea has been adapted so that it is working well in a particular context, at scale, and under a range of conditions, it is ready to implement. **If testing has been comprehensive, engaging the majority of staff as the scale increased, and the change was relatively simple, implementation is often a straightforward, almost seamless step.** In this guide, we assume these conditions apply and as such only touch briefly on the differences between testing and implementation. If the change you have been testing is complex and requires implementing across a workforce with limited exposure to the original testing, we would refer you Chapter 8 of “The Improvement Guide – A Practical Approach

to Enhancing Organisational Performance”¹. **NOTE** for simpler changes, it may be possible to implement them in the departments or unit engaged in the testing and then spread them to other parts of the organisation (see guidance on how to spread a change).

Having secured improvements through the testing and implementation of a change, it is important to ensure these gains are not lost. We must make a plan to sustain our improvements. The Institute for Healthcare Improvement defines sustainability as “locking in the progress ... and continually building upon it”². In the HOW TO guide we will explore how to do this.

Finally, great ideas and enhanced performance should not be confined solely to those organisations engaged in the original

piloting. We owe it to staff and customers across our wider systems to try and spread best practice. This is a fascinating and wide-ranging topic. In the guide we introduce some of the underlying principles and offer a few practical steps to leaders, managers and improvement enthusiasts who want to plan such activities.

*“We like to test things...
no matter how good an
idea sounds, test it first.”*

Henry Block



1 Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W, Norman, C.L. & Provost, L.P., 2009. The Improvement Guide – A Practical Approach to Enhancing Organisational Performance. 2nd ed. Jossey-Bass, San Francisco, USA

2 5 Million Lives Campaign. *Getting Started Kit: Sustainability and Spread How-to Guide*. Cambridge, MA: Institute for Healthcare Improvement; 2008. (Available at www.ihl.org)

Implementing changes



Implementing changes is usually easy if during testing they have shown demonstrable benefits over previous approaches and early “teething problems” have been ironed out through adaptation and retesting. **The fundamental differences between testing and implementing are:**

- › everyone now needs to **conform to the new way of working**. It is no longer optional or just for those who volunteered to be part of the testing process
- › **support mechanisms** need to be put in place to enable the change to be **successful over the long-term**. This could, for example, entail providing training in a new skill or process, amending ordering systems to ensure there are always the required supplies or producing job aids as a reminder of the new practice

When staff have been fully engaged in the testing and review process and the benefits of changing are clearly visible, implementation can be an uneventful step.

However, **moving from temporary to permanent can throw up some unexpected insecurities** and grief associated with laying

aside old ways of working. **Supporting staff through this transition, keeping communication channels open, reiterating the benefits of the change and giving reassurance to those performing new duties** is an important role for managers during this time.

For complex changes, **implementation may involve further testing** using the Plan-Do-Study-Act (PDSA) cycle. This testing is not designed to establish the worth of the changes, but to ensure they are working effectively for everyone, every day of the week. The scale of tests will be larger during the implementation phase.



Sustaining improvement

Change and improvement takes effort. Having tested ideas and implemented those that are contributing to improvement, there is little more demoralising than seeing a return to old levels of performance. Anyone who has lost significant amounts of weight in the past and then put most of the weight back on again will relate to this.

In order to sustain improvements there are some simple but necessary things that need to be done to ensure the system and hence performance does not revert to old patterns:

- 1. Celebrate!** – it is important to reinforce successful behaviour with recognition. Celebrations are remembered by staff and become part of the organisational memory. People can be inclined to look back nostalgically on old systems remembering the good and forgetting the challenges and dysfunctionality. **Moments of celebration stand as a marker to remind people that what we have now is really better than what we had before;** that's why we were celebrating. This activity may be introduced as part of the transition from testing to implementation.
- 2. Remove the old systems** – even though members of staff may be overtly supportive of the new system, some may be tempted to

resort back to the old, especially soon after implementation when the previous system still feels comfortable and easier to use. To stop this you need to **remove any option to use the old system.** **EXAMPLE** imagine the Department of Health has been developing a new register to capture patients suspected of having TB and their follow up. This is designed to significantly enhance the testing of presumptive TB patients. Your clinic was engaged in the development of the register, staff generally support the change although they know it will require them to include more entries, and they were all given training on how to complete it. New registers were issued weeks ago and you started implementing the change. When all the pages in the first new register are completed, someone replaces it with a blank old register even though new ones are available. No one says anything and members of staff complete it as if the new version was never introduced. When the clinic manager finally notices, no one wants to return to the new register.

“Sustainability is not a ‘project’ with an end-point. It is rather a constant effort to embed a change into the fabric of daily work”

NHS Modernisation Agency Improvement Leaders Guides, Sustainability and Spread





'Continue to measure'

3. Continue to measure – this is so important in providing an objective means of telling you if you are managing to sustain your improvement. You don't need to continue to measure whether you are still making the change (your process measure); it is enough to **continue tracking whether you are achieving your original aim (outcome measure)**. If this starts to deteriorate you can investigate further. Usually deterioration in performance signals the unreliable execution of the change idea or a change in the environment that is making the new idea less effective. When you have many improvements to monitor, it is advisable to **identify a "dashboard" of measures** that give you some information about the health of the system overall. This is like the dashboard of a car. The indicators on a dashboard don't provide information about performance across all parts of the car's systems (e.g. suspension, engine, brakes) but it does give you an indication something is not right. If, for example, the temperature gauge is going up you may not know why but you know you need to stop and investigate and resolve the problem.

4. Embed the approach – this includes making measurement systems permanent, developing standard operating procedures to reflect the changes in practice, teaching new approaches when inducting newly appointed staff, including new roles in job descriptions, incorporating new activity into individuals' personal objectives, etc. This activity may be introduced as part of implementing a change.

5. Make it hard not to follow the new process – we can build in **constraints** (e.g. we no longer stock the old drug), **affordances** (e.g. the document in which we have to record data also prompts us to perform the right practice) and **differentiation** (e.g. a sticker or code word on the inside of the patient's file distinguishes them as needing a particular service).

6. Connect with hearts as well as minds – initially when change is introduced, not all members of staff necessarily embrace it but they are usually **compliant**. They understand what is expected of them and their behaviour conforms to these expectations. However, they may not have **internalised the "rightness" of the change**. They are doing it because they



are told to, not because they believe it's the right thing to do. Such individuals need frequent supervision and monitoring to maintain the new system. This is resource-intensive and is unlikely to be sustainable. If, however, the advantages of the change are described in such a way as to **engage with individuals' values and beliefs**, they are much more likely to persist in the change irrespective of whether anyone else is watching.

7. Build contingencies for known exceptions – changes should be tested under a range of conditions before they are implemented. However we **don't design new systems around exceptions** but around what usually happens. This means there are usually **some exceptional conditions under which the change may not perform optimally or of which we have no previous experience**. We may need to modify the system or introduce some additional processes to ensure we can still be productive during these times. This will probably already have been done for old systems. Staff have found ways of “muddling through” (e.g. they've learned how to manage when colleagues are absent during the long Christmas vacation

and during power outages). In order to **avoid difficulties when operating our new systems in these exceptional circumstances, we need to have a plan**. If we don't, there is a risk the new system appears worse than our old one and staff decide to revert back to old practices.

'Make it hard not to follow the new process'



8. Plan to continually improve – the environment in which we work is constantly changing. **New processes can quickly become old processes** that don't support the levels of performance we've come to expect. Having learned how to set goals, identify change ideas and measure to see if changes are an improvement, we can continue applying these techniques in response to patients' needs, known best practices and policy changes.



Who is responsible for sustaining improvements?

*The correct answer to this is those **people who own the process**. These are often the people who tested and introduced the improvements in the first place. Systematically working through the steps outlined above is an important final stage in making improvements. Those who have invested in the improvement, often an improvement team and their senior executive sponsor, should coordinate this activity before moving on to new areas of change.*

*They may, however, need **support from an improvement expert to advise them on the approach and senior leaders to encourage and legitimise the activity and remove key obstacles**.*

***Line managers should also be engaged in this process**. It is their role to provide recognition and supportive supervision, direct activity, create space for the work to be done and hold teams to account. Along with other key indicators, line managers should be tracking relevant measures to ensure new levels of performance are being sustained.*

This process should not be undertaken by anyone who sits “outside” of the system, e.g. a supporting NGO.

“New processes can quickly become old processes that don’t support the levels of performance we’ve come to expect.”

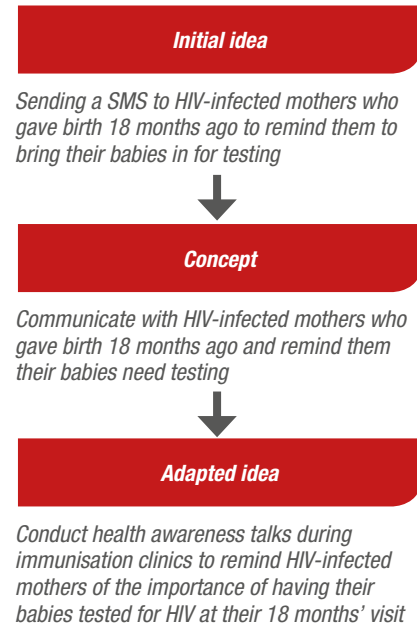


Spreading improvement – in principle

What are we spreading?

Spread involves the active dissemination of **something tangible – an idea, an object, a practice** and its adoption by a new target group. Most spread activity follows an intensive period of small scale testing where teams will have worked collaboratively to secure improvements in a given topic. Throughout the piloting period, new ideas will have been tested and data captured to establish which changes have contributed to improved performance and which have not. Whilst improvement methodology may have been pivotal in facilitating improvement, **it is the successful changes and not the methodology that is usually spread.** Successful changes, along with evidence of their efficacy, are typically set out in a single document known as a **change package**. A comprehensive change package contains information about what interventions were necessary to secure improvements and what change ideas made it possible to perform those interventions reliably. Although spreading a complete package of changes will offer the greatest potential for achieving the overall success, independent change ideas can be spread one at a time and still have a demonstrable impact.

Change ideas may not be immediately transferrable. The circumstances in which they were successfully applied will be unique. The greater the similarities in context between those originally piloting the ideas and the spread population, the more likely the change idea's success can be replicated without the need for modification. However, **if differences in circumstances are significant, the change ideas may need to be turned into change concepts in order for them to spread.** A change concept captures the intention and principle behind the idea. **EXAMPLE** the concept behind the idea of “sending a SMS to HIV-infected mothers who gave birth 18 months ago to remind them to bring their babies in for testing”, would be “communicate with HIV-infected mothers who gave birth 18 months ago and remind them their babies need testing”. The original idea of sending a SMS may not be possible if mothers don't have phones or a clinic doesn't have the funds to pay for the SMSs. However, every clinic can find a way to communicate that works in their own set of circumstances. For more information see HOW TO Module 4.





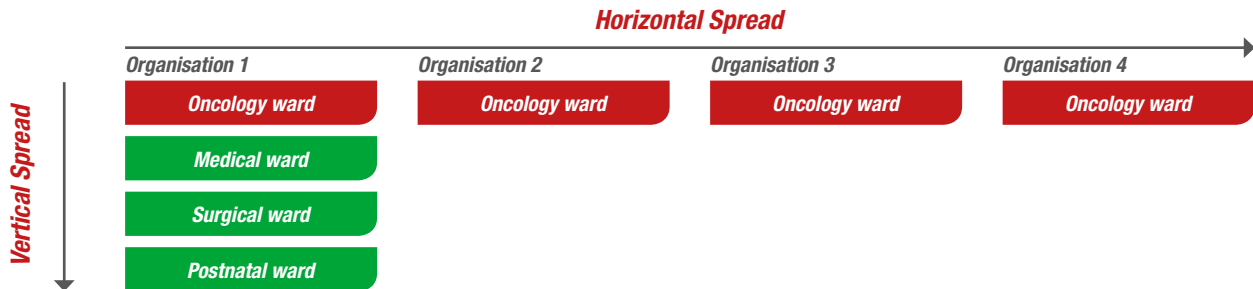
If the spread population is likely to have to adapt change ideas or apply change concepts in order to secure improvements, it will need to know something about testing cycles (PDSA cycles), measurement and how to generate change ideas from change concepts. Whilst the focus of our spread activity is the transfer of ideas and concepts, some improvement methodology may also need to be shared in order for the full benefits of these tested change ideas to be replicated.

Who are we spreading to?

Rogers³ observed that some new ideas can spread spontaneously across social systems. Where spread is a deliberate activity rather than a natural occurrence, we will want to clearly identify and define our target population. It should ideally have some overlap with the social networks of our pilot community so that we can enhance and accelerate what is already likely to occur naturally. These social networks could be, for example, professional associations, administrative structures (e.g. a healthcare district), the audience of a particular radio station, members of a golf club or a church or denomination.

Vertical and horizontal spread

The most obvious and simplest way of spreading new ideas is within the organisation in which they were initially tested. This may already have happened as part of testing at scale and implementing but not necessarily. **EXAMPLE** as part of a project to improve cancer care, an oncology ward comes up with some new ways of organising the drug round that saves time and makes it safer for patients. These ideas are applicable to any type of ward and so can be spread across the whole hospital. This is known as **vertical spread**. **Horizontal spread** is the spreading of ideas from one organisation to another.



Diffusion of innovations curve

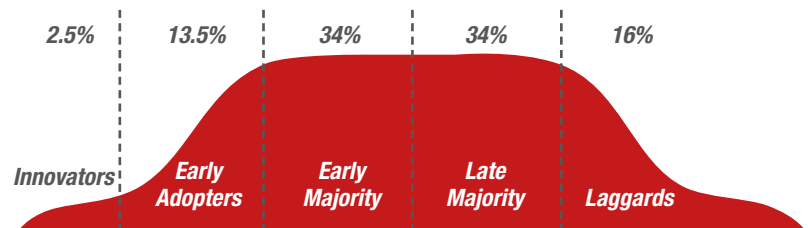
Everett Rogers, a recognised authority on spreading innovations, suggests that every population is made up of people who are more or less inclined towards change. He categorised individuals based on how quickly they adopted new ideas or products. The diffusion of innovation curve shows these different categories and their prevalence within any population.

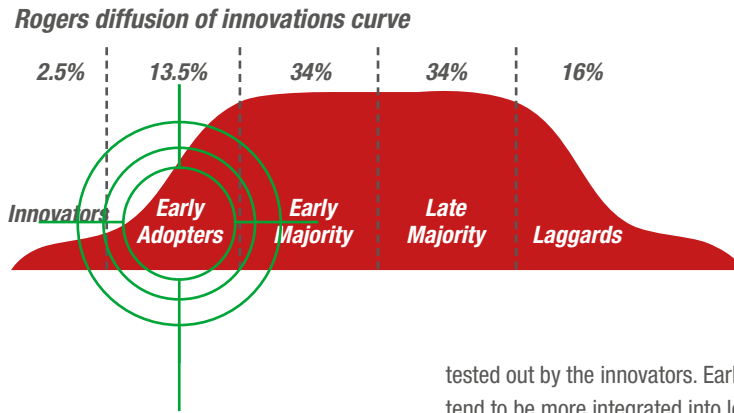
Innovators, comprising approximately 2.5% of the population, are the first to adopt a change. They tend to like novelty, can cope with uncertainty, are able and willing to take risks, and can understand and apply technical knowledge. **In order to establish any new idea in a target population, we must first identify and market the change to its innovators.** Their adoption then makes the idea visible to others, raising awareness and allowing the more cautious to learn from the innovators' experiences. Assuming we have piloted

ideas before trying to spread them, **some innovators will reside in the piloting sites. These people are highly effective at communicating the benefits of changes to other innovators** in the spread population.

Early adopters are the next group of people likely to accommodate a new idea. They are less inclined to change than the innovators but will not take long to embrace an innovation, particularly after it has been

Rogers diffusion of innovations curve





As we plan a spread strategy it is important we concentrate our efforts on the people who are positioned on the left-hand side of the diffusion curve

tested out by the innovators. Early adopters tend to be more integrated into local social systems than innovators and are the group from which **opinion leaders** emerge. The majority will look to them for advice and information about the innovation and as such they are **critical in facilitating spread**.

The **early majority** represent about a third of the spread population. They are likely to deliberate for some time before adopting something new. They will look to the early adopters for guidance. The **late majority**, who also represent about a third of any population, are more likely to be swayed by peer pressure. They are risk averse and will wait until most of the uncertainty surrounding a new idea has been eradicated before embracing it.

Finally, the last group to adopt the change are the **laggards**. Laggards have no propensity for change; their reference point is the past. Often they change only when something is mandated.

As we plan a spread strategy it is **important we concentrate our efforts on the people who are positioned on the left-hand side of the diffusion curve**. These individuals will be more receptive to new ideas and are the means through which an innovation is established within a given population. Research suggests that once between 10-20% of the population has adopted an idea or new product, it is usually impossible to prevent it from spreading across the whole population. According to Rogers, all we have to do is convince the innovators, early adopters and some of the late majority to embrace the change and we will be successful in penetrating the entire target population.

It is important to remember that whilst people have an overall inclination/disinclination towards the adoption of new ideas, **they can fall into one category for one innovation and a different category for another**. For example, you may be a late adopter when it comes to technology and a laggard when



it comes to ideas about nutrition and exercise. People have good reasons for holding the positions they do. **There is nothing right or wrong about residing in any given category.**

Wherever you sit along this curve, the people most able to present a convincing case for change are those who fall within the group immediately to the left of you. Innovators are able to present a coherent argument to early adopters but that same argument is unlikely to have any impact on the late majority. They don't think the same way and have very different reasons for adopting innovations. Similarly, individuals from the early majority will be able to construct meaningful reasons for change to an audience comprising the late majority. This knowledge needs to be utilised as we develop a spread strategy. We need to **think carefully about our message and our messengers.**

What is our message?

Our spread population is not homogeneous. It comprises innovators through to laggards, different professional groupings, people with different values and beliefs, individuals belonging to different social networks, etc. It is therefore helpful to **segment our target audience and develop messages that speak to each segment.** For example, you could develop a message that is meaningful to doctors who are early adopters or innovators.

We also need to tailor our messages to emphasise specific characteristics of the change that will help accelerate its adoption.

These include:

- » **How easy it is to see the change in action** – we need to describe the sites who have already tested the idea and found it to be successful
- » **Its relative advantage** – we should use data and stories to demonstrate it is better than the old way of doing things



- » **Ability to try it out** – we encourage testing and adaptation before implementing the change and provide guidance on how this can be done using PDSA cycles
- » **Its simplicity** – if it is not a simple idea, we need to break it down into smaller steps that can be introduced one at a time
- » **Appeal to values and experience** – think about and talk to the motivations of the target population

Our messages need to achieve two fundamental goals. The first is to **raise awareness** of the change and possibly the need to change. The second is to **provide the technical “know-how”** to be able to adopt the change. Our messages may therefore be constructed and sequenced in such a way as to focus initially on awareness raising and then on providing more detailed information to enable a decision to change.

Publicising the change can often be done to segmented groups whereas the sharing of technical know-how may require more one-on-one communication. For people to transition from awareness to adoption, they often need to have specific questions addressed. It may be difficult to anticipate and address these through mass communication. **Change agents**, enthusiasts who have already been involved in piloting changes, have an important role to play in providing this more tailored messaging.

Box 1: How to increase the speed with which a change is spread

Rogers noted through research that ideas were spread more quickly if they had the following characteristics:

Observability – the degree to which the results of the innovation are **visible to others**. If change ideas have already been piloted and successful ideas documented in a change package, their observability is heightened. This can be further enhanced by inviting those who did the piloting to describe their experiences to the spread population.

Relative Advantage – the extent to which the new idea is perceived as having **benefits** over existing options.

Trialability – the degree to which changes can be **tested on a small scale** and withdrawn if the benefits are not evident. This characteristic is present in all change ideas that have been initially tested using PDSA methodology. Teaching the spread population how to test ideas on a small scale helps satisfy this need to trial new ideas.

Simplicity – the extent to which changes are **perceived to be easy to understand and apply**. We are often inclined to “talk up” our successes and exaggerate what we had to do to achieve them. This is inadvisable if we are trying to spread ideas. We need to present them as simple and very easy to adopt.

Compatibility – the degree to which the change is seen as **consistent with the values and past experiences** of the spread population. As these will not be uniform, it is important to vary our description of the change and its benefits to appeal to a diverse audience.



Who are our messengers?

For our changes to have the greatest chance of spreading, we have to develop **well-constructed and targeted messages** and have them **delivered by the right messengers**. Who are the people most likely to have the greatest influence over our target population? The answer is **opinion leaders** and **people like them**. Opinion leaders can be people outside of our social networks such as politicians and sportsmen or those who fall within them such as an older relative, teacher or pastor. “People like them/us” are just that; they are often from a similar cultural background, are the same gender, have a similar job or interests, are of a similar age, religion, etc. **The closer the match, the greater the potential influence.**

When preparing to communicate messages about our change to the spread population, we need to try and identify opinion leaders for mass communication and opinion leaders or “people like them/us” for a segmented audience. Here, opinion leaders may be someone occupying a position of authority such as a senior doctor or a chief executive. They may, however, have no particular status but are respected by many in their social

network. **EXAMPLE** researchers⁴ in the 1990s were anxious to spread information about the reduction of HIV transmission to gay men in the US. They determined the most effective way of doing this was to educate opinion leaders and seek their support to convey these messages across their social networks. But how did they know who the opinion leaders were? They decided to ask bartenders working in the gay bars to identify those men who greeted and were greeted by the most people. These men were then approached to be peer educators.

When you are attempting to communicate to a segmented audience you may want to identify messengers who are “people like them/us”. **Clearly it is impossible to get a perfect match but some characteristics will be more important than others depending on the change you are trying to spread.** For example, if the change relates to work-related practices, the most important similarities you will be looking to match will be job role and/or professional status. If the change is a new washing powder, gender, socio-economic group and cultural background are likely to be more important.

Box 2: Who has the greatest influence over the important decisions in your life?

Facilitators and teachers of improvement methodology often ask this question; the answers received are remarkably consistent:

- > my partner/spouse
- > my mother/father
- > a teacher or lecturer
- > a trusted boss
- > a church-leader
- > a close friend
- > a sibling

These answers can be summarised as “someone I look up to” and/or “someone like me”



⁴ Kelly, Jeffrey A., Murphy, Debra A., Sikkema, Kathleen J., McAuliffe, Timothy L., Roffman, Roger A., Solomon, Laura J., Winett, Richard A. & Kalichman, Seth C. 1997. Randomised, Controlled, Community-Level HIV-Prevention Intervention for Sexual-Risk Behaviour Among Homosexual Men in US Cities. *Lancet* 350:1500-1505. PH(E).

Spreading improvement – in practice

Managing the spread of change ideas across a defined health care system is a complex exercise that needs to be planned and implemented like any other complex project. It requires a clear **aim**, **leadership**, an **execution plan** based on a given spread strategy, a **team to implement** the plan and **measures** to demonstrate the aim has been achieved. Let us look at each of these essential components in turn.

The aim

Our spread activity should have a measurable aim or aims. It will include a **definition of spread** that could relate to the uptake of new ideas or the expected improvements resulting from these changes being adopted. The aim should also clearly define the **target population** and how quickly some or all of the ideas or improvements are to be spread.

Leadership and implementation team

Ideally the leadership of a spread project will be provided by senior managers who are ultimately responsible for performance within the target population and, where possible, piloting organisations. These individuals will have a strong belief that improvements are possible and will be motivated to see these in the remainder of the organisations that fall within their jurisdiction. They may also be **opinion leaders** within the spread population.

These managers may need support from improvement experts to help design and support the spread activity. In addition, they will probably need to assign the day-to-day management of the project to others with protected time to dedicate to this work. Ideally this will include at least some individuals who work within the same system as the target population. This team may be supplemented by subject matter experts and change agents drawn from the most successful piloting sites. The team may also include or have access to individuals who can help change support systems such as human resources, finance and information technology. As changes are adopted across a wider population, existing support systems can sometimes struggle to adapt to new demands. It is essential that any limitations are addressed quickly so that decisions to adopt new ways of working are not limited by infrastructure constraints.

The execution plan

The structure and content of the execution plan will be dictated by the spread strategy chosen (see Table 1: Common spread strategies). It is not possible within the scope of this HOW TO guide to expand on specific plans related to each type of strategy. There are however, some elements of the execution plan that will be common to all. We have already discussed the crafting of messages associated with successful change ideas and the





identification of appropriate messengers to raise awareness of the changes and provide technical support to those wanting to adopt them. A list of common spread strategies is set out in the following table:

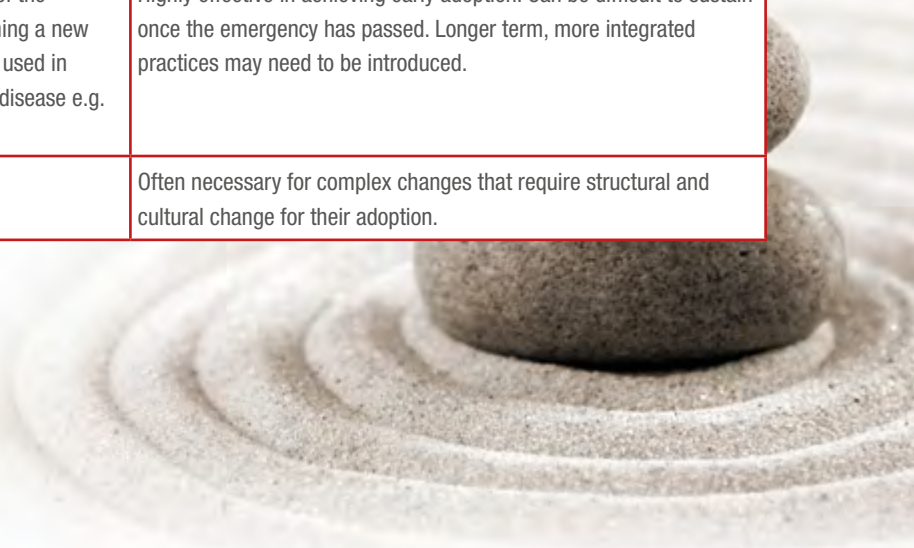
Table 1: Common spread strategies

Spread strategy	Description	Advantages/disadvantages
Natural diffusion	Changes or ideas spread without any attempts to expedite the process.	Requires no additional resources but for most innovations it takes a long time before they impact the whole target population. Diffusion may not occur even for ideas with proven efficacy.
Learning collaborative⁵	Multidisciplinary teams from different organisations come together to work on a common improvement aim. Taking ideas that have already been tested and are known to help secure improvements, teams adapt and implement these using PDSA cycles. They share their progress periodically at joint workshops.	Significant resources are needed to support a learning collaborative. The cost may be reduced if supervisory and specialist managers involved in the piloting of ideas are assigned to help run the spread collaborative. Teams will be encouraged to test and adapt successful ideas. This will increase ownership and sustainability. Adapting ideas will also help ensure they achieve their potential to improve performance across a wide range of contexts. Teams participating in the collaborative will learn improvement methodology and be able to apply it to other areas of poor performance. Improvements are secured more quickly in a spread collaborative than during the piloting phase.
Executive mandate	Members of the target population are directed by those in authority to adopt the change.	It is a quick way of securing change and requires little extra resource. However, necessary modifications to changes that ensure they work effectively in different contexts may not occur if the directive does not encourage this. Even when permission is given, many will not know how to adapt changes to secure better results. Change that is mandated can be difficult to sustain.

Spread strategy	Description	Advantages/disadvantages
Extension agents	Individuals with experience and knowledge of the new idea or product are appointed to work within a defined segment of the target population to promote the change and support innovators and early adopters as they try it out.	Can be highly effective in securing adoption across a heterogeneous population. The approach enables face-to-face encounters that allow the targeting of messages and technical support. It is resource intensive and coverage can be limited because of a large reliance of direct communication.
Marketing programmes	Raising awareness and enabling exposure to changes is facilitated through the use of the media, advertising, and creating opportunities to trial ideas/products with support.	<p>Can achieve good general awareness over a short space of time. Messaging tends to be pitched at a broad constituency; there is limited opportunity to tailor to different interest groups within the population. Creating opportunities to trial an idea or product with support encourages adoption. However, this may not provide sufficient technical support to address the majority of potential adopters' needs.</p> <p>The approach lends itself to simple changes that can be easily adopted without much support or modification.</p>
Campaigns	Campaigns begin with a well-constructed and inspiring aim that resonates with their targeted population. They have a simple set of measures, a broad communication system and dispersed champions or extension agents. Designated organisations or individuals are recruited to mentor and support others within a defined geographical area.	Can achieve widespread coverage and the adoption of ideas with relatively modest resources. A simple and galvanising aim helps to create alliances and support across organisations that may not be used to collaborating and that bring with them additional resources. The approach lends itself to the spread of relatively simple changes that require little or no process redesign. Campaigns harness capacity and good will within the existing infrastructure. Where spare capacity and good will is in limited supply, it may be difficult to access the resources required to be successful.



Spread strategy	Description	Advantages/disadvantages
Wave sequence	<p>Those involved in piloting changes or using a new product become responsible for sharing knowledge and their experiences with a defined group within their social network or organisational system.</p> <p>Within healthcare, the wave sequence is sometimes referred to as “wedge and spread”.</p>	<p>New converts to an idea or product are highly effective at communicating the benefits to others. Those within their organisational system will relate to them and are likely to be able to adopt ideas without the need for much adaptation as their contexts should be similar. The approach requires few additional resources as it harnesses those already in the system.</p> <p>The responsibility to pass on information and offer support to others can be burdensome. Some may even experience a reversal in their own improved performance as their attention is drawn away from sustaining their efforts.</p> <p>The selection of piloting sites needs to be carefully planned to ensure there is full coverage across the spread population when individual pilot sites spread within their own social or organisational systems.</p>
Emergency mobilisation	<p>Rapid adoption is mandated because of the negative consequences of not performing a new practice. This is a strategy sometimes used in public health to prevent the spread of disease e.g. extensively drug-resistant TB.</p>	<p>Highly effective in achieving early adoption. Can be difficult to sustain once the emergency has passed. Longer term, more integrated practices may need to be introduced.</p>
Hybrid model	<p>A combination of some of the above.</p>	<p>Often necessary for complex changes that require structural and cultural change for their adoption.</p>



Irrespective of which spread strategy is chosen, spread to a large population can be constrained by infrastructure challenges, commonly known as **scale-up issues**, not experienced when ideas were initially piloted. In commerce, this could be, for example, insufficient internet capacity to support a spike in tablet sales. In health, this could be procurement challenges associated with a change in drug or supplies usage or human resources and training issues arising from assigning new roles to a particular staff group. **Wherever possible, these challenges need to be anticipated and a clear plan made to address them before they are encountered by potential adopters.** In practice, not all such barriers to spread are predictable and the spread implementation team will need to be very responsive and resourceful when they come up against such problems.

Measurement

It is important to track progress as the execution plan is implemented. As with other improvement projects this should include a combination of **outcome and process measures**. **Outcome measures specifically relate to the aim and how we defined spread.** They will enable us to determine if we have secured the improvement in performance we were aiming for, and/or how extensive the adoption of new ideas.

Outcomes should ultimately be measured for the entire target population but initially this may be too insensitive a measure to detect early improvements. Depending on the aim and spread strategy (e.g. wave sequence), **it may be appropriate to segment the target population and measure outcomes within a specified segment where effort is being focussed. As the plan to spread broadens, measurement will also need to expand to encompass additional parts of the population and eventually the whole.**

Process measures relate to the spread strategy and execution plan. If, for example, a team chooses marketing programmes as its strategy, it may measure how many adverts have been screened, the number of radio programmes that featured discussions about the changes, the number of enquiries received for further information, etc. If the team was running a spread collaborative, it may measure attendance at workshops, the number of ideas each participating organisation are testing with a view to adopting, etc.

Progress should be communicated at least monthly to all involved in the spread activity. This helps to strengthen commitment and ensures there are timely interventions when progress deviates from planned targets.



MODULE 1

HOW TO USE THE MODEL FOR
IMPROVEMENT

MODULE 2

HOW TO DEVELOP IDEAS FOR CHANGE
THAT MAY LEAD TO AN IMPROVEMENT

MODULE 3

HOW TO PRODUCE AND ANALYSE
A PROCESS MAP

MODULE 4

HOW TO SELECT MEASURES TO KNOW
YOUR CHANGE IS AN IMPROVEMENT

MODULE 5

HOW TO TEST A CHANGE USING THE
PLAN-DO-STUDY-ACT CYCLES

MODULE 6

HOW TO PLOT AND INTERPRET
DATA OVER TIME USING
ANNOTATED RUN CHARTS

MODULE 7

HOW TO RUN AN
IMPROVEMENT TEAM MEETING

MODULE 8

HOW TO DESIGN AND RUN AN
IMPROVEMENT COLLABORATIVE

MODULE 9

HOW TO SUSTAIN AND
SPREAD IMPROVEMENT

MODULE 10

HOW TO USE PSYCHOLOGY TO HELP
SECURE AND SUSTAIN IMPROVEMENTS

In addition to specific references cited in the main body of the text, this guides draws from ideas presented in the following texts:

- » Rogers, Everett M. 1995. Diffusions of Innovation”, Fifth Edition, New York: The Free Press
- » S. W. Fraser. 2010. Accelerating the adoption of better practice, Lulu, (Print and ebook)
- » Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W, Norman, C.L. & Provost, L.P., 2009. The Improvement Guide – A Practical Approach to Enhancing Organisational Performance. 2nd ed. Jossey-Bass, San Francisco, USA
- » Massoud, M.R., Donohue, K.L. and McCannon, C.J. 2010. Options for Large-scale Spread of Simple, Highimpact Interventions. Technical Report. Published by the USAID Health Care Improvement Project. Bethesda, MD: University Research Co. LLC (URC)
- » Massoud MR, Nielsen GA, Nolan K, Nolan T, Schall MW, Sevin C. A Framework for Spread:
From Local Improvements to System-Wide Change. IHI Innovation Series white paper. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2006. (Available on www.IHI.org)
- » The NHS Modernisation Agency. 2002. Improvement Leaders Guide to Spread and Sustainability

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MODULE ten

10

HOW TO

Use psychology
to help secure
and sustain
improvements



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THE AURUM
INSTITUTE

HOW TO GUIDE FOR QUALITY IMPROVEMENT

HOW TO USE PSYCHOLOGY TO HELP SECURE AND SUSTAIN IMPROVEMENTS

“

*People don't resist change.
They resist being changed*

Peter Senge

”

Module ten

In this HOW TO guide we cover:

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Introduction

Change would be easy if it wasn't for the people! We all react differently to change and, for some, it can leave them feeling anxious and disempowered. But there are a number of psychological theories we can draw on to help make the process of change much easier, even enjoyable. One of the most important things we need to keep in mind is people are much more likely to **embrace change if they feel in control; change is happening by them and with them not to them**. This process of engagement can often be seen as too difficult and time-consuming but if change is to be self-sustaining, it is essential. What can we as facilitators and change agents do to ensure people participate in and own any necessary change?

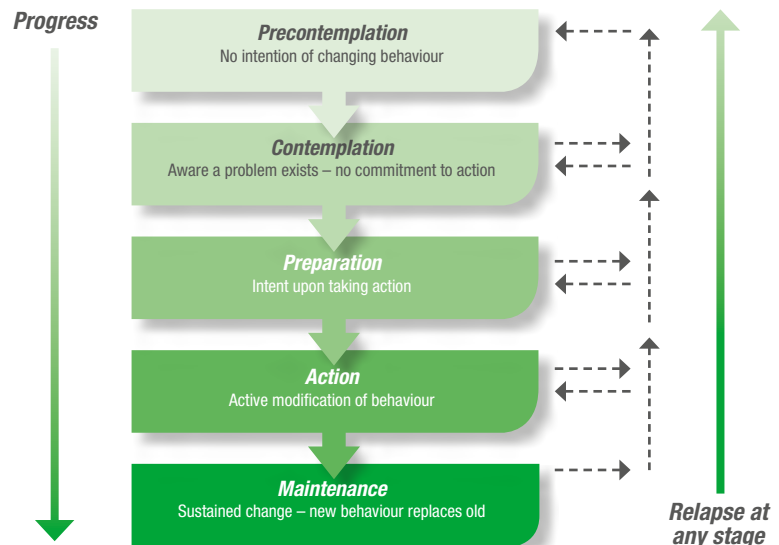
Understand that change is a process

Behaviour change is very rarely a distinct, single event. The Stages of Change Model defines change as a process with identified stages through which people pass¹. This model describes 5 distinct stages, namely: pre-contemplation, contemplation, preparation, action and maintenance.

People can move in either direction through the stages of change. Most people will “recycle” through the stages of change several times before the change becomes fully established².

Often in improvement work we can make the fatal mistake of thinking that people are in the preparation phase, willing and ready to test a change. This is often not the case. Understanding what stage a person is at in the model helps tailor interventions to be ‘stage-based’ and therefore pitched to the person’s “readiness” to change²; this understanding is vital if change is to be sustainable.

The Stages of Change Model



Source: Adapted from DiClemente and Prochaska, 1998

1 DiClemente, C. and Prochaska, J. (1998) Toward a comprehensive, transtheoretical model of change. In Miller, W. and Heather, N. (eds), *Treating Addictive Behaviours*. Plenum Press, New York.

2 Gretchen L. Zimmerman, Psy.D., Cynthia G. Olsen, M.D., and Michael F. Bosworth, D.O., Wright. A 'Stages of Change' Approach to Helping Patients Change Behaviour. *Am Fam Physician*. 2000 Mar 1;61(5):1409-1416.

The table below will help in identifying:

- » the stage of change you or someone else is at
- » techniques to apply in helping move from one stage to the next
- » what realistically one can expect as an outcome at each stage of change

Stage	Where are they in the change cycle?	Exercise Example	What will help to move them to the next stage of change?	What's a good outcome at this stage?
Pre-contemplation	<ul style="list-style-type: none"> » The person is not thinking about changing behaviours, actions or work processes » The problem or issue is outside of their frame of awareness or perceived need » They are not aware of the situation as it might affect them » They have no intention to change at this stage and defences may be raised if you push them to change » They often get labelled as “resistant”, “blocker” or “in denial” 	<p>A person is not doing any exercise, nor are they thinking about doing it any time soon. They do not acknowledge the need for it in their life.</p>	<ul style="list-style-type: none"> » The focus should be on creating awareness for the need to change » The focus should be on creating awareness for the need to exercise » Use strategies to raise awareness for the need to exercise and lower doubt and anxiety that may be associated with exercise such as time and/or ability » Increase perception of risks and problems associated with being overweight and having a sedentary lifestyle » Emphasise the consequences and possible costs associated with maintaining the existing system i.e. heart attack, loss of income » Emphasise the benefits that stem from the change i.e. positive self-image, ability to run and play freely with children » Use basic skills such as reflective listening and open-ended questions » Function as a collaborator not an educator 	<p>They begin to recognise that there might be a problem that they need to do something about</p>





Stage	Where are they in the change cycle?	Exercise Example	What will help to move them to the next stage of change?	What's a good outcome at this stage?
Contemplation	<ul style="list-style-type: none"> » They are aware a problem exists and are seriously considering action but have not yet made a commitment to an action » They have some level of awareness of the problem » They may not want to admit it but they also have a large degree of fear of the unknown and of the amount of effort it may need to make the change » If you force someone to change at this stage, there is a risk that defences will remain in place. A person might be compliant with the change but not committed to it. As a result, the change may not be sustained 	<p>The person acknowledges that there is a need for exercise in order to lose weight and improve their general health. They have not started exercising yet but they are thinking about it</p>	<ul style="list-style-type: none"> » The focus should shift to increasing the perceived benefits of the change and reducing the expected or perceived negative consequences of changing i.e. the extra time and effort spent on exercising will be worth it because they will have increased energy, look fabulous in clothes, have more years with loved ones etc » Create a “tipping point” where the expected benefits outweigh the expected costs of the change. To get to this point it may be necessary to provide further clarity on both the benefits (which may be unknown) and costs (which may be unrecognised). » You need to try to step into their shoes, considering the pros and cons of change from the other persons perspective 	<p>Obtain a tentative commitment to change the way things are currently being done; note that this may still be a fragile commitment</p>
Preparation	<ul style="list-style-type: none"> » A decision to take future action has been made, but they are not yet prepared to actually take the action now » They may need to do some more thinking about the individual steps that need to be taken prior to attempting the new behaviour or new way of working » There is a strong likelihood that peers will still be at the precontemplation and contemplation stages. As a result, this may cause discouragement or cause one to question their decision to take action 	<p>A person admits that a structured, regular exercise routine is necessary for them and they start obtaining help in order to develop and implement an exercise routine</p>	<p>Help to build skills, knowledge and confidence in the new way of working by:</p> <ul style="list-style-type: none"> » building an action plan for change – exercise plan and routine » including others in the plan – i.e. personal trainer » examining barriers to change and help them work through potential solutions (what will the first week be like?) – schedule for exercising as time may be a constraint » encouraging them to take part in formal training sessions and workshops – they may not know how to exercise properly and therefore need specialised assistance (trainer) » giving interesting articles to read that show evidence and emphasise the benefits » agreeing on how the change will be evaluated i.e. time, distance or frequency may be options 	<p>The person is making clear statements about the change. They have an action plan in place</p>

Stage	Where are they in the change cycle?	Exercise Example	What will help to move them to the next stage of change?	What's a good outcome at this stage?
Action	<ul style="list-style-type: none"> » Aware a problem exists and have actively modified their behaviour, work process and/or environment in order to overcome the problem » They have now made the changes and are working in a new way » Note, some old habits are probably still in place and it is quite likely that they may revert to the old way of working 	A regular exercise routine is being implemented	<p>Reinforce the changes made by coaching and mentoring:</p> <ul style="list-style-type: none"> » Recognise and acknowledge the success of the change even if the success is only the attempt with results not yet evident – if weight loss is the goal, it may take time for results to show; focus on the other benefits of exercise so they don't get discouraged » Reaffirm their commitment to the change and engage in active problem solving 	Actively implementing the plan - working in a new way
Maintenance	<ul style="list-style-type: none"> » A sustained change has been made » New ways of working have become firmly established and the threat of relapse has become less intense » The new way of working has become more automatic » Note: in times of stress there is still a risk that they might revert to the old ways of doing things 	The exercise routine is now part of their weekly morning schedule	<p>Understand that even though they are well established in the "maintenance" phase, they still need ongoing support and encouragement. Be there for them if they relapse. If this happens, help to:</p> <ul style="list-style-type: none"> » Reaffirm the original reasons for the change » Explore the factors that precipitated the crisis » Get back on track 	Hopefully, they successfully exit the final stage of change cycle and move into a new cycle for a new change. If they relapse, they will re-enter the contemplation or preparation stage



Learned helplessness

In the late 1960s when psychologists were trying to understand how human beings learn, they conducted many experiments on animals. Their assumption was that if they could understand how animals learned new patterns of behaviour it would provide insights into how humans learned. In those days, experiments were not regulated by the ethical standards we now take for granted. Researchers not only gave their animal subjects rewards to encourage learning, they also applied punishments, often in the form of electric shocks. Seligman and Maier³ conducted a series of such experiments on dogs. They divided the dogs into three groups. One group were placed in harnesses and released after a given period of time (no shock group). Another group were placed in harnesses and subjected to electric shocks that they could stop if they operated a lever with their noses (controlled shock). The third group were put in harnesses and experienced the same strength and duration of shocks as the second group but they had no control over the shock (uncontrolled shock). After the experiment, the dogs experiencing no shock or a controlled shock recovered quickly from their ordeal. The dogs from the uncontrolled shock group exhibited signs of apathy and helplessness.

Later the same dogs were exposed to another experiment. They were placed in a cage with two sections known as a shuttle box. They could move from one section to another by jumping over a low bar. When dogs from the previous “no shock” and “controlled shock” groups were subjected to an electric shock in one section of the enclosure, they jumped over the bar, and in doing so escaped from the shock. **When the dogs in the “uncontrolled shock” group were**

‘The dogs from the uncontrolled shock group exhibited signs of apathy and helplessness.’



3 Seligman, M.E.P., Maier, S.F. 1967. “Failure to Escape Traumatic Shock”. Journal of Experimental Psychology 74: 1–9.



A 'shuttle box' – used in 'learned helplessness' psychological experiments

exposed to the same set of conditions, they lay whimpering in the section of the box receiving the shock. They appeared to be incapable of attempting to avoid the shock by jumping over the bar. This behaviour was called **learned helplessness**. It appeared the dogs had learned they were helpless in trying to avoid electric shocks even when they could. The phenomenon of learning helplessness was later expanded to describe helpless and depressive behaviour in human beings. It is believed to be induced when **individuals' perceive they have no control over negative events in their environment**. Like the experiments with dogs, this behaviour seems to persist even when the opportunity for control is reintroduced.

This passivity and abandonment to adverse events can sometimes be observed in co-workers and staff members who have worked in organisations where they perceive themselves to have no control over a hostile environment. Teaching **improvement methodology can empower such workers to regain control** by providing them with the means to make improvements in their workplace. Understanding how to change key aspects of their work can **break negative patterns of learned helplessness** (see other HOW TO modules in this series for more information on improvement methodology).

'understand how to change key aspects of their work and break negative patterns of learned helplessness'



Establishing the case for change

Describing the “burning platform”

We have to have a reason to change. If everything is going well, performance is good and processes are working efficiently, why change? However, we can sometimes be overly complacent and fail to see that our processes are not serving us or our customers well. We have got so used to doing things in a particular way and are not monitoring whether our processes are still fit for purpose. It is often the case that someone sitting outside of our system can see what is right in front of our noses; that we are standing on the equivalent of a burning platform. To do nothing is not an option. Change will be forced upon us by an inevitable and substantial failure. The alternative is to engage with a change plan designed to help move us to a new place, more compatible with the current environment. Many of us whose role it is to support organisations and act as a **change agent can gently lead individuals to a point of realisation that their current position is untenable.**

The application of the ‘burning platform’ approach in industry⁴

Jack Welch was appointed CEO and Chair of General Electric in 1981. As he started to analyse the company’s health in terms of market position, profitability and efficiency he realised it was in serious difficulties. He knew he had to mobilise support from the company’s significant workforce to prevent it from “hitting the wall”. In order to do this, he clearly articulated the consequences of not making major changes and the need to become “the most competitive company on earth” to guarantee its survival. He described the “burning platform” that the company was on. To do nothing was not an option. There was some pain ahead but it was nothing compared to the disaster they would face if they failed to act. General Electric went on to be a highly successful business.



⁴ Hartman, A., 2004. *Ruthless Execution: What Business Leaders Do When Their Companies Hit the Wall*. Upper Saddle River NJ, Pearson Education

Are we like frogs when it comes to change?

There is a popular, yet contested, anecdote that suggests if you put a frog in a very hot pan of water it will immediately attempt to jump out. However, if you put a frog in a pan of cold water and slowly heat it up, the frog won't notice. Its skin is not able to detect small changes in temperature. It will just adapt its own body temperature to the temperature of the water without recognising the danger it is in. It will stay in the pan until it boils. **True or false, this is a strong metaphor for the response many people have to change happening around them.**

Sometimes we need to help people see that their working practices and systems are incompatible with the current environment. They have been so busy doing the same thing they haven't noticed that the small incremental changes in their environment have added up to a big change over time. Their systems are now inadequate to meet the new demands.





Creating “attractors”

Have you ever asked yourself why people featured in TV adverts are always attractive? For example, family meal-times are portrayed as happy occasions with a beautiful mother and handsome father in a loving relationship and children only too enthusiastic to eat the food set before them. Of course it is because the advertisers are appealing to deep-seated desires within us that can trigger a felt need to buy their product. Subliminally they are saying “if you serve up this food to your family you will have an attractive and loving husband and your children will be polite, appreciative and well-behaved.” They do this because it works; it increases sales. They know how to encourage changes in buying behaviour by associating products with “attractors”.

The “**burning platform**” approach to change **emphasises its going to be very uncomfortable to stay where you are**. “**Attractors**”, on the other hand, help **make the place you need to move to a whole lot more appealing than where you are now**. Attractors come in many forms. They can be tangible rewards such as a money, food and a job promotion or intangibles such as the

possibility of encountering an attractive man/ woman, prestige, a sense of being needed, praise and recognition. Attractors are closely related to motivation and motivational theories (see Box 1 – Maslow’s hierarchy of needs on the following page). **Motivations can be defined as the drive to have unmet needs met; attractors offer the potential to partially meet these needs.**



Box 1: Maslow's hierarchy of needs⁵

Maslow said that we are motivated by unmet needs that are organised in a hierarchy. Our most basic needs are physiological, things that sustain life such as food, water, shelter, etc. Until these needs are satisfied, we are unlikely to be motivated by the desire to satisfy 'higher' needs such as the need for relationships and affection. He classified and ordered these needs. Once lower level needs have been met, Maslow suggested our motivation shifts to the satisfaction of needs in the next tier. This model, proposed in the 1940s still has value today. These predicted patterns of behaviour can arguably be observed at times of natural disasters or, for example, in a reality TV programme such as 'Survivor' when individuals are left to fend for themselves in remote places. Like most models, however, it has its limitations. It fails to explain amazing acts of generosity and altruism shown by people whose basic needs are not being met.

It is interesting to note that even amongst people who are normally motivated by higher level needs such as recognition and status, the need to satisfy hunger several hours after a meal will often dominate their motivations. Offering sandwiches during a training session at midday can greatly enhance attendance levels.

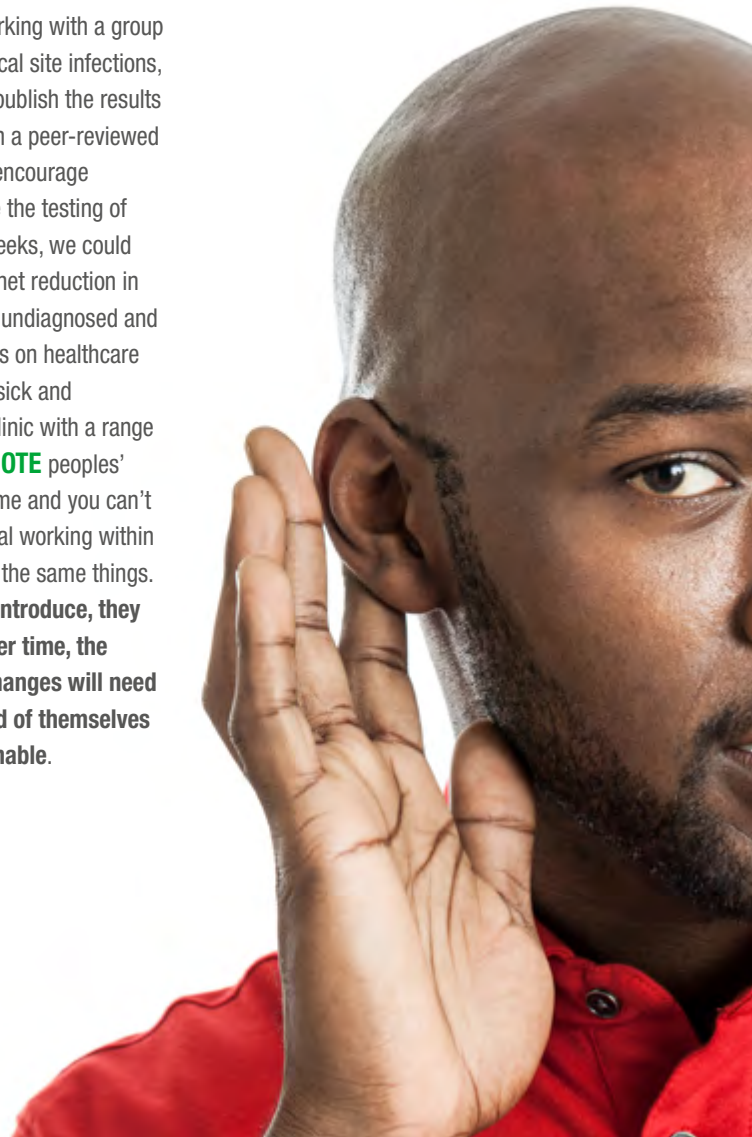
⁵ Maslow, A.H., 1943. *A Theory of Human Motivation*. *Psychological Review*, 50(4), 370–96

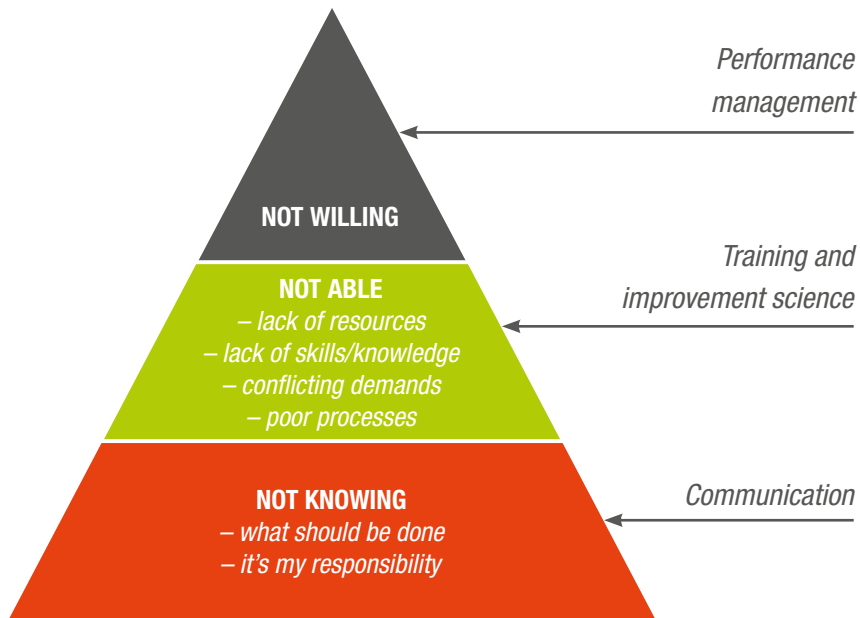


If we are in the business of change, we need to be aware of peoples' motivations and, wherever possible, **link relevant attractors to changes that will improve customer outcomes**. But **how do we work out what is motivating people**? The answer is to **listen carefully to what they say**. People reveal a great deal about what motivates them in their day-to-day conversation. They talk about friendships and family, a desire to do the best for their patients, a hope for recognition or intellectual stimulation or concerns about having enough money to make ends meet. We have to work out where they are usually positioned within Maslow's hierarchy. Are they still needing their basic needs met? If so, we might need to think carefully about any improvement meetings we organise; where we meet, what food or beverages are provided, making sure we cover incidental costs. If they seem to be motivated by higher order needs such as recognition or a sense of accomplishment, we may want to ensure high profile leaders

are recruited to show an interest in and publicise the improvement work.

EXAMPLE if we are working with a group of doctors to improve surgical site infections, we could discuss plans to publish the results of our improvement work in a peer-reviewed journal. If we are trying to encourage busy clinic staff to increase the testing of HIV-exposed babies at 6 weeks, we could describe this in terms of a net reduction in workload. Children who go undiagnosed and treated make high demands on healthcare services because they get sick and repeatedly present at the clinic with a range of different conditions. **NOTE** peoples' motivations change over time and you can't assume that every individual working within a team will be attracted by the same things. **Whatever attractors you introduce, they need to be temporary. Over time, the benefits of making the changes will need to be the attractors in and of themselves for the work to be sustainable.**

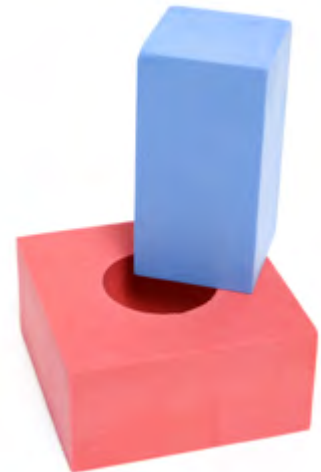


Resistance to change

Adapted from "The Resistance Pyramid" elaborated from Nieder and Zimmerman by Galpin (The Human Side of Change 1996) © 2010 C Green

"A round man cannot be expected to fit in a square hole right away. He must have time to modify his shape."

Mark Twain





Addressing resistance to change

Even when we think people have been actively engaged in a change process and understand the need for change, they can still appear resistant when it is time for them to make a final, long-term commitment. It's easy to make assumptions about what drives this behaviour. We do have a tendency to interpret it as "them being difficult" or "uncooperative".

A model adapted from Nieder and Zimmerman's and Galpin's work is useful in making sense of this apparent resistance and its underlying causes. It suggests people who appear resistant usually fall into one of three camps; the "not willing", the "not able" and the "not knowing". By far the majority fall into the "not able" group. Within this group are people who have the capacity and will to make the change but don't know how. This is common within healthcare. **We train staff to be able to take on new responsibilities, we make the case for change, but we fail to recognise that their current processes make it impossible for them to incorporate what they've learned into their daily work routines.** To overcome this, we have to assist them in redesigning these processes, otherwise the problem will persist. Others within the "not able" category lack the skills to perform the new tasks required. These individuals need training and skills development to be able to embrace the change. It is important to distinguish between the two. **No amount of additional training will resolve a "not able" problem derived from "I don't know how".**

People who fall within the "not knowing" group are **unaware of what is expected of them.** They may have heard about a change but didn't understand it meant they had to do something different. Others may not even have heard of it. Here effective communication will quickly resolve misunderstandings and an apparent reluctance to change. Some of these individuals may then move into a "not able" or exceptionally a "not willing" position once they understand what is expected of them.

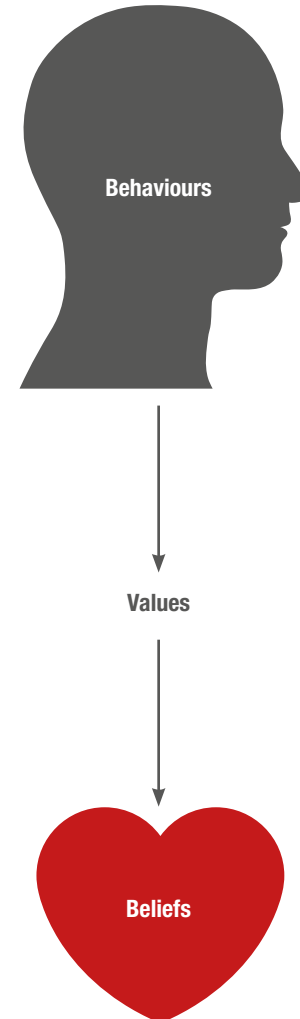
And finally we have a small minority who may fall into the "not willing" category. These individuals **know about the change, have the skill-set to perform any new requirements and can accommodate changes** in their working practices. They, however, are **not willing to do so.** Our response to these individuals should be to manage their performance. Direct line managers need to establish if this is a genuine case of "not willing" and if necessary emphasise the requirement for change. Support should then be offered to assist them in transitioning from their current to the new position. If, after time, they are still resistant, disciplinary measures may need to be taken. This scenario rarely occurs if **apparent resistance to change is carefully diagnosed and addressed with appropriate actions.**

not
not able
willing
not
knowing

Sustaining change

There are a number of different activities known to increase the probability of a change being sustained (see HOW TO Module 9). Here we focus on just one with a strong psychological component; the process by which individuals shift their change behaviour from compliance (driven by thoughts and rationale) to commitment (driven by feelings, values & beliefs).

When we begin testing new change ideas with the aim of securing improvements we can be rather detached. Our role is that of a researcher; we introduce a new variable and observe its effect on our outcome. Once we have established that a change is an improvement, there is an expectation we will implement it. This means a long-term commitment to the change. It requires a psychological shift. It is relatively easy to make a temporary change knowing that you can return to old ways of working at will. Once changes are ready to be implemented, **those affected by the change need to commit to new patterns of working. This commitment is strengthened when the change resonates with an individual's values and belief systems.** Sometimes this shift happens automatically; sometimes it needs to be facilitated. The benefits of the change **may need to be described in such a way as to appeal to what we know are individuals' values and beliefs.** We therefore may make reference to the change supporting the Hippocratic Oath ("first do no harm") or religious teachings about the worth of an unborn child ("I formed you in your mother's womb"), the value of the elders within our society, etc. **This shift from the mind ("I do it because I'm asked to - I conform") to the heart ("I do it because I believe it's the right thing to do - I commit") is an important factor in determining the sustainability of a change.**



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IMPROVEMENT

MODULE 2
HOW TO DEVELOP IDEAS FOR CHANGE
THAT MAY LEAD TO AN IMPROVEMENT

MODULE 3
HOW TO PRODUCE AND ANALYSE
A PROCESS MAP

MODULE 4
HOW TO SELECT MEASURES TO KNOW
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MODULE 5
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MODULE 10
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