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**Plan, Do, Study, Act  
(PDSA) cycles and the  
model for improvement**

# Plan, Do, Study, Act (PDSA) cycles and the model for improvement

## What is it?

The model for improvement provides a framework for developing, testing and implementing changes leading to improvement. It is based in scientific method and moderates the impulse to take immediate action with the wisdom of careful study.

Using PDSA cycles enables you to test out changes on a small scale, building on the learning from these test cycles in a structured way before wholesale implementation. This gives stakeholders the opportunity to see if the proposed change will succeed and is a powerful tool for learning from ideas that do and don't work. This way, the process of change is safer and less disruptive for patients and staff.

## When to use it

When planning any improvement or change to work processes, it is essential to know what you want to achieve, how you will measure improvement and to be explicit about the idea to be tested. You may not get the results you expect so it is safer and more effective to test out improvements on a small scale before implementing them across the board.

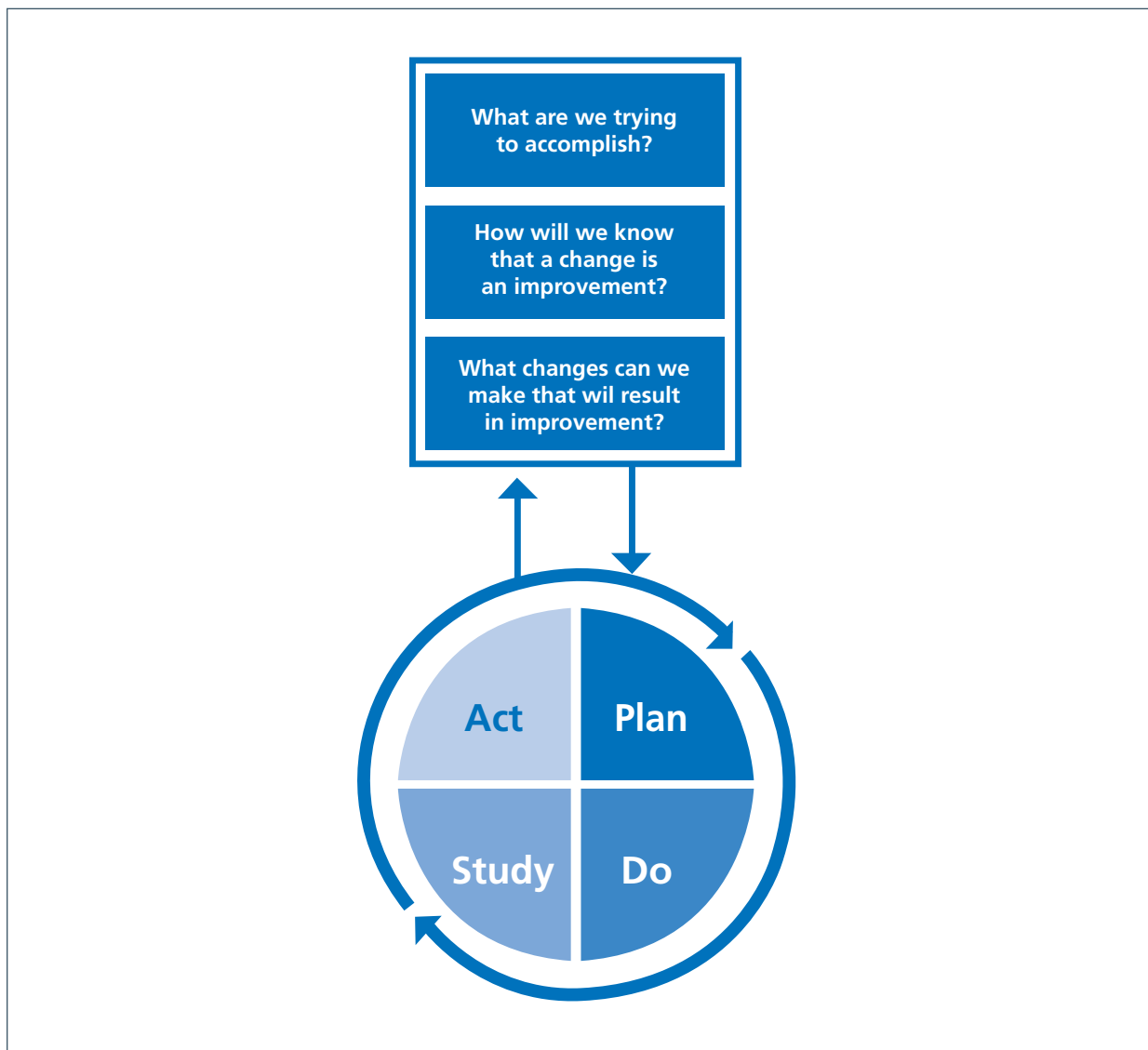
## How to use it

The framework includes three key questions to answer before testing an improvement concept and a process for testing change ideas.

### Key questions

1. What are we trying to accomplish? (The aims statement).
2. How will we know if the change is an improvement? What measures of success will we use?
3. What changes can we make that will result in improvement? (The change concepts to be tested).

**Figure 1: The model for improvement**



This approach has been unusual in a healthcare setting because traditionally, new ideas are often introduced without sufficient testing.

The four stages of the PDSA cycle are:

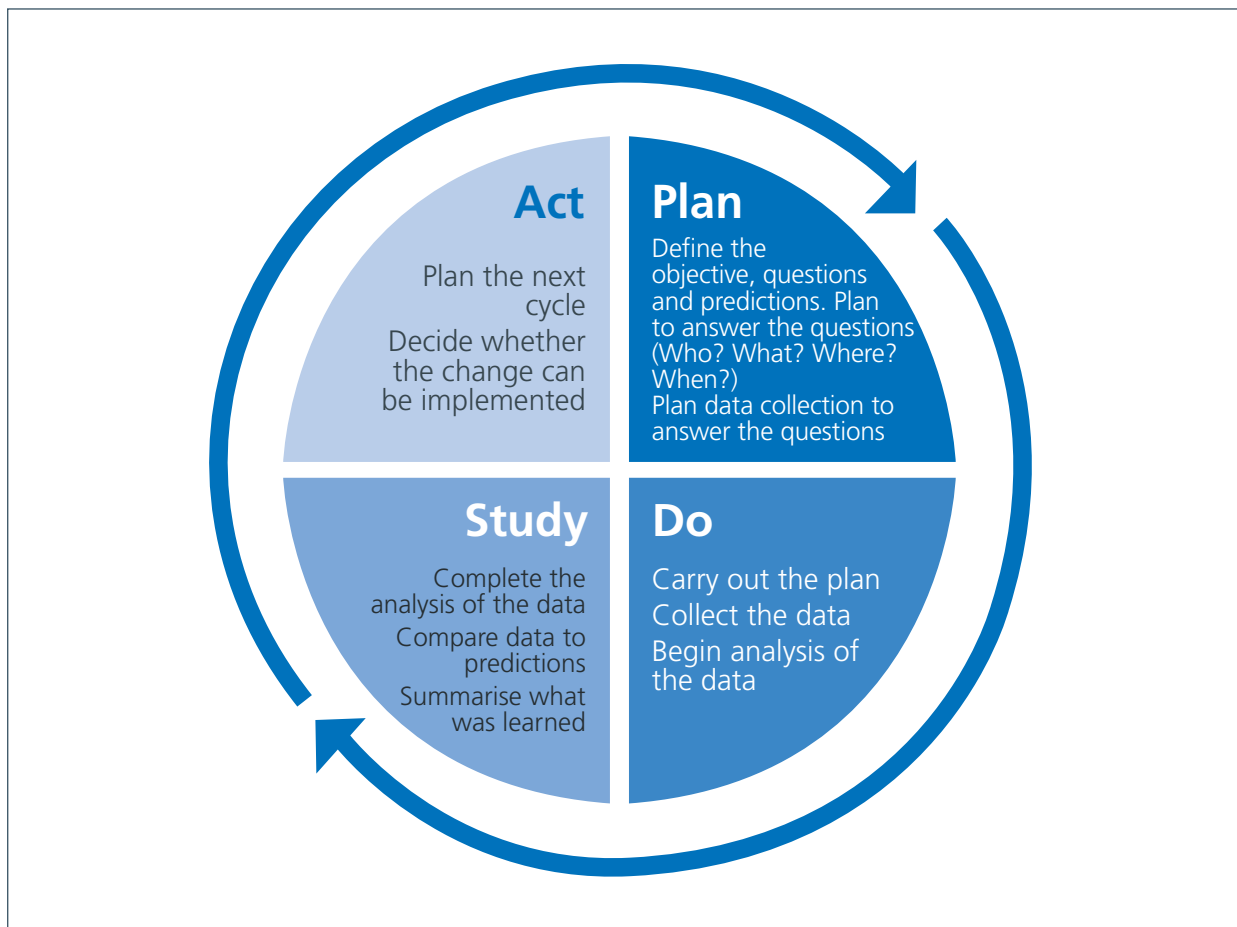
**Plan** – the change to be tested or implemented

**Do** – carry out the test or change

**Study** – based on the measurable outcomes agreed before starting out, collect data before and after the change and reflect on the impact of the change and what was learned

**Act** – plan the next change cycle or full implementation.

**Figure 2: PDSA cycle**



As with any change, ownership is key to implementing the improvement successfully. If you involve a range of colleagues in trying something out on a small scale before it is fully operational, you will reduce the barriers to change.

### **Step 1**

Start by answering the three essential questions.

#### *1. What are we trying to accomplish?*

Teams need to set clear and focused goals with measurable targets. These goals require clinical leadership and should focus on problems that cause concern, as well as on patients and staff. They should be relevant to the length of the project and be bold in aspiration.

An example of an aims statement from cancer services:

To improve access, speed of diagnosis, speed of starting treatment and patient care for people who are suspected of having bowel cancer. This will be achieved by:

- Introducing booked admissions and appointments. Target: more than 95% of patients
- Reducing the time from GP referral to first definitive treatment to less than 15 weeks
- Ensuring that over 80% of patients are discussed by the multidisciplinary team.

## 2. How do we know if the change is an improvement?

In order to answer this question, you will need to measure outcomes such as reduction in waiting time. If we make a change, this should affect the measures and demonstrate over time whether the change has led to sustainable improvement. The measures in this model are tools for learning and demonstrating improvement, not for judgement.

Each project team should collect data to demonstrate whether changes result in improvement, reporting progress monthly on time series graphs known as [run charts](#) or [statistical process control \(SPC\) charts](#).

You may also want to undertake a qualitative analysis through patient questionnaires. (See [gaining insights from/working in partnership with health service users](#))

## 3. What changes can we make that will result in improvement?

There are many potential changes your team could make. However, evidence from scientific literature and previous improvement programmes suggests that a small number of changes are most likely to result in improvement.

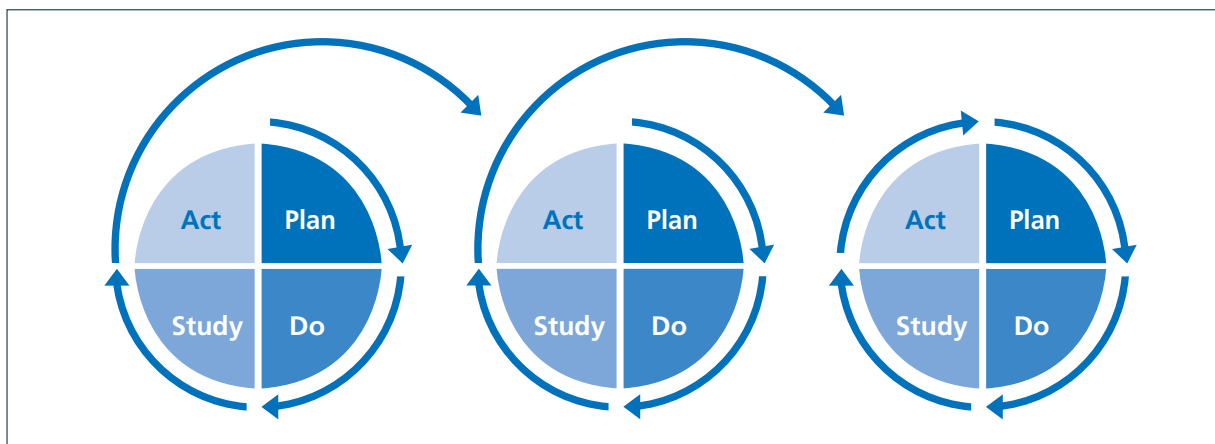
The Cancer Service Collaborative identified twenty eight change principles grouped into four areas.

1. Connect up the patient journey.
2. Develop the team around the patient journey.
3. Make the patient and care experience central to every stage of the journey.
4. Make sure there is capacity to meet patients' needs at every stage of the journey.

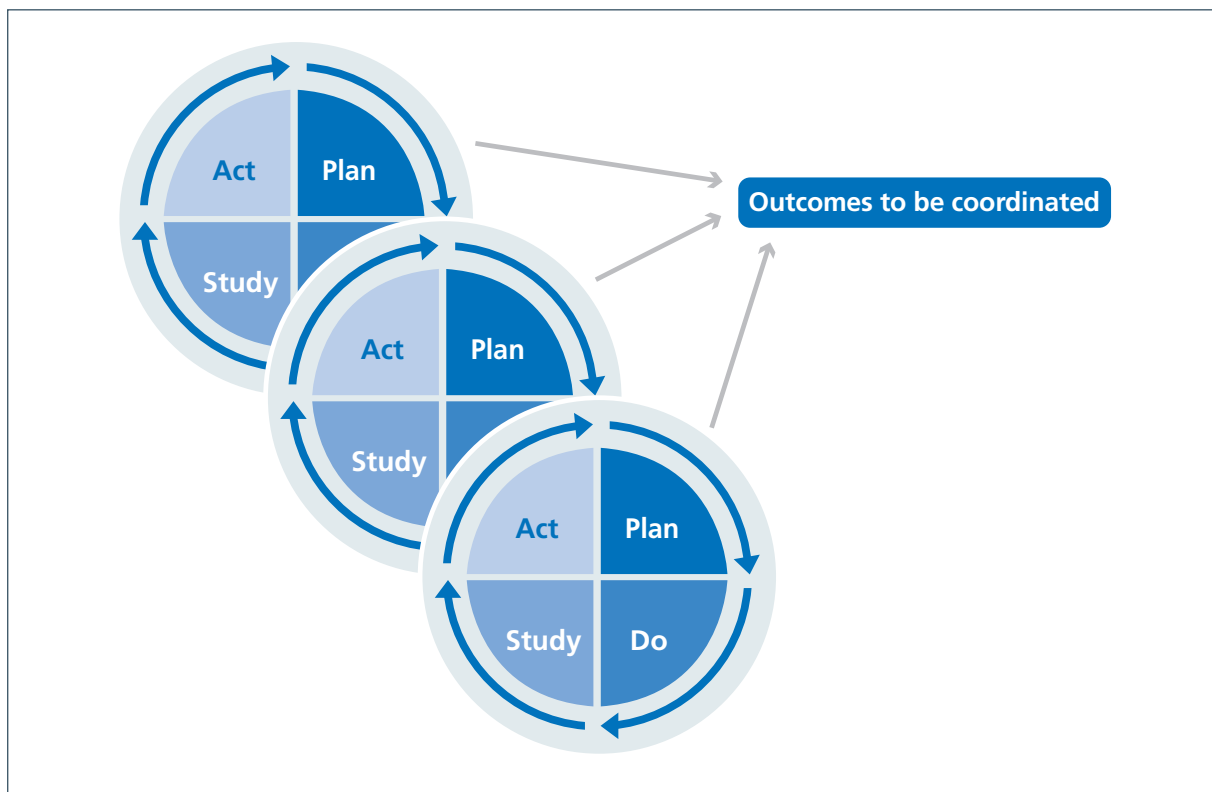
## Step 2

You should now start the PDSA cycle. There may be several PDSA cycles running sequentially (figure 3), or even simultaneously (figure 4). Sequential cycles are common when the study reveals results that suggest a different approach is needed.

**Figure 3: Sequential PDSA cycles**



**Figure 4: Simultaneous PDSA cycles**



Simultaneous cycles may occur when the changes are more complex, possibly involving several departments. It is important that you identify any interactions between simultaneous cycles, as a change in method in one cycle may alter the impact of another somewhere else.

### **Step 3**

Record your PDSAs over time to capture the learning and to demonstrate the improvement journey, which is often lost or not recorded. You could use the template opposite.

## **TIPS**

- **Plan multiple cycles to test ideas.**
- **Test on a really small scale. For example, start with one patient or one clinician at one afternoon clinic and increase the numbers as you refine the ideas.**
- **Test the proposed change with people who believe in the improvement. Don't try to convert people into accepting the change at this stage.**
- **Only implement the idea when you're confident you have considered and tested all the possible ways of achieving the change.**

**Figure 5: project management PDSA template**

<b>TEAM:</b>		<b>Date:</b>	
<b>AIM</b>	<b>Question you want answered with this test:</b>		
Describe your first (or next) test of change	Person responsible	When to be done	Where to be done
<b>PLAN</b>			
List the tasks needed to set up this test of change	Person responsible	When to be done	Where to be done
<b>DO</b>	<b>RUN THE TEST</b>		
<b>STUDY</b>			
<i>Describe what actually happened when you ran the test</i>			
 <i>Describe the measured results and how they compared to the predictions and what you learned from the cycle</i>			
<b>ACT</b>			
<i>Describe modifications for the next cycle based on what you learned</i>			

## What next?

Continue with new PDSA cycles and continuous service improvement.

Having identified the changes with the greatest benefits, the next stage is to fully implement the change. This will require a [stakeholder analysis](#). You will possibly need to use aspects of [project management](#) and [benefits realisation](#).

## Additional resources

Langley, K, Nolan, K and Nolan, T *et al.* (1996) *The Improvement Guide: A Practical Approach to Enhancing Organisational Performance*, San Francisco: Jossey-Bass

The Institute for Healthcare Improvement has lots of information on improvement models and PDSA cycles ([www.ihl.org](http://www.ihl.org)).

## Background

The Plan, Do, Study, Act (PDSA) cycle started out as the Plan, Do, Check, Act cycle and was introduced by Walter Shewart in the 1920s. It formed the basis of Dr WE Deming's approach to organisational development and leadership.