The National Patient Flow Programme

MODULE TWO - Diagnostics and Measurement
Introduction: Patient Flow in Wales

Overview of two day workshop and accompanying tools and techniques to support.

Introduction

The purpose of the second ‘How to Guide’ is to support the learning that many have experienced from the two day workshop with Dr Kate Silvester. The confirmed programme for the day is described on the following pages and the guide contains the tools and techniques that are discussed during the two days. These tools will support and act as a reminder to help with the key actions taken away from the workshop to support an understanding of flow issues within unscheduled care in hospitals.

Getting to the heart of what exactly is the problem is key to success which is why we are focusing on it so much. Often within the NHS, this stage is undertaken in a haphazard fashion or sometimes hardly at all. We are so keen to jump to solutions often because of a sense of urgency to ‘get it sorted’. Taking a methodical approach can reap dividends which is why we are recommending the structured approach that is contained within this Guide. For those who are undertaking or have undertaken Silver level IQT, many of the tools described here will be familiar to you even though the overall A3 format may be new.

The Guide is divided into 3 sections

- **Section 1**: Preparation for the diagnostic workshop (data collection tool and as detailed in the How to Guide no 1 the completion of Foundations in Improvement Science for Healthcare (FISH) which will support the new concepts that will be discussed)
- **Section 2**: The diagnostic workshop itself, including the tools and techniques discussed
- **Section 3**: Post-event actions, this will encourage the momentum to continue and highlight what needs to be done next.
Section One: Preparation for the diagnostic workshop

Introduction

The workshop is a very intense experience with an ambitious agenda to achieve within 2 days. Taking staff out of the ‘front line’ always comes at a cost and so we have to minimise the time they are away and hence the ambitious agenda. To allow us to get the most out of these 2 days, we require Health Boards to do some preparatory work. This section outlines what that is and gives the justification.

Mandatory preparation

The following is absolutely required to allow participants to get the most out of the workshop.

The Flow team

Identify the team and reserve dates in diary.

The organisation needs to empower the core team to make changes and decisions based on the learning from the collaborative. Ideally, the core team would comprise of one representative from each of the below categories:

1. Executive Lead
2. GP
3. Hospital consultant
4. Senior Nurse
5. Data Analyst
6. Service Manager
7. Diagnostics service manager
8. Service Improvement representative
9. Intermediate care manager
10. Adult Social Care manager
11. WAST Representative
12. Operational Lead for Flow (e.g. Chief Operating Officer)

Online Foundations of Improvement Science for Healthcare (FISH)

All participants must complete modules 1, 2 and 3 of the online FISH training prior to attending the workshop.

High level data

Teams must prepare their high level data, which reflects the emphasis on flow, cost and quality, to inform the workshop discussion. These measures have been referred to as the ‘Warwick charts’ (see page 13 for a further description).

Flow data

The Microsoft Excel Flow Data Tool must be fully populated and shared with the organisers a minimum of 3 working days prior to the workshop.
This tool represents up to 1,820 days (260 weeks or approx. 5 years) of data for activity relevant to the Patient Flow Programme. It provides a simple way to look for seasonal or other patterns and also relationships between two measures.

Full instructions on how to populate the tool are contained within the tool itself.

**Optional preparation**

The below preparation would be useful to support the workshop, but are not essential.

**Draft high level process map**

The patient pathway that the flow project team wants to address is identified and a high level map produced and brought to the workshop.

**Practice FISH skills**

Team members have tried out using the Gantt charts on 1 or 2 steps in a pathway they are familiar with. Gantt charts are covered in the online FISH training.
Section Two: The 2 day Diagnostic Workshop

As part of the diagnostic phase this workshop will help delegates establish an understanding of what is currently happening in our unscheduled care system and why that may be. The workshop will support the use of the tools and techniques to support the diagnostic element of the Patient Flow programme. The workshop takes place over 2 days.

2.1 An overview of the workshop

Day 1 – introducing the concepts and techniques

The first day concentrates on introducing the concepts and tools that the local team will need to tackle their unscheduled care system. An illustrative agenda is shown in Figure 1 below and each session is described briefly. Some sessions are then covered in more detail in the remainder of Section Two.

Figure 1 - Day 1 agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Arrival &amp; Registration</td>
</tr>
<tr>
<td>09:15</td>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>10:00</td>
<td>Systems Thinking</td>
</tr>
<tr>
<td></td>
<td><em>Save the NHS simulation</em></td>
</tr>
<tr>
<td></td>
<td><em>Seattle Children's Hospital Flow model</em></td>
</tr>
<tr>
<td>11:00</td>
<td>Examining Your data</td>
</tr>
<tr>
<td></td>
<td><em>Warwick charts and Flow Data Tool</em></td>
</tr>
<tr>
<td>13:00</td>
<td>LUNCH</td>
</tr>
<tr>
<td>13:30</td>
<td>The patients at St Elsewhere’s</td>
</tr>
<tr>
<td></td>
<td><em>Using a simple simulation to highlight potential flow issues and the measures needed to diagnose them</em></td>
</tr>
<tr>
<td>14:00</td>
<td>Solving St Elsewhere’s</td>
</tr>
<tr>
<td></td>
<td><em>Introducing A3 process as a structured way of diagnosing and solving a flow problem</em></td>
</tr>
<tr>
<td>15:00</td>
<td>TEA</td>
</tr>
<tr>
<td>15:15</td>
<td>Continue St Elsewhere’s A3</td>
</tr>
<tr>
<td>16:00</td>
<td>The nerve curve and the drama triangle</td>
</tr>
<tr>
<td>16:30</td>
<td>Homework and close</td>
</tr>
</tbody>
</table>

Session 1 Introductions

This session is intended to achieve three things:

- For team and the facilitators to be introduced to each other and to understand the levels of knowledge they bring into the room about the principles of Flow. Experience and reflections of the inline FISH course should be covered.

- An update on the outputs from the Executive Workshop (if it has happened already) so that all participants are all ‘on the same page’.
• To review the agenda and aims for the day so that participants are aware of the journey ahead of them.

**Session 2 Systems thinking**
This session introduces participants to the complexity of trying to make changes in a system by using a simple simulation called ‘Save the NHS’. It also covers how one health care organisation has changed its organisational structure to better manage patient flow. This session is covered more fully in Section 2.2

**Session 3 Local data**
This session used the high level charts and a selection of charts from the Flow Data Tool to allow participants to explore the performance of their current unscheduled care system. This session is covered more fully in Section 2.3.

It concludes with an exercise to elicit the ‘Nuggets’ from the session and an example from Sheffield of reducing bed occupancy.

**Session 4 The patients at St Elsewhere’s**
This session uses a simple simulation to highlight potential flow issues and the measures needed to diagnose them. Participants will run through the simulation and capture the data before discussing how to improve their performance. See more information in Section 2.4.

**Session 5 Solving St Elsewhere’s**
One of the lessons that participants learn from undertaking the simulation is that to improve something even as simple as St Elsewhere’s, they need a process to follow otherwise chaos reigns.

This session introduces them to that process which is called the A3 problem solving process, named after the paper size that is used to hold the information generated. They complete the 9 boxes and along the way learn about several useful tools. This session is covered more fully in Section 2.5.

**Session 6 The nerve curve and the drama triangle**
This session covers some theory on the emotions we feel on the journey of discovery. See Section 2.8 for more information.
Day 2 – Using the techniques locally

Figure 2 - Day 2 agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Arrival &amp; Registration</td>
</tr>
<tr>
<td>09:15</td>
<td>Review of day 1</td>
</tr>
<tr>
<td></td>
<td>4Ns for the flow team</td>
</tr>
<tr>
<td>10:15</td>
<td>Process map for patient flow</td>
</tr>
<tr>
<td></td>
<td>Including coffee break</td>
</tr>
<tr>
<td>12:00</td>
<td>Tools for Estimating capacity</td>
</tr>
<tr>
<td></td>
<td>Process templates</td>
</tr>
<tr>
<td></td>
<td>Takt time</td>
</tr>
<tr>
<td>13:15</td>
<td>LUNCH</td>
</tr>
<tr>
<td>14:00</td>
<td>The Big Room Process</td>
</tr>
<tr>
<td>15:15</td>
<td>COFFEE &amp; TEA</td>
</tr>
<tr>
<td>15:30</td>
<td>Action Planning</td>
</tr>
<tr>
<td></td>
<td>Agree Departmental A3s</td>
</tr>
<tr>
<td></td>
<td>Agree Stakeholder Groups</td>
</tr>
<tr>
<td></td>
<td>Communication Plan</td>
</tr>
<tr>
<td></td>
<td>Actions from Process Mapping</td>
</tr>
<tr>
<td>16:30</td>
<td>CLOSE</td>
</tr>
</tbody>
</table>

Session 1 Review of day one and the 4N chart

Reflection is a key skill for would-be improvers and as with any skill take time and practice. So we start day two with a reflection on collective experience of the previous day. The 4N chart (nuggets, niggles, nice-ifs and no-nos) is introduced and completed. The chart is explained in more detail in section 2.6.

Session 2 Process mapping

In day one participants learned how to understand and improve an artificial process, St Elsewhere’s. Now it is time to get to grips with a real one. The participants map the actual process they want to improve from the end of the process backwards towards the start. This is covered in detail in section 2.7.

Session 3 Tools for estimating capacity

The process map created in the previous session shows the typical patient journey with all its current waits and delays. The staffing and other resource needed to support this is dependent on the rate and number of patients arriving and how long they stay in the system. This section tackles some simple tools that enable participants to estimate the capacity required. In particular it covers Takt time and process templates which are explained in section 2.4.

Session 4 The Big Room process

As we make clear elsewhere in this Guide, improving flow doesn’t just happen in 2 day workshops. It is grounded in a regular cycle of planning, action and reflection. And the Big
Room is a very helpful technique in helping teams to ‘get the habit’. This session is aimed at explaining what it is for those who have not come across it before. See section 2.9 for details about how to set it up and run it.

**Session 5 Action Planning**

Ideas and learning are great but they need to be turned into actions if improvement is to happen. The final session in the 2 day workshop is focused squarely on doing just that. Section 3 explains the four types of actions.

**The full agenda**

A much fuller agenda with learning objectives for each session is included as Appendix 2.

### 2.2 Systems Thinking

**Shift in management thinking**

The diagram below highlights the concepts that will be discussed during the two day programme. These tools will help the teams to identify why their systems behave in the way they currently do and also why people also behave in a particular way. During the two days, teams will be introduced to tools that support the diagnosis of their system and concepts that could be introduced and adopted to support improvement.

#### Management Paradigm shift

<table>
<thead>
<tr>
<th>Hierarchies</th>
<th>Human dimensions of change</th>
<th>Systems Thinking</th>
<th>Teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>- People are problem</td>
<td>- Transactional Analysis, Aikido</td>
<td>- System dynamics (Forester effect)</td>
<td>- System is problem</td>
</tr>
<tr>
<td>- Parent to Child</td>
<td>- Myers Briggs</td>
<td>- Demand &amp; Capacity,</td>
<td>- Adult to Adult</td>
</tr>
<tr>
<td>- (I'm OK, you are not OK)</td>
<td>- Honey and Mumford</td>
<td>System Design</td>
<td>- (I'm OK, you're OK)</td>
</tr>
<tr>
<td>- Fire-fighting</td>
<td>- Belbin etc</td>
<td>- Scheduling</td>
<td>- Persistent, consistent,</td>
</tr>
<tr>
<td>- Short term</td>
<td>- Lean: Improving quality and productivity</td>
<td></td>
<td>- Long term</td>
</tr>
<tr>
<td></td>
<td>- By improving flow, by eliminating waste</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional view</td>
<td>- <strong>A3 problem solving method</strong></td>
<td>- Process view</td>
<td></td>
</tr>
<tr>
<td>- Focus is organisation</td>
<td>- <strong>Lean:</strong></td>
<td>- Focus is Patient</td>
<td>-</td>
</tr>
<tr>
<td>- Optimising individual or department</td>
<td>- Improving quality and productivity</td>
<td>- Optimising flow between individuals and departments</td>
<td>-</td>
</tr>
<tr>
<td>- Utilisation</td>
<td>- By improving flow, by eliminating waste</td>
<td></td>
<td>- Quality saves time, money and lives</td>
</tr>
<tr>
<td>- So Waiting list = asset</td>
<td>- A3 problem solving method</td>
<td></td>
<td>- Waiting list = liability &amp; waste</td>
</tr>
<tr>
<td>- Unit cost</td>
<td>- <strong>Lean:</strong></td>
<td></td>
<td>- Effectiveness/cost = efficiency</td>
</tr>
<tr>
<td>- Quality costs money</td>
<td>- Improving quality and productivity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comparative measures**

- Push systems
- **Comparative measures**
- based on averages
  - (DH, Monitor, Dr Foster, NHS Scotland Benchmarking)

**Batch production**

- **Comparative measures**
- based on averages

**Flow**

- Pull systems
- **Continuous measures for one System, in real time**
- Monitor average and variation statistically

**Statistical Process Control**

- Monitoring performance of one system statistically over time (Six Sigma)

**Theory of Constraints**

- Optimising flow through the most expensive value adding resource in the system

**FISH**

- Foundations in Improvement Science

**Taking a system view**

We start the workshop by running the ‘Save the NHS’ simulation. This introduces delegates to the way that a typical system operates. They see the interactions and also the unintended consequences of ill-thought through actions. The diagram above outlines the key differences between this way of thinking about a system and the conventional way.
The screen shot below depicts the ‘Save the NHS’ simulation. 

[Image]

Saasoft®

http://www.saasoft.com/index.php go to ‘Games’
download the guide

**Key Messages**

- Learn to get flow to flow first before removing capacity
- Bottlenecks cause queues
- Delays harm patients

The FISH modules will help you to understand the concepts of flow and the impact that it has on our healthcare system.

**Introducing the System view into our organisational structure**

To guide the design of this improvement programme we asked the question: Given the complexity of a healthcare system, is there a simple structure for understanding and improving it?
**Background**

The challenge for an organisation and for this programme was to develop a simple structure by which staff can steer their way through the complexities of a health care system to improve their patients’ care.

**Current State**

A typical healthcare organisation structure has the characteristics shown in Fig 1. below.

**Fig 1. A typical Organisation Structure.**

At the ‘top of the organisation’ The Board interprets the National and Local healthcare strategy and sets the direction for their organisation and monitors performance.

There are typically 3000 to 8000 employees in hospitals in the UK, i.e. far too many employees for the Board members to instruct or monitor directly.

Employees are typically organised within two ‘types’ of skills groups:

- Those that supply specific clinical skills that directly ‘touch’ the patient or their body parts (imaging, pathology, therapy, pharmacy, transport) The ‘functional departments’
- Those that provide support services that indirectly impact patients e.g. Finance, Human resources, Information technology and data, Estate services, Supplies and Procurement, housekeeping etc. The ‘Support services’

There are still too many of these for the heads of department to report to the Board members directly. So these departments are grouped into Divisions.
The common objectives of the staff are to provide patients arriving at their departments the right care, on time, every time, in full, at a cost that the organisation can afford (as defined by the department budget). Each functional department focuses on optimising or utilising their resources without keeping patients waiting too long.

What is missing from the organisation structure is responsibility and accountability for the flow of patients through the system. Who ensures that the patient flows safely, correctly and smoothly, without unwarranted delay, from one functional department to another?

**Structure of the improvement programme**

The design of this programme recognises the impact of poor patient flow through the healthcare system on the quality and cost of patient care.

Seattle Children’s Hospital have taken this one step further and deliberately changed their overall organisation map to include a ‘Flow’ layer as in Figure 2 below.

Fig. 2 below shows the Structure for this improvement programme. This model was adapted with grateful thanks to The Seattle Children’s Hospital.

**Fig2. The Structure for the Improvement Programme**

<table>
<thead>
<tr>
<th>Board Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Board are responsible for translating health policy into operational processes within their organisation and reporting their results into the Welsh Government, national and local regulatory bodies.</td>
</tr>
<tr>
<td>In essence the Board are responsible for ensuring that the organisation provides the right care, on time, every time, at a cost that the UK taxpayer can afford. Fundamentally this means that patients must flow safely, effectively and efficiently through the organisation. In this structure responsibility for patient flow is made explicit.</td>
</tr>
</tbody>
</table>
Flow level

Few healthcare organisations have a formal organisational role with responsibility for patient flow into, through and out beyond their systems. However, in the UK many patients regard their General Practitioner (GP) as the person responsible for guiding them safely and quickly from one step to the next in their diagnosis and treatment. If patients require specialist knowledge, their GP refers them to a specialist or consultant within clinical sub-speciality (gastroenterology, cardiology, general surgery, paediatrics, geriatrics, etc) which grouped into Medical or Surgical depending on the traditional origin of the skill of the doctors involved.

In the absence of any formalised responsibility for steering a patient through the complexities of hospital care, the patient assumes that the specialist consultant physician or surgeon undertakes this role and ensures they flow safely back to their GP for continuing health and social care.

The GPs and specialist clinicians recognise that they and their colleagues in the Functional departments are faced with multiple patients and are required to optimise the utilisation of their resources. So the patient flow is split artificially into two broad streams:

1. emergency, un-planed or non-elective care (red) - can’t wait
2. planned or elective care (blue) - can wait

Functional Departments

As a patient flows through the system, their GP or specialist consultant will request tasks or services from various functional departments that have specialist skills or equipment, to help with the transport, diagnosis and treatment of their patients.

These departments face the challenge of meeting multiple requests (demand) from GPs and the clinical sub-specialities. As the patients are deemed ‘emergency’ or ‘elective’ every department is faced with meeting multiple waiting times and optimising their resources.

The challenge for functional departments within the organisation is to design and improve their individual services so that it meets the needs of all the patients, on time, every time and in full within budget, without causing delays between one department and the next.

Support Functions

The support functions are responsible for ensuring that the specialist functional departments have the required capacity of resources to meet their demand and support flow of patients. These resources include human resources (skills), estates, supplies and utilities, capital equipment, information technology and finance.

Key Messages:

- The design of organisational structures typically fragment healthcare organisations into individual services or functions and as a consequence place less emphasis on the responsibility for patient flow through the system
- The design of this programme explicitly recognised the impact of poor patient flow through the healthcare system on the quality and cost of patient care.
- The structure of the programme guided the teams and helped them understand and improve their systems
**Using the model to understand and improve the System**

In both Trusts participating in the *Flow, Cost, Quality* programme\(^1\) (South Warwickshire NHS Foundation Trust and Sheffield Teaching NHS Foundation Trust) the programme reflected this structural model. The difference in organisation size and complexity meant that in one trust looked at the emergency flow for the whole hospital, whereas the other Trust concentrated on the flow for emergency and elective patients in just one clinical sub-specialty - Geriatric and Stroke Medicine (GSM).

Monthly meetings monitored the relationship between flow, cost and quality and understanding changes to flow of patients. This defined the requirements of the functional departments. In turn, the impact of changes within the functional departments (e.g. imaging) on patient flow were monitored at the monthly meeting. Making the required changes within the functional departments revealed the need for strategic and policy changes within the support functions e.g. finance, human resources, information technology and data, procurement and supplies etc.

The papers reporting the programme interventions and learning are also structured to reflect the levels (flow, functional and support etc) of this structural model\(^2\).

### 2.3 Using data to diagnose the problems

**High level measures**

The Flow programme encourages a very different way of viewing and using data. And this is not restricted to the teams who are working on getting the flow to flow. It also affects what the senior management team should look at on a regular basis. The 3 selected ‘high level’ measures therefore reflect the programme emphasis on flow, quality and cost. These are referred to in the workshop and this guide as the ‘Warwick charts’ because that is where they were first defined and used.

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www.health.org.uk/publications/improving-patient-flow

\(^2\) The Health Foundation (2013) *Learning report ‘Improving the flow of Older People’ and ‘Unblocking a hospital in gridlock’* London: The Health Foundation

www.health.org.uk/publications/improving-patient-flow
Warwick Chart 1: A&E breaches and crude mortality

How is it constructed?
The blue line and blue scale on the left hand side of the chart represents the number of A&E 4 hour breaches each week. The red line and red scale on the right hand side of the chart represents the percentage of non-elective admissions each week that died in hospital by their date of admission. This is referred to as the crude death rate.

Note: Crude death rates are usually calculated using the date of discharge or death but in this instance because we want to relate deaths to A&E pressures we use the date of admission.

Why do we use it?
This chart illustrates the connection between poor flow and quality, as depicted by in-hospital mortality, if it exists. The A&E breach indicator, whilst a poor measure of A&E performance, is a useful indicator of whole hospital flow. When flow slows down patients get delayed and stuck in locations that are not ideal. There is a clear link in the evidence between such delays and death rates.
Warwick Chart 2: Emergency adult RAMI

How is it constructed?
This is the RAMI (Rate Adjusted Mortality Index) score as produced by CHKS for the patient group defined as Non elective admissions excluding Obstetrics for patients are 16 and over.

It should be plotted over time using a fixed baseline so that time series trends can be observed if they are present.

Why do we use it?
The crude hospital mortality used in Warwick Chart 1 is susceptible to variations in patient case mix. Changes in the rate might be the result of case mix change. To adjust for that and some other potentially influencing factors, case-mix adjusted mortality measures have been devised. And the RAMI by CHKS is one such measure. In theory at least, patient to patient variation has been taken out of the equation so any changes to the rate should be down to patient care. In practice, such measures are vulnerable to changes in data quality especially clinical coding so we should use them with caution. However in the context of the Flow programme, it does provide a useful cross check to the crude mortality. If we have genuinely improved care by improving flow, there should be an effect on RAMI.
Warwick Chart 3: Monthly pay

How is this constructed?
This is the Actual Pay costs each month for all staff employed within the hospital identified in 3 groups:

- Permanent and seconded staff;
- Bank and agency staff;
- Locum staff.

If you plot the agency and locum costs on a separate monthly chart then you can see when the invoices for the agency and locums are paid and look to see whether there is any correlation with any spikes in A&E breaches.

Why do we use it?
If the first two charts represent the outputs from the hospital system, or some of them, then this chart represents a major input. It is the cost element of the flow, quality and cost triangle. In a system with poor flow, for both emergency and elective streams, there will be peaks on pay cost corresponding with the short-term use of temporary staff and also on overtime costs. Once the waste is removed, existing staff can do more productive work without it feeling that they are working harder. In fact they often feel like they are working less hard because a lot of the stress has been removed. As a consequence sickness levels reduce which feeds through into the ‘bottom line’.

Ongoing use
As with much of the data that is used and discussed within the workshop, these high level measures are intended to be updated and reviewed on a regular basis. They are particularly useful when annotated with major system or policy changes. This provides a vital learning loop as the effects of such changes are made clear.
The Flow level data and measures

This section is about the Flow Data Tool which you will have been introduced to on the Diagnostic workshop. It covers why the Tool was created, what it contains, how it’s used in the workshop and finally further uses you can put it to.

Why this tool

The NHS collects lots of data that are pertinent to understanding the way patients flow through unscheduled care pathways in hospital. However that data is often not used at all or, if it is, presented in a way that aids understanding. This Flow Tool has been designed to show how routinely collected data can be useful. It is a requirement of participation in the Flow programme that Health Boards populate the Tool ahead of the Diagnostic workshop. This is so the data can be used by the facilitators in the workshop to drive a discussion based on local data.

If Health Boards want to integrate the Tool principles into their own information systems after the workshop, the national Flow team would support that aim as long as the data continue to be used to understand and monitor the performance of the local unscheduled care system.

About the tool

The tool is designed to be easy to use with navigation buttons to allow users to move swiftly between the various pages. Each screen has a box with guidance so we will not cover anything more here about general use of the Tool. However we do want to say more about the data and also the charts available.

The data set

The Tool contains 65 data items in total. 43 of these are data supplied by the local team with the remaining 22 being derived from the supplied data. The ‘Setup’ page lists those and the eagle eyed will notice that there is space for a further 31 data items that can be chosen locally.

These data items have been chosen specifically because they are available in every Health Board and provide useful insights into how patients flow through the hospital system. The ‘Setup’ page provides a brief explanation of each so we will not cover them all in this Guide. However several are worthy of special mention:

- **Age groups** - the Tool groups patients into 4 age bands. From experience we think these are sensible groupings if you want to understand the impact of patient age on the data items you are looking at. However if you have agreed age bands that are different, you can use those instead. Simply edit the text in the title, short title and description columns on the ‘Setup’ page.

- **Emergency bed days** - these are obtained by adding up the bed days used by patients who have been discharged but allocating those bed day to the day of admission and not the day of discharge as is normally done. This is because we want to look at length of stay by day of admission. Many hospitals show a ‘weekend’ effect when this is done, that is certain days typically Thursday or Friday have higher stays than other days of the week. This effect is masked when looking at length of stay by day of discharge. The downside is of course that patients still in hospital will be excluded from this analysis. This can be
mitigated by choosing a period that ends at least 3 months ago because the vast majority of patients in hospital 3 months ago will have been discharged.

- Last minute cancellations and intended elective admissions - although the focus for our work is on unscheduled or emergency care, the way in which elective work is planned can also impact. We are used to thinking that emergencies affect the elective workload and whilst this is true, it is also true that there is more variation in elective admissions than there is in emergency admissions. If we simply look at elective admissions, we are looking at those who have been successful in getting a bed. This is where the last minute cancellations come in. If we add those to elective admissions we get the total number of elective cases that we intended to admit. Looking at that pattern may give us some clues about why we run out of beds on certain days of the week.

- Emergency deaths - we want to know the number of patients who dies by day of admission not by day of death as is normally the case. This is mainly so we can construct the ‘Warwick’ chart but also so that we can explore whether the day of admission makes a difference. Evidence has shown for example that delays early on in a pathway can have detrimental effects to both outcome and stay in hospital.

Local data

As mentioned earlier you are able to add your own local data to the Tool. The simplest way to do this is to add a new data item. For example, you might want to include the number of assessed patients. In the ‘Setup’ page, move to the end of the data table to find the first completely blank row. Now complete the following fields as in the figure below.

- The ‘data type’ column offers you a choice of ‘Number’ or ‘calculation’ choose ‘number’.

<table>
<thead>
<tr>
<th>Data type</th>
<th>Title</th>
<th>Short title</th>
<th>Description</th>
<th>Calculator</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation</td>
<td>Length of stay for emergency patients aged 80+</td>
<td>Emergency LoS 80+</td>
<td>Emergency bed days divided by emergency admissions aged 80+</td>
<td>(Emergency bed days aged 80+) / (Emergency admissions aged 80+)</td>
<td>0.00</td>
</tr>
<tr>
<td>Calculation</td>
<td>Bed occupancy</td>
<td>Bed occupancy</td>
<td>Occupied beds divided by available beds.</td>
<td>([Occupied beds] / [Available beds]) * 100</td>
<td>0.01%</td>
</tr>
<tr>
<td>Number</td>
<td>Number of assessed patients</td>
<td>Assessed patients</td>
<td>The number of patients admitted today into the Assessment Unit</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

- Add some appropriate text into the columns headed ‘Title’, ‘Short title’ and ‘Description’. The short title is used on the chart that shows two data items because there is not enough space in the title area for two full data item titles.

- Leave the calculation column blank

- In the Format column, enter ‘0’ (zero). The format column tells the Tool how you want the numbers displayed, for example how many decimal places or whether it is a percentage. Assessed patients are whole numbers (you can’t have half an assessed patient) and Excel’s way of knowing this is to use a number with no decimal places.

It is also possible to add derived or calculated data items to this tool. To do this required a more in depth knowledge of Excel and in particular familiarity with running macros. If you want to do this, we would advise you to contact the Data Tool author whose email address is given towards the bottom of the Guide page.

The charts

The Tool requires the data to be entered as one row per day and the Tool can cater for up to 104 weeks of data. We specify whole weeks with a Monday start because this gives us the
opportunity to study the data day by day, week by week or for specified days of the week, for example all Mondays. So please ensure that you have entered your data as whole weeks. The Tool gives you a warning if your data does not start on a Monday. Once you have done that, you have access to all the charts.

The most sensible chart to start with is the Weekly data chart. See the figure below. In this example it shows the total number of minor A&E attendances. Each blue dot represents a week. The orange line shows the average over the 2 year period and the red lines represent the range of normal variation, in this case between 400 and 600 patients per week. However the power of looking at weekly data over such a long period is that seasonal variations are made obvious. Here there is a strong seasonal pattern to the data with many more minors attending in the summer months. The weekly chart is designed to spot these patterns and also to spot any step changes up or down.

The second chart to the right enables you to compare two data items to see if the patterns or trends are replicated or whether the two data items move in opposite directions. You can create the ‘Warwick’ chart in this way by selecting % A&E breaches first and then emergency death rate on the comparison chart.

In this example, the user has chosen to compare minor attendances with majors to see if they both have the same pattern. It is clear that in this instance they do not.

Now you can look at the daily charts to see if the day to day variation adds any more light to the discussions the weekly charts will have raised. Again the comparison chart is available too and the figure below shows an example.
The daily chart might not add much more than the weekly chart but it only takes a moment to find out.

Now, having satisfied yourself about the picture over the entire period, you might want to explore whether the patterns are different for different days of the week. There are two ways you can do this in the Tool. The first is to look at a particular day, for example Monday, over the entire two year period. The figure below shows an example of this. In this case, the user has chosen to look at emergency discharges on Fridays.

Here there is no clear sign of seasonal variation so the red lines do more accurately reflect the range of Friday discharges of anywhere between 26 and 70 discharges. There is one day that tops the upper red line which in statistical terms makes this day exceptional. No prizes for guessing that this is 21st December. They have also chosen to compare discharges with admissions on the same day (the right hand chart). You can see that although the lines move roughly together there are many days when they are not in synch. Does this matter? It might especially if the imbalance on days either side causes a build-up of patients in beds.
Which leads us onto the second way of looking at days of the week (the summary chart), an example of which is shown below. Here all 7 days are displayed for emergency discharges so you can see the pattern over the week. The large red square is the average for that day and corresponds to the orange line in the day of the week chart above. The red lines representing the range of variation in the day of the week chart are translated into the short blue lines on this summary chart.

From the chart it is clear that on average more patients are discharged on Fridays than any other day of the week. Furthermore discharged are sharply reduced on Saturdays and Sundays. Comparing this chart with one which shows emergency admissions might give you some clues as to why the hospital feels fuller at certain times of the week.

**Using the Tool in the diagnostic workshop**

In the Diagnostic workshop we concentrate on a small selection of the data in the Tool. The sequence tends to be:

- 4 hour A&E breaches & the Warwick chart
- The pattern of A&E attendances, both major and minor
- The pattern of emergency admissions and discharges
- A brief digression in intended elective admissions
- A study of bed occupancy

The intention in the workshop is to look for obvious patterns & events. The facilitator will draw out of delegates the dates that certain changes happened and relate those to the data on screen. The first aim is to teach delegates the power of annotating charts with actual changes. The second aim is to formulate theories about why things happen as they do that they can test after the workshop.

**Further uses of the Tool**

In the workshop we only cover a small proportion of the data contained within the Tool. This means that there is plenty of scope to return to the Tool after the workshop to see whether there are other lessons to learn. Some of the questions that you might want to explore are:

- Does the pattern activity and demand change by age group? If it does this might have implications for what age group you tackle first.
- What is the difference between the major/minor classification of A&E attendance and the admitted/ not admitted classification?
• Emergency care is unusual in that when looked at day by day, activity is also demand. This is not true for planned care. So looking at the daily chart, how many attendances or admissions are you expecting and what does that mean for the capacity you need? The ‘80% of variation’ rule of thumb for capacity required will be covered in the workshop. When reading the charts, that 80% line is roughly halfway between the average and upper limit.

• Staying with A&E, where are the breaches? Are they in the elderly majors alone? Look at the breaches by type of attendance and age to generate some ideas that you might want to test.

• Does length of stay display the ‘weekend’ effect mentioned earlier in this section? What else can you glean about the pattern of length if stay from this data?

• Are intended elective admissions more variable than emergencies? Would smoothing the requirement for elective beds have an impact on the demand for new beds and therefore on occupancy?

• How big is the ‘Other admissions’ category? These are usually transfers from other hospitals. Are they large enough to tip the hospital ‘over the edge’ at certain times of the week? Is there scope to reduce the daily variation in these numbers if they are large?

As you can see, the number of topics you can explore is almost endless. Do set aside time to cover the ones you think will be important to you. And do this soon after the workshop has completed.

**Keeping going**

Finally, do not regard studying this Tool as a one-off. Ensure your Information department can update it on a regular basis and make time as a team to study it when that happens. This is especially important when you are beginning to make changes so you can monitor how they are working. For those of you setting up a Big Room, these charts can form the basis of the information you want to display.

**Key Messages**

• To understand your performance and annotate with changes

• To become familiar with Flow Data Tool and to surface issues

• To share an example of linking improvement to the data
2.4 St Elsewhere’s – a simulation to illustrate the principles of Flow

ABCD
Activity, Backlog, Capacity and Demand — the four measures

A common unit of measure

Because it is important to compare the four measures on a single graph, the same measures must be used for each. Minutes of time is used as a common unit, although there are other measures that can be used.

Activity

Activity is the throughput of the system — the number of patients seen in. The number of patients must be converted to the common unit of measure. Figure 48 shows cataract operations measured in minutes of theatre time.

Backlog

The backlog is the number of patients waiting, again the patient numbers must be converted to the common unit.

Capacity

The capacity of the system is the time that the resource is available. Capacity is usually measured in time.

Demand

The demand on the service is all the patients referred into the service from all sources, once again converted to a common measure of time.

An understanding of the dynamics of patients waiting and delays in their treatment is essential to managing them. There are four key measures that must be understood and monitored on a continuous basis if waiting is to be managed effectively. In addition, it is vital to understand the two key types of limitations in the system: constraints and bottlenecks.

The NHS collects data on activity, but rarely on capacity. Activity is measured in patient numbers. There are many systems in place to automate the data collection process. To understand capacity, we need to dig deeper. So what is the relationship between activity and capacity, and how can they be related?

Measuring capacity

Capacity is the resource available, multiplied by the time it is available.
Measuring activity

It is not possible to compare two items measured in different units, so if the intent is to compare activity to capacity, activity must be measured in time as well.

Measuring Demand

In order to compare capacity and activity to demand, it must also be converted to time. Demand must be measured by the number of patients waiting list, multiplied by the time to process that patient.

It is also essential to ensure that total demand is measured ie demand from all sources into A&E.

Constraints

The constraint in the system is the factor that ultimately restricts the capacity of the system. In every process there will be a constraint which ultimately limits the throughput of the system. The constraint is not easily removed without substantial investment in terms of staffing, or facilities. Identification of the constraint is an essential part of understanding a service.

Once identified, the constraint should become the most important part of the process. Work should be scheduled so that the maximum use is made of the constraint. Resources at the constraint should not be used for jobs that other staff could do.

Bottlenecks

The bottleneck is altogether a different beast. Health processes are complex and full of bottlenecks. Constraints cannot be removed without investment; bottlenecks are usually cheap or even free to remove. Distinguishing between the constraint in the system and the bottleneck currently limiting activity is essential. Constraints limit capacity — bottlenecks limit activity. By removing bottlenecks it is possible to increase activity until it gets close to the capacity of the system — which the commissioner is ultimately paying for.

Constraints and bottlenecks: a three step process

1 Identify the constraint in the system. Use process mapping to determine where the constraints are.

2 Determine whether the process is scheduled around the constraint. Use patient flow modelling to determine this.

3 If not, use PDSA cycles to eliminate a bottleneck and then repeat step 2.

4 When you reach the point where the use of the constraint is maximised, analyse your capacity to determine whether it is sufficient. If it is not, then you will be able to demonstrate this with data.
Maximising use of the constraint: The 80% rule

When calculating throughput do not use averages. Averages are seductive; using average time may seem like an obvious solution, but it will usually under estimate the actual demand. Variation is a normal part of all processes and clinical processes are no different. Accounting for the variation is important when doing the calculations and averages hide variation. Rather than using the average (50th percentile) you should use the 80th percentile.

Process Mapping looks at the care process from a patient perspective. There is another tool that will help identify where the bottlenecks in the process are and how to maximise use of the constraint in the system. Patient flow models look at the care process from a clinical unit perspective, bringing together a number of patient process maps to look at work flows through the unit. Flow models are the best way to analyse the work of a unit. The process of building up the model is simple if all the steps are followed.

Takt

Takt time is the rate at which the process must work to keep pace with demand or, to put it another way, the required average supply interval. ‘Takt’ is also the German word for ‘drum beat’.

Takt time = \[ \frac{\text{shift length (demand period)}}{\text{number of arrivals in that time (demand volume)}} \]

For example: shift = 8 minutes, arrivals = 16 patients

Takt = 8/16 = 0.5 minutes or 30 seconds

Note: the takt time is an average value and the conclusion that flow-capacity matches demand is only strictly valid is the demand is regular. The concept of a takt time is a starting point and requires modifying when demand, case mix, cycle time and process path are all subject to variation.

Cycle time

The cycle time of a process is the time interval between the same event for consecutive tasks.

An example might be the time between a surgeon starting an operation and being ready to start the next. Cycle time is often much longer that the time taken to complete the task as it includes set up time.
2.5 The A3 process – a structured way to solve problems

Staff will have experienced the St Elsewhere’s simulation which highlights the need for a systematic way of diagnosing the problems within a process. We use the A3 planning template to help us do this.

**Fig. 1: A layout of an A3 problem solving process.**

<table>
<thead>
<tr>
<th>Lean A3 Problem solving process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Box 1 Issue or Problem:</strong></td>
</tr>
<tr>
<td><strong>Box 2 Background</strong></td>
</tr>
<tr>
<td><em>How has this problem come to light?</em></td>
</tr>
<tr>
<td><em>How important is it to:</em></td>
</tr>
<tr>
<td><em>Business?</em></td>
</tr>
<tr>
<td><em>Customers?</em></td>
</tr>
<tr>
<td><em>Suppliers?</em></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Box 3 Stakeholders</strong></td>
</tr>
<tr>
<td><em>Who is affected by this problem?</em></td>
</tr>
<tr>
<td><em>Who is involved in the process?</em></td>
</tr>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Position</strong></td>
</tr>
<tr>
<td><strong>Date of meetings</strong></td>
</tr>
<tr>
<td><em>Present, absent,</em></td>
</tr>
</tbody>
</table>

**Box 1 - Issue**
How well do staff solve problems for their patients?

**Box 2 - Background.**
This programme adopted the disciplined and iterative A3 problem solving process that has ‘evolved’ through 60 years of problem solving in the manufacturing process and supply chain at Toyota.

This iterative process takes the customer’s end-to-end process view of a problem rather than the isolated functional (departmental or organisational) views experienced by staff. The customer’s issue, the diagnosis of the root cause of their problem and the impact of changes on the end-to-end process are captured, in pencil, on one piece of A3 paper hence the name. Thus at any one time there is only 1 visible copy which prevents confusion and version control issues. The final record (after much rubbing out and re-recording of consecutive tests) is distributed to every factory or office that will be experiencing the same problem. Thus the
problem, the diagnosis and the impact of effective implementation is made visible to anyone addressing the same problem thus saving them hours of management time.

The focus is first on understanding the problem. What is the issue we are trying to solve? What is the impact on patients and the stakeholders? How will they know we have made a difference? There is a strong focus on facts, data and measurement. Once the facts are known, the stakeholders can then ‘see’ the value and the waste in their invisible end-to-end process. Then they can discuss, without blame, the alternative actions to eliminate the waste. Thus they are more likely to choose changes that will make the most difference to the patient and customer (the person paying the end-to-end bill). Planning and testing the proposed changes quickly allows staff to adjust to and learn the new pattern of work. This ensures that any change has the desired effect before it is implemented in full.

Although there are many versions of the A3 problem solving process most utilise layouts which follow the common architecture as shown in Fig. 1.

The A3 process is not only a technical method for identifying, understanding and solving the right problems in business processes, it brings about a change in the beliefs and behaviours (culture) of the individuals and departments affected by the problem - the stakeholders.

**Boxes 1-3 - The problem**

The left hand side of the A3 document captures the issue and its impact on the customers (patients). Patient stories are a powerful way of conveying the impact of an issue. The next stage is to understand and document the background: how the problem came to light and the importance of the issue to the patients, customer (tax payer) and business (healthcare organisation). This helps define the measures for improvement (Box 9. bottom right). There are 3 dimensions to improvement: quality (defects), timeliness (speed and reliability) and total end-to-end process cost. Once the issue and background are understood these can be explained to the ‘experts’ that must be recruited in order to solve the problem - the people who carry out or are impacted by the process i.e. the stakeholders. Once the stakeholders from isolated functions under different managers have been recruited into one multi-disciplinary team they can begin to understand their end-to-end process, make a diagnosis and solve the problem.

**Boxes 4-6 - Diagnosis**

The middle column (boxes 4, 5 and 6) supports the diagnosis. How does the end-to-end process work now? Each stakeholder’s task is mapped in sequence to produce the current state map of the whole end-to-end process as it is perceived by the patient. At the end of this crucial step all the stakeholders will ‘see’ their process for the first time. Then the team moves on to the data driven analysis.

1) identifying the activities that do not add value to the patient or customer (waste) and

2) measuring the demand for the process and the capacity of each task to reveal the constraint (or bottleneck) in the process. Wasted resources can then be redirected to relieve the bottleneck. The future state is a map of how the process will work once the wasted activities have been eliminated and how the capacity of the rate limiting task can be adjusted to meet the demand.
Boxes 7–9 - Testing and implementing the changes.

The right hand column of the document contains the changes that are required. (These are sometimes referred to as countermeasures). The next stage is to plan and test the changes quickly to check that they have the desired effect on the end-to-end process measures before they are implemented in full.

Once the issue has been solved i.e. the required performance has been achieved and sustained, the team can be disbanded. The A3 is then ‘signed off’ and sent to other stakeholders working in the same process elsewhere. Until a better process is defined, this is the ‘standard work’ i.e. the best evidence based way of running this process.

Model for Improvement

To support the testing and implementing stage for the A3 process, the model for improvement and the use of Plan, Do, Study, Act (PDSA) cycles would be critical in allow small tests of change prior to larger scale implementation.

Fig.2: The Model for Improvement (Institute for Healthcare Improvement)

The A3 is not a plan, it is a process.

It is important to reiterate that the A3 is NOT A PLAN. It can’t be ‘written’ by one person in isolation. It is a communal process - a series of logical and iterative steps that require and ensure communication and involvement by all the staff involved in the ‘faulty’ process. For example, their understanding of the patient’s issue will be revisited as they work through the analysis and the root cause of the problem is better understood.

Engaging clinical staff

Medical staff recognise the A3 problem solving process - they use it every day.

Box 1: The issue: The patient (customer) states their problem (symptom),
Box 2: the background: The doctor takes a history of the how the problem came to light and the impact it is having on the patient’s life,

Box 3: the stakeholders: the doctor and quickly recognises who, including the patient and their carers, is going to be involved in solving this problem for the patient,

Box 4: the current state: an examination with an understanding of the invisible anatomy (the organs involved), physiology and biochemistry (the process and flow between organs) allows the doctor to map the likely causes - blocks to the physiological or biochemical flows (differential diagnosis),

Box 5: Analysis: physiological and biochemical tests and imaging clarify the diagnosis,

Box 6: Future state: this defines the expected physiological state to be attained after treatment,

Box 7: The treatments required to achieve the future state are listed and requested,

Box 8: At every stage in the implementation of treatment, the key physiology parameters (how the patient is feeling, consciousness, temperature, blood pressure, pulse, respiration rate, fluid balance etc) are monitored against the expected outcome and adjusted according the patient’s response in Box 9.

Case Studies are published allowing the same process to be used for other patients with the same problem.

Engaging Managers
Many department managers can initially struggle with the A3 process especially if they don’t have a scientific background. Common issues are:

1. Managers feel exposed by their lack of understanding of how the end-to-end process works,
2. They ‘haven’t got time’ to leave the fire-fighting caused by workarounds,
3. They don’t feel they have a mandate to work cooperatively to bring a multidisciplinary team of stakeholders from other departments together. This is compounded by arguments about lack of staff, budgets and business cases,
4. Managers with many fires to fight work through many short weekly or monthly meetings. Therefore the probability of all the stakeholders meeting in a room regularly and often are minimal. Thus it takes far longer for problems to be solved and good intentions dwindle. Meanwhile the problems the wasted costs and fire-fighting persist.
5. Impatience results in one individual - if any - mapping the process and making assumptions about the work which they have never themselves performed. Thus the power of the conversation between stakeholders and a collective understanding never materialises,
6. Managers, at best, provide a timetable of their department’s work. So they fail to see how the flow of patients from one department to another is disrupted by their individual departmental timetables.
7. Access to the data is difficult as it is held, in bits, in different department silos. So collecting the facts involves unnecessary and time consuming manual collection.

8. Managers and staff expect and are expected to ‘do something’. So they rush to implementation before the issue has been defined and measures for improvement agreed. So messy compromises and complicated workarounds are the norm.

When managers do take part in a stakeholder team and observe an invisible process for the first time they often report this to be the single most important event in their management careers.

Summary

The A3 problem solving process is more than an iterative technical process for understanding the root cause of a problem and testing solutions, it is a powerful process to change the beliefs and behaviours (culture) of the staff involved.

The process builds certainty and momentum for the changes required by bringing those affected by the problem (the stakeholders), often separated by geography or organisational silos, together into a gradual shared understanding of the problem and their solutions to the root cause of the problem. Though it can be ‘struggle’ to encourage stakeholders to spend more time in meetings based around the A3 problem solving process, the result is shorter timescale to solving the problem and eliminating waste. The initial costs of the longer meetings far outweigh the costs of poor problem solving (workarounds) and fire-fighting persistent problems.

Key Messages:

- The A3 problem solving process is a powerful technique for engaging staff in understanding the root cause of problems, generating solutions and testing them
- The flow, cost and quality project used the A3 problem solving process as the methodology for all its analysis and tests of change
- The structure of the individual project papers reflects the A3 problem solving process methodology

Further reading

### 2.6 4Ns – giving our staff a voice

A tool to surface and share what people are thinking.

#### 4 Ns Chart®

<table>
<thead>
<tr>
<th>Now</th>
<th>Future</th>
</tr>
</thead>
</table>
| **Nuggets:**  
What is going well and we want to keep doing? |  
**Nice-ifs:**  
It would be nice if…. |
| **Niggles:**  
What is not going and well and we want to change? |  
**NoNos:**  
What is not happening now and must never happen? Our greatest Fear? |

27/02/2014

© SAASoft Ltd
The 4N Chart®

The 4N chart® is a simple, quick and effective tool for gaining a balanced, qualitative perspective of any issue. When used as part of the improvement process it can help an individual and a team focus on where they will get most benefit for least effort.

To create a 4N Chart:

1. Take a blank piece of paper;
2. Draw a vertical line down the middle - this separates the Present on the left from the Future on the right;
3. Draw a horizontal line across the middle - the separates the Positive feelings above the line from the Negative feelings below the line.

4. You now put your individual or group ideas about your topic on the chart - grouping them according to the four boxes.

5. Answer the question "What is the feeling?" then "What is the cause?" Feeling because Fact.

1. Start top left and focus on the positive feelings that are generated by what works well now. You may be talking success for granted. *E.g. I feel supported because we look out for each other*. These are your Nuggets and there are always more nuggets than you see at first glance. Start here because it builds emotional momentum.

2. Move bottom left and focus on negative feelings that you have now - these are your Niggles. Work backwards to expose what causes the feeling. *E.g. I feel anxious when I am late for work because I set off late because I could not find my car keys*.

3. Move bottom right and list the negative feelings you do not want in the future. These are your NooNoos. *E.g. I do not want to feel overburdened by bureaucracy*.

4. Finally go to the top right and focus on the positive feelings that you want more of in the future and how you could get them. These are your Nice Ifs. *E.g. I would like to feel focused by having a clear expectation of my role and responsibilities*.

The 4N Chart® and Niggle-o-Gram® are registered trademarks of SAASoft Ltd  www.SAASoft.com
The 4N Chart®

The process of improvement has two linked challenges:

1) Finding ways to stop doing some Niggles and to prevent doing them again - converting Niggles into NooNoos.

2) Finding ways to start doing some Nice Ifs and to keep doing them - converting Nice Ifs into Nuggets.

The process usually starts with getting rid of a Niggle first because this will create some resource to invest in a Nice If. When we find a way to stop doing a Niggle we will liberate emotional energy, time and money and these are the three "currencies" that we need to re-invest in converting a Nice If into a Nugget.

The key is **focus** and to decide where to start: enter the Niggle-o-Gram®.

<table>
<thead>
<tr>
<th>Description of the Niggle</th>
<th>Incidence (0 to 9)</th>
<th>Impact (0 to 9)</th>
<th>Influence (0 to 9)</th>
<th>Code (000-999)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can’t find car keys</td>
<td>8</td>
<td>5</td>
<td>9</td>
<td>8-5-9</td>
</tr>
<tr>
<td>Untidy desk</td>
<td>9</td>
<td>2</td>
<td>9</td>
<td>9-2-9</td>
</tr>
<tr>
<td>Global warming</td>
<td>9</td>
<td>9</td>
<td>0</td>
<td>9-9-0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For each of your Niggles ask three questions and score your answer as a number:

Q1. How often it happens or the **Incidence**. (0=Never to 9=Always).
Q2. What is the effect or **Impact** (0=No Effect to 9=Showstopper).
Q3. How much **Influence** do you have over the root cause (0=None to 9=Complete).

Now create a code for each Niggle that will range between 0-0-0 and 9-9-9.

*The Niggle with the code that is closest to 9-9-9 is the one to focus ALL your effort on first because this will give the maximum return on investment and avoid dissipating your efforts. (NB. The weighting is Influence > Impact > Incidence).*

In the example the "Can’t find car keys" is the Top Niggle - so we start there - by installing a key hook by the front door perhaps? 😊.
2.7 Process mapping

It is important to understand how patients proceed through the service. The best way to achieve this is through process mapping. Process maps are the ideal way to identify rework within the system, constraints and bottlenecks, and unnecessary process steps. It is unlikely that any one member of staff will fully understand the whole service until the process has been mapped.

Current State Map

There are two stages to process mapping. First, understand what happens to the patient, where it happens and who is involved. Then examine the process map to determine where there are problems such as multiple hand-offs, parts of the process that are unnecessary or do not add value, or parts of the process which would flow better if undertaken in a different order. These problems can be addressed by designing a new more streamlined process. Second, use process mapping to determine where bottlenecks and constraints occur. Is use of the constraint maximised? Do the patients flow through the system without delays?

Patient processes in healthcare

Patient processes have evolved over time within the NHS with many new systems being bolted on to current processes without an overall analysis of how the whole system functions. There can be many layers to a patient’s journey and no one professional has a detailed overview of that journey. It is therefore essential to any improvement work that current systems are mapped by the staff on the ground floor who are directly working within those systems and with the involvement of patients and carers who experience the whole journey from a different perspective.
Benefits of process mapping

Process mapping is a very simple exercise, and ensures any improvement work is based on a realistic analysis of current working systems, as opposed to how local policies determine they should be working. It provides a clear indication of where there may be impacts on other parts of the service when changes are made as well as the opportunity to get multi-disciplinary teams from across the healthcare community together to ensure a culture of ownership and continuous improvement is generated. Staff are often not aware of all the complexities involved in a patient’s journey and this provides an opportunity for staff to understand how their work impacts on other parts of the system.

The final map itself can be used as a training tool; for communication purposes as well as identifying areas for continuous improvement. The map should be updated when changes are made to ensure current processes are being captured.

The high level process map

The first step in understanding any service should be to get as many of the staff together as possible, and attempt to map the process at a high level. When choosing which patient groups to map try to ensure you are looking at a group who share common characteristics; with high volume for largest impact; where there is a potential to standardise care and a potential for prescheduled care. Choose clearly defined start and end points;. At this stage a quick mapping exercise by a few staff may be useful to determine who will be involved in a more detailed mapping exercise. It is essential to have representatives of all staffing groups involved in the process at the main mapping exercise, and a quick high level map will help ensure no staff group is forgotten. Do not forget to involve patients in the mapping process.

One person One place One time

Three useful ‘rules’ to apply when process mapping:

- Clarity over what is being mapped
- 5 minute ruling — if there is debate over a certain step, note the issues and move on after a 5 minute discussion
- The session is looking at processes not people

Throughout the session it may be useful to reiterate some of these rules, and it is essential that there is a blame free culture present. It is a human response to be defensive when groups are looking at the way people work, and the group needs to ensure all staff are focusing on the processes and not the staff involved in those processes. At the mapping workshop, use ‘post-it’ notes to capture the information about the patient journey down to the level of ‘One person, one place and one time’. This will ensure that hand-offs, multiple staff, changes in location, and loops in the process are all captured. Capture any issues or suggestions for improvement that are made on a separate flip-chart to circulate with the map when finalised for comments. Arrange the ‘post-its’ into order, and look for:

- Things that are done more than once.
- Steps that do not add to the patient outcome — ask “Why is this being done?”
- Count the number of hand-offs.
• Identify where there are delays, queues, and waiting built into the process.
• Ask for each step whether the action is being undertaken by the most appropriate staff member.
• Look for ‘re-work loops’ where activities are taken to correct situations that could be avoided.

It may be useful to re-draw the process map to look at a specific issue. For example, a process map can be drawn with each staff group in a different column to identify the hand-offs — a hand-off occurs each time the process map moves across to a different column.

Focusing in on the problem
Once the overall process map has been drawn and the staff agree with the process, it will be useful to identify where there are bottlenecks in the process. Which step causes the most delays? This step can then be mapped in more detail, expanding out the process. This can be done several times, each time expanding and getting to a greater level of detail.

Some simple tips:
• Try photographing key steps of the process and illustrating the map for a staff presentation;
• Walk through the process with a patient to check that all events are included;
• Work to the 80% rule — there will be differences in the process for different patients — draw the map for the majority;
• Involve everyone
• Don’t forget to include the patient, this can be through the use of patient stories which is a powerful tool but can be uncomfortable listening.

Next steps
Process mapping is the first stage, helping to identify where to start making improvements. The use of Plan Do Study Act (PDSA) cycles of improvement provide a structured approach and framework for developing, testing and implementing changes. When looking for potential areas for improvement look for the following:

• Co-ordinate the patient process of care — promote links throughout the healthcare community
• Reduce the number of hand-offs and steps within the process
• Provide patients with a clear comprehensive care plan at an early stage
• Create trigger systems so that booking diagnostic tests triggers an appointment for results etc
• Reduce the number of times a patient has to attend hospital or surgery
• Reduce or eliminate batching
• Reduce the number of queues to be managed
• Extend staff roles encouraging flexibility
Executive Summary for Human Dimensions of Change

Within the FISH workshop it is important to take time away from discussion of data and process maps to understand more about the behaviour of individuals and how those behaviours impact upon Flow.

Our primary tools in our FISH workshops are to use quantitative and qualitative tools to not only understand how our system operates, but to also understand how that system impacts on the experience of patients who use the system. These tools will identify for us where there are opportunities to improve the flow of our system.

The primary aim of this section is to take time to become consciously aware of the quality of the transactions between colleagues, teams and departments in our system. If we are to effect change and improvements in flow, then we need to understand and appreciate how we can make our communication and transactions more effective.

The reason for this is that we can start to appreciate and understand how we are responding to or perhaps resisting change and improvement. By understanding how we or our colleagues are reacting enables us to support and help our colleagues to engage with change. They can help us think about whether we need to change the way in which we are asking others to do things differently.

To help us progress change we explore the ‘Nerve curve’, which is an adaption of the work developed by Elisabeth Kubler-Ross about the stages we experience in response to grief and loss. We then go on to explore our individual positions in a conversation or transaction by looking at ‘Transactional Analysis’. Transactional Analysis allows us to understand in a specific conversation, transaction or change, whether we are choosing to communicate in the form of a parent, child or adult. Naturally, if we communicate at the level of a parent or a child we learn that the success of communication is far less than when we choose to communicate as an adult.

Finally, in our exploration of the communication and behaviour of individuals during change, we look at the ‘Drama Triangle’. This tool enables us to determine in a particular transaction who is taking on the role of a ‘Persecutor’, who is behaving as the ‘Victim’, and who is trying to ‘Rescue’ the imbalance in the transaction between ‘Persecutor’ and ‘Victim’.

There is a significant body of literature and research on change management tools and techniques. This exploration in the workshop of three tools is not to exclude the myriad of other tools that others may use. These tools have been used successfully to help progress change in other flow projects.
2.8 The Nerve Curve and the Drama triangle

**Issue**
Why is it so difficult to change one’s own habits and lead others to do the same?

**Background**
The issue of managing change in organisation is a persistent problem. This vignette consolidates and simplifies some useful models that the author has found useful in understanding and individuals challenge with change and the interactions, or transactions, that are involved when other individuals are involved.

**Stakeholders**
Any individuals involved in a personal or business transaction. In healthcare this includes the patient, their carers, and the clinical, administrative and managerial staff.

**Current State**
The majority of change programmes appear to have a very linear mental model regarding changing an individual or an organisation performance. The typical trajectory of such a change is indicated in Figure 1 below.

*Figure 1: the typical trajectory of a planned business change programme*

Most individuals or organisations recognise that at some point, their current performance is unsustainable. The crisis may be anticipated or occur. At this point a group of individuals will seek out others who recognise the problem to build a ‘guiding coalition’. Then a communication exercise is planned and initiated to rally the troops to the cause. A change programme is launched, usually with some aspect of training for the troops, arranged by the senior leadership, to address the problem. The leaders then anticipate that the cumulative changes will result in transformation in the individual or organisation’s performance.
Audits of business change programmes reveal that 1/3 of change programmes work and the desired change is maintained; a 1/3 partly achieve their objective, but the change is not sustained; and 1/3 achieve nothing.

Why?

**Analysis**

Elizabeth Keebler-Ross described the Bereavement Curve (Figure 2) as the typical trajectory of an individual’s response to a life threatening change. This model has been transferred into industry where it has been described as the ‘Nerve Curve’ indicating the emotional roller-coaster individuals and organisations should expect in response to emotional events, such as a business going bust.

*Figure 2: The Bereavement or Nerve Curve*

In this model of individual change, the individual recognises a life threatening situation and this is accompanied by a sense of shock - and emotional event. The initial response to this is denial (‘Oh this is just a one off’) but the problem and the facts persist (e.g. a lump in the individual’s breast, the arrival of a red bank statement in the post, a redundancy notice is received). The next response is fear or anger. In this case the individual’s emotional energy (morale) will be high and must be high enough to initiate change i.e. a flight or fight response. The individual can only fight or flee this new threat with their current emotional, physical and logical understanding. After a time the individual recognises that their current mind set and behaviours are not having the desired effect and the threat persists. A sense of despair sets in an ‘emotional fog’ develops in which the individual has no idea what direction to move in or what to do. Slowly over time, the individual picks up clues that have always been there but have not made sense in their previous circumstances. Now they do appear to have some merit but the understanding and use is not clear. Then only gradually over time
does the individual learn how to use these new emotional, physical and logical tools to address the problem. This is facilitated by learning with others who are facing the same issues. Gradually performance improves and morale picks up and the new way of thinking becomes the established way of working.

Notice however that the trajectory of the Nerve Curve and the planned trajectory of a typical improvement programme are very different. Just as the Guiding Coalition are rallying the troops and expecting performance to level out as the training and communication programme take hold, the individuals and organisation as a whole will be in the flight or fight response with every individual experiencing a different amplitude and phase of their individual Nerve Curves. Is it any surprise that rallies in which the change is marketed as a ‘golden opportunity’ go down like a lead balloon with the dominant response to the ‘good news’ being anger directed at the guiding coalition.

Eric Berne’s work on Transactional Analysis between individuals (the Games People Play 1972) explains this conflict and why it can be so damaging to an individual or an organisation is at its most critical stage.

Berne describes the development of the human psyche based on Freud’s work a made up of three ‘parts’: the parent (Super ID), the Adult (ID) and the child (Ego) described in Figure 3 below.

**Figure 3: The three levels or states of the human psyche**

A vulnerable child learns its conforming responses from its parent’s two behaviours - the controlling and nurturing Parent programmes. At the same time the child copies these Parent Programmes and will in turn pass these on to his or her children thus explaining why family and organisation cultures persist. After a while (approx. 2 years) the child begins to test their parent Programmes and rebel - thus discovering the boundaries of their emotional and physical environment. Over time the more logical evidence based adult programmes appear in which the individual can recognise and control their emotional child programmes and question the rationale for their learned Parent programmes.

The transactions between individuals are then characterised as uncrossed or crossed transactions.
In Figure 4, the transaction is uncrossed and appropriate; the venerable child is being controlled nurtured appropriately by their parent.

**Figure 4: The appropriate transactions between a parent and a young child**

At some stage the child starts to rebel and tries to gain control, in which case we have a crossed transactions between the parent and the child, and the parent or child will use more and more verbal or physical force to establish control, all the while the child will be learning these tactics from their parent.

**Figure 5: Crossed transactions**
At some stage the parent will start to take a more facilitative and questioning approach to understand the child's point of view, and the child will learn these strategies too, thus developing their Adult programmes. Taking an Adult approach breaks the crossed Parent/Child transactions and encourages an un-crossed transaction.

Figure 6: The un-crossed Adult to Adult Transaction

The signals between the two individuals in Figure 6 are described by Amy and Thomas Harries, as 'I'm OK, You're OK'. i.e. 'I recognise that you are a perfectly reasonable human being, just as I am and I want to understand your point of view'. The characteristics of Adult to Adult transactions interactions are Listening behaviours rather that Telling conversations of the Parent 'I know what you should do, so do as I tell you to', or the 'I don’t know what to do, so tell me what to do' of a Child.

So what happens if an individual doesn’t develop adequate Adult rational, logical and listening skills? What happens if they are unwittingly governed by their Parent or Child programmes? The both parties can end up in escalating vicious transactions which Berne originally described as ending up in the courts or in the morgue.

The drama triangle

A third party can unwittingly become involved to form a Drama Triangle as described by Karpman.

One of the individuals is ‘rebelling’ against the established mind set or directive and is running their ‘Child’ mode - they may perceive themselves as a Victim. The other individual is attempting to get control of the 'rebel' and is using their nurturing and controlling Parent programmes to achieve this. The other individual may perceive them as a persecutor. Sometimes this may deteriorate to the point at which they attempt to humiliate the 'rebel' and deliberately invoke a Child response. This is called bullying. Either of these individuals then turns to a their person to ask them to rescue them: the Parent asks the 3rd party to ‘get control of the individual in Child state and get them to conform while the individual in Child state requests help to get the Parent ‘off their back’. This the third party’s Parent gets embroiled as a Rescuer. Inevitably the original Persecutor starts to see them as the Victim, their Rescuer is now their Persecutor and the individual in Child state may now step in to
really get control of their original Persecutor by offering to rescue them form the new Persecutor! The result is an unmitigated disaster with a collapse of any rational transactions or response to the perceived or real threat.

Figure 7: The Drama Triangle.

Too often in business that are facing a crisis the senior managers find themselves in the role of Parents, trying to establish control and nurture the rest of the workforce into another way to doing business. All too often the Child in the rest of the workforce rebels and the rebellion takes up a united front, with Rescuers being called in by either party.

Future State

The trick is for no party to allow either their Child programmes or their Parent programmes to get ‘hooked’ but to engage and stay in their Adult state. This means listening, asking the open questions (what how, when, where and who) that encourage discussion and understanding of and by both parties.

Changes required

The emphasis is for the established Parents in the hierarchy to recognise that the old established business models are no longer working. A new mind-set is required and this can only be done within a non-hierarchical learning environment in which logical uncrossed Adult transactions are accompanied by uninhibited, unrestricted problem solving i.e. uncrossed Child to Child transactions. These constructive transactions are required by every member of the workforce - including, and especially, the senior managers.

This may explain why change in response to a real threat is so difficult. Senior managers find themselves in a Parent role and therefore very difficult to admit they don’t know what to do and to ask for help from their colleagues to learn how to address this new threat. Instead they turn to outside agencies to ‘rescue’ them. They may also unwittingly find their Parent programmes being ‘hooked’ by the angry and frightened workforce looking for a persecutor to blame.
This means both parties have to recognise that conflict, i.e. differing views based on different understanding and mental models for explaining our world, is normal. The secret to avoiding confrontation is to engage one’s Patent Stoppers (stop one’s own Parent programmes) and ‘Parent blockers’ that block the other individual’s Parent behaviours and language from hooking one’s inner Child.

In the context of an organisation experiencing an emotional event, with every individual going through their own Nerve Curve, the faster that the emotional energy of every individual’s anger can be harnessed into constructive and creative uncrossed transactions, the faster the organisation is likely to respond to a perceived or real threat.

This requires the members of the established hierarchy to recognise that their mental models may no longer be adequate for addressing the new environment, and they must adopt Adult listening behaviours and strategies by which they can learn alongside the other members of their organisation.

**Further Reading**

1. The Games People Play, Dr Eric Berne, 1969
2. I’m OK, You’re OK’ by Amy and Thomas Harries 2004
3. The Drama Triangle by Stephen Karpman, first described in his 1968 article "Fairy Tales and Script Drama Analysis’’
6. The Chimp Paradox by Dr Steve Peters, 2013
   a. Psychology advisor to Team GB’s Olympic Cycling team
   • See also “The Battle of the Chimps” at [http://www.saasoft.com/blog](http://www.saasoft.com/blog)
2.9 The Oobeya ‘Big Room’ Process

Issue
What techniques can be used to help identify improvements to individual health care processes with reference to their wider system impact and then implement them successfully in a complex modern health care system?

Background
This programme started by using the A3 Problem Solving Process (based on Deming’s Plan, Do, Study, Adjust cycle) to drive changes at key points of repeated process errors and bottlenecks (e.g. delays in the blood test process) in the patient’s process. This process worked well engaging stakeholders from the ‘shop floor’ by providing them with an evidence based scientific method for identifying the root cause of problems, testing changes, measuring the result and allowing staff time to adjust to the new process of working. However, over time it became apparent that this approach was lacking in 2 key areas:

- The number of separate PDSA cycles we were undertaking was leading to problems with the overall management of the change process.
- A similar method was needed to bring senior managers and other staff groups together to understand and focus attention on the delays and sources of error in the wider health and social care system.

Traditionally the NHS has used the PRINCE (Project Management in Controlled Environments) project management methodology. This provides a structured, formal process for initiating projects and bringing together a steering group of senior managers. However, the health and social care system is anything but a controlled environment. The many and highly variable patient pathways flow through a complex system (in which there are numerous shared resources between pathways) resulting in dynamics in which the relationship between ‘cause’ and ‘effect’ are non-linear. In addition the organisational boundaries are in a near constant state of flux due to structural changes. The formalised feedback systems in PRINCE are dependent on structured work methodologies that have a tendency to lead to the creation of significant amounts of paper. In our experience this reduces the ability of staff to undertake rapid improvements as meeting the requirements of PRINCE becomes an industry in its own right. PRINCE should be used to deliver a discrete outcome and the inherent delays often means that other initiatives are being implemented in parallel without the interdependencies being understood. In addition minutes of meetings and the agenda are rarely sent out in real time adding to the confusion. Theoretically programme management should be able to handle multiple projects and their interdependencies but again it is our experience that these tend to be very paper-heavy and incapable of testing and creating change in a short period of time.

Stakeholders
So how well do senior managers understand patient flows through the wider health and social care system and the likely impact of the changes they propose to make?

As part of the flow cost quality programme one Trust looked for an alternative process that allowed:
A standard process that allows staff, including senior managers, to see and understand the complexity of the whole system and their ‘place’ in the system and their impact on the system

- Frequent meetings,
- Decisions in real time made in response to real time data,
- Encourages frequent tests of change to the processes of care so that staff and senior managers could ‘see’ and understand their invisible and complex system,
- Encourages dialogue between senior managers,
- Each manager recognising and taking responsibility for the impact of other parallel initiatives in which they are involved,
- Reduction in the intervals between successful changes which governs the cost of change,
- Improve the value and reduce the cost of meetings (travel time + meeting time) x staff salaries).

There are examples of operational ‘nerve centres’ or ‘control rooms’ in healthcare, but few have a clear process for senior managers by which they can manage change across the wider, highly complex and variable health and social care system. The Trust adopted and translated the Oobeya process developed by Toyota and used by other manufacturing companies (NASA, Boeing, Unipart) for managing new product development in highly complex, world-wide supply chains.

The Big Room

Two of the team attended a day’s training in the Oobeya process. Following this it was obvious that they needed to be able to translate the manufacturing orientated Oobeya process into a healthcare context (See further reading). The word Oobeya can be translated into “a big room” and for this reason the process and room in which it was held is now called The Big Room. They appropriated a staff coffee room which is handily placed with a high level of passing traffic and setting up the visual process in the room cost £240. A lot of work was done by clinical directors of geriatric and stroke medicine and the service improvement team to persuade all staff involved in the process to attend.

It was clear from the work undertaken up to that point that a range of stakeholders were required in order to tackle the processes that were the primary cause of poor flow, high cost and a poor quality for Geriatric and Stroke Medicine (GSM) patients. Relevant staff and senior managers (including directors) of primary care, ambulance service, secondary care, intermediate and social care were invited to the weekly Big Room meetings. It soon became obvious that the Big Room wasn’t physically big enough!

Current State of The Big Room (Oobeya) process:

The Big Room is setup with a number of visual management boards to help understand the strategic issues, the improvements made, actions required and issues raised. A picture and description of these boards are given in the sections below.
Figures 2 to 8 illustrate the boards by which the management process is made visible and one of the weekly meetings in action.

**Board 1. The Business objectives:**

What are the health and social care system’s business objectives? How do these translate down to the objectives for the GSM patient flow?

**Figure 2: The Business objectives:**
The only business objective for the GSM directorate was to reduce the number of beds occupied by GSM patients. The GSM team created the chart of daily midnight bed occupancy and the targets. As this target is one that has little resonance with the clinical teams it was translated by the GSM team to mean ‘The GSM will change its delivery model from an in-patient bed based model to one of delivering care close to the patients home’.

**Board 2: What do these objectives mean for our patients?**

George’s story is the GSM team’s translation of the corporate objectives from the patient’s perspective: George is the pseudonym of a real patient’s experience of perfect care following a PDSA cycle.

**Figure 3: What do these objectives mean for our patients?**

**Board 3: How are we doing against the GSM business and patients objectives?**

Key measures of timelines, cost and quality were adjusted and updated every week to show current performance and the impact of tests of change.
Several measures are captured and presented on this board as each change cycle tested different parts of the process.

**Board 4: High Level GSM Process through the complex health and social care system**
Wall chart of the total process from presentation through referral, transport, medical assessment, diagnostics, treatment planning, treatment, discharge planning and, if required, continuing health and social care assessment and funding, transport to original place of residence or a new residential or nursing home (or death).

**Board 5: Real time plan**
The initial milestones on the plan (based on the Business objectives) should be done in a Right to Left planning (from target backwards in time). The plan is ‘built’ in real time as every manager becomes clearer about what changes are required in what order in order to meet the milestones.
Board 6: issues and resolution.

At the initial Big Room meeting, there was a ‘splurge’ from all the stakeholders of all the issues that needed to be solved. These were captured and referred to at every meeting thereafter to check that they were being addressed within the tests of change.
As managers developed a better understanding of what needs to happen as the result of the test of change, each will have specific issues that need to be resolved in order for the test of change to succeed. These are highlighted by pink post-it notes. Another manager(s) will take responsibility for delivering the solution to each issue (yellow post-its). The manager leading the Big Room process takes responsibility for taking issues (pink post-it notes) that cannot be solved by the managers within the Big Room up to next level of authority (executive).

**Board 7: Current challenges:**
This board captures the details of tests of change that are in progress.
Figure 7: Current challenges:

**Between meetings**
Anyone familiar with The Big Room process can visit and/or guide other stakeholders through the process and status of the tests of change at any time. This is one of the major plusses of this approach in that all the knowledge is on the walls and visible and not locked in one or more computers.
Big Room Meeting and Agenda:
Figure 8: The Big Room in Action

Weekly, 1 hour standing meeting (literally) with a standard (work) agenda:

1. Welcome and introductions

   Our big room process still hasn’t got a consistent membership and so every stakeholder has to quickly introduce themselves and their role.

2. Patient story:

   A stakeholder brings a patients story (often as a consequence of the previous week’s test of change) to illustrate what patient (taxpayers) experience in order to remind all the stakeholders emotionally what we need to achieve.

3. Review of the last test of change:

   Review of the updated ‘How are we doing?’ process control charts to provide the rational response to the changes.

   This is followed by a discussion: What did we learn?

   - Nuggets (what went well and we want to keep),
   - Niggles (what didn’t go so well and needs changing), (captured on pink post-it notes)
   - Nice-ifs (things we need to include in the next test of change),
• NoNos (things that could happen, didn’t happen, and must not happen as a result of changes) e.g. readmission on the same day as a consequence of a failed discharge.

4. Plan the next test of change:

The Study phase (of the previous PDSA cycle) is used to plan the next test of change. Niggles or issues (captured on pink post-it notes) are discussed and those that can be resolved have a yellow post-it note attached to the pink note (See Fig 6). Once these are finally resolved the note is crossed out by a red line maintaining the visualisation of the management process. Normally the managers would do their own post-its. Due to the changing ‘attendees’ we had to adapt this process so that one person kept track of all the issues and their post-it notes. This person was responsible for ensuring that all pink post-it notes were ‘solved’ by a yellow post-it by the next test of change with the name of the person who had made that commitment.

5. Any other issues.

This included brief feedback of other relevant meetings that stakeholders had attended


**Learning from the Big Room**

A summarised analysis of the learning from the big room process to date is shown in box 1

**Box 1 Analysis of The Big Room process to date:**

**Nuggets:**

• Regular meetings without fail
• Large (but variable) numbers of people in the room
• Breadth of staff groups represented
• 1 hour agenda
• Standard process for meetings.
• Strict facilitation
• Visible representation of the wider system as a high level process with the delays and errors,
• Combination of patient stories and real time data,
• Dialogue between staff across the health and social care system irrespective of hierarchy or role,
• Data driven,
• ‘Can do’ attitude to the Tests of Change.
- No need for minutes and agenda, all the information captured in the room in real time.
- Room open to all between weekly meetings and visited by senior managers

Niggles

- Too many people (ideal is no more than 12)
- Not arriving on time, causing re-work in the meetings
- Not enough directors (rarely did directors or assistant directors consistently turn up at the weekly meetings,
- Directors continue to make decisions outside of the Big Room process and plan changes with no evidence that their changes would work or measures for improvement.
- Few milestones, if any on the plan indicating the lack of direction at executive level in the health and social care system.

Nice-ifs

- Regular weekly attendance by directors or primary, ambulance, secondary, intermediate and social care, patients and carers in the room
- More frequent and faster ramp-up of the tests of change
- Sticking to the culture of ‘a commitment given is a commitment kept’
- Stopping other meetings so that the GSM Big Room Process is the key driver for all changes planned across the health and social care system.

NoNos

- Failing to address the skills and capability of the senior managers to:
  - measure demand on each service and to deliver the capacity required rather than continuing with ‘carve out’ or prioritisation and optimising their sub-system at the expense of the whole process cost,
  - Establish and monitor the measures for improvement of any changes to be made.

Measures of Improvement for The Big Room process

Improvement in the Big Room Process was assessed each week by:

1. Number of people in the room.
2. Seniority and decision capability of the people in the room
3. Interval between one completed test of change and the next
4. Cost of decisions: \((\text{travel time} + 1 \text{ hour}) \times \text{salaries of the staff involved})\)
However these are not formally measured and recorded yet.

Future State
This Big Room process is in its infancy and has yet to develop as the process by which directors and heads of organisations meet weekly to plan, test and implement successful changes. We accept that we have a long way to go before we reach the level of expertise as described in Toyota and Boeing (see further reading).

Changes Required
Directors are still involved in a decision making process which is out of touch with what is really required to improve timeliness cost and quality of patient care on the shop floor. For example we had several demands for business plans for the new ‘frailty unit’ when we had no idea what the form of this unit would be. We actually needed a real time transport system to bring patients in and to take patients home. The latter included ‘a man with a van’ with therapy staff and equipment to deliver patients to their homes and carry out their health and social care assessment. The form of the ‘frailty assessment unit’ was immaterial if we couldn’t get patients home.

Test of Change
It would be interesting to run at least one Big Room meeting with the directors of the organisations and departments involved to see how much they understand their system and the impacts of the tests of change that have been carried out.

Summary
‘The plan is nothing and planning is everything’ (Eisenhower).

Managing change in complex modern health care environments is a challenge. This requires a process which helps staff and senior managers, see, understand and test changes in a complex-non linear system in real time. The level of complexity, variations and detail cannot be managed by one individual. Only by listening to the issues can staff and mangers understand the implications for their own part of the system and impact on parts managed by their colleagues elsewhere.

The Oobeya (or big room) process offers an environment for real-time decision-making that engages all relevant stakeholders. The process facilitates:

- Changes to be rapidly tested, assessed and implemented
- The measurement of improvement to the timeliness, cost and quality of the service
- Regular feedback from patients and carers experience of using the service.

Key Messages
- Improvements to health care processes are often carried out without a thorough understanding of the system wide implications of change
- Highly structured project management approaches can struggle to cope with the complexity of modern health and social care systems
• The Oobeya (or big room) process offers an environment for real-time decision-making that engages all relevant stakeholders
• For the full benefits to be realised, the Oobeya process needs to be adopted universally as the single way the organisation manages its service and process improvement
Section Three: Post event actions

3.1 Problem solving using the A3 process

Participants learn to use the A3 problem solving process to improve St Elsewhere’s during the workshop and make a start on the A3 for their overall flow. A key post event action is therefore to complete the flow A3 and to continue to use it in their Big Room. The A3 provides a route map to a successful project because it keeps teams focused on the important issues and ensure that they have done a proper diagnosis before embarking on solutions.

As well as the overall A3, teams will be encouraged to consider creating further A3’s covering subsidiary flows. Typically these might be for Pathology and Radiology. These diagnostic departments can have a crucial influence on the overall flow of patients through the hospital system. Those tasked with creating such A3’s should be supported to do so. They should also form part of the Big Room process to ensure that progress is visible to the whole flow team.

A key component of any A3 is the analysis. This is box 5 in the A3 structure. When considering department flows such as Pathology, there are 2 aspects that need to be measured: demand and lead time. Sometimes these are not easy to obtain but worth the effort.

Demand
This should be measured from the date and time of referral and the data presented by hour of the day and by day of week to study any recurring patterns. Once the average and variation has been established, it is then a straightforward task to estimate the capacity required using the 80% rule.

Lead time
This should be measured from the date and time of referral to the date and time that the test result is available to the referring clinician. The data should be presented in a time series format and any variation studied to identify the cause. This may help suggest the areas that may need to be tackled to ensure a swift turnaround of test requests.

3.2 Actions from process mapping

A number of actions will have arisen as a consequence of the process mapping exercise undertaken on the morning of day two. One of these might be to complete the map itself. Another may be for all the flow team members to complete the online FISH training.

All the actions will need to be placed onto a project grid to define:

- What is the required action
- Who is responsible for tackling it and
- By when

If there is a delay before the Big Room is up and running, these should be tracked through a more traditional project meeting so as not to lose any momentum.
3.3 Implementing the Big Room

As well as the actions from the process mapping exercise, there will be a series of actions arising from the need to get the Big Room up and running. Do not underestimate this task. As a minimum you will need a room big enough to house the A3 components including any data on permanent display.

But do not allow perfection to get in the way of progress. It is better to get started and move towards a well run Big Room in a series of PDSAs that to wait until everything is perfect. The Big Room signifies a different way of working so the sooner you get started, the sooner you will have built the habit.

3.4 Stakeholders and communication

The 2 day workshop will be a seminal experience for many of the participants. It is not unusual for them to be fired up and ready for action. That’s not surprising because the workshop is set up to deliver just this sort of outcome.

However not all the flow team will have been present and there are also many others who have a vital role to play that won’t have been present either. So it is important to consider how they are to be brought up to speed. This is important because:

- They may have misconceptions about what the flow project is aiming to do
- They may feel excluded and react negatively to the new concepts and the jargon. Words such as Takt time are literally a different language.
- They don’t understand the science behind Flow and so bring unhelpful suggestions to the table
- Their well-meaning actions may cut right across what the Flow team are trying to do
- In some cases they have the ability to bring the Flow project to a grinding halt.

Tools such as the Barriers & Aids analysis that is presented in the Silver level of Improving Quality Together (IQT) and also stakeholder mapping can be helpful here. In this 2 day workshop there is not time to cover these. But do spend time identifying your stakeholders and also what approach you need to take with each of them. You will need different strategies; one size definitely does not fit all. Publishing a monthly Flow newsletter however engaging is not going to do it for everyone.

Feed this work into your overall project plan and remember each action need to have a “What, by whom and by when” attached to it.
Section Four: Appendices

The appendices contained within this section are:

- Email containing instructions on pre-work for the 2 day workshop
- A full workshop agenda
- A glossary of FISH terms (reproduced with permission from Melanie Andrews, ABMU)
- A3 template
- Big Room example agenda
- The Milestone Checklist
Appendix 1 Pre-work email

Flow Team Workshop 1

Foundation in Improvement Science for Healthcare (FISH) Day 1 & 2

Overview
This is the first of two two-day team workshops for the Flow Team participating in the National Patient Flow Programme facilitated by Dr Kate Silvester BSc MBA FRCOphth and the 1000 Lives Improvement Service.

The purpose of this two day workshop to begin to equip Health Board Flow Teams with the knowledge and tools to diagnose the system flow issues within their local system. This workshop will include using the Health Board’s own flow data provided in advance of the session in the flow data tool.

Dr Kate Silvester will lead the session, supported by the nominated contact from the 1000 Lives Improvement Service national team.

Outcomes from workshop
- Produce a Project Plan to identify the flow constraints and plan for diagnosis of system issues.
- Identify the team members who will undertake the advanced Improvement Science Practitioner (ISP) course focusing on stream redesign.

Pre-requisites
The following pre-requisites must have been completed for the workshop to take place:

1. All team members to have completed modules 1, 2 and 3 (as a minimum) of the online FISH training
2. The Excel Flow Data Tool must be fully populated and sent to carys.jones4@wales.nhs.uk at least 3 working days prior to the workshop (see Appendix A).
3. The patient pathway to be worked on by the project team is identified and a high level map produced and brought to the workshop
4. Team members to have tried out using the Gantt charts on 1 or 2 steps in a pathway they are familiar with. Gantt charts are covered in the online FISH training.
**Who should attend?**
All core members of your Health Board’s Flow Collaborative Team.
Organisations can decide how many staff are added to the core team, however spaces at the FISH workshops are limited to 15 people. Participants are asked to **attend both days in full**. Failure to attend the two days fully will disrupt the St. Elsewhere’s simulation and compromise the team’s learning.

The organisation needs to empower the core team to make changes and decisions based on the learning from the collaborative. Ideally, the core team would comprise of one representative from each of the below categories:

13. Executive Lead  
14. GP  
15. Hospital consultant  
16. Senior Nurse  
17. Data Analyst  
18. Service Manager  
19. Diagnostics service manager  
20. Service Improvement representative  
21. Intermediate care manager  
22. Adult Social Care manager  
23. WAST Representative  
24. Operational Lead for Flow (e.g. Chief Operating Officer)

**How long will it last?**
2 full days (see agenda). The team must be able to attend both days, as well as the next 2 day FISH workshop (date to be determined by Health Board).

**Venue:** The Health Board is asked to arrange a large room with sufficient space to accommodate the flow team (up to 15 people), in addition to two other speakers. The room should be arranged cabaret style. If a suitable room is not available for the session, the 1000 Lives Improvement Service will also cover the cost of room hire by prior agreement.

**Equipment:** A laptop, projector and screen are required for the session. These can be provided by the 1000 Lives Improvement Service upon request.

**Costs:** The 1000 Lives Improvement Service will cover the cost Dr Kate Silvester’s time and travel. This will be managed directly by the National Team. As above, room hire costs may also be covered by prior agreement.

**Booking arrangements:**
To arrange a session with Kate please contact your National Team member:  
carys.jones4@wales.nhs.uk (for ABHB, C&V, Hywel Dda and WAST)  
claire.lloyd@Wales.nhs.uk (for BCU, ABMU, Cwm Taf and Powys)

**APPENDIX A: Flow Data Tool**

*Note: A copy of the excel file was included for reference.*
### Appendix 2 The full workshop agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Day 1</th>
<th>Objectives and Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00</td>
<td>Arrival &amp; Registration</td>
<td></td>
</tr>
<tr>
<td>9.15</td>
<td>Welcome and Introductions</td>
<td>Know the team</td>
</tr>
<tr>
<td></td>
<td>Update on outputs from the Executive Workshop</td>
<td>All on same page</td>
</tr>
<tr>
<td></td>
<td>Review Agenda and Aims for the day</td>
<td>State the journey ahead</td>
</tr>
<tr>
<td>10.00</td>
<td>Save the NHS simulation</td>
<td>Learn to get flow to flow first before removing capacity</td>
</tr>
<tr>
<td></td>
<td>Seattle Children’s Hospital Flow model</td>
<td>Bottlenecks cause queues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delays harm patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Links to FISH</td>
</tr>
<tr>
<td>11.00</td>
<td>Your data - Warwick charts</td>
<td>To understand your performance and annotate with changes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To become familiar with tool and to surface issues</td>
</tr>
<tr>
<td></td>
<td>Your data - Data Tool</td>
<td>Capture the lessons</td>
</tr>
<tr>
<td></td>
<td>Breaches; major/minor; non admit/admit attendances, admissions; occupancy</td>
<td>Example of linking improvement to the data</td>
</tr>
<tr>
<td></td>
<td>Nuggets from the data session</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sheffield story of reducing bed occupancy</td>
<td></td>
</tr>
<tr>
<td>13.00</td>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td>13.30</td>
<td>The patients at St Elsewhere’s</td>
<td>Learning by Doing: Mapping and Measuring a process to diagnose and understand the constraints</td>
</tr>
<tr>
<td></td>
<td>Using a simple simulation to highlight potential flow issues and the measures needed to diagnose them</td>
<td>Need a process to follow</td>
</tr>
<tr>
<td></td>
<td>Introduce and play the game, capture data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discuss plan (15 mins)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Details</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>13.30</td>
<td>Modelling St Elsewhere’s: Diagnosis (boxes 1-5)</td>
<td>Introducing A3 process as a structured way of diagnosing and solving a flow problem. Boxes 1-3</td>
</tr>
<tr>
<td></td>
<td>• Aim</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Background</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Stakeholders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Map: create process map and spaghetti diagram</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analysis: for each letter we want Gantt chart &amp; cycle time; for demand we want Takt time; use 7 wastes to identify issues; use Ishikawa to classify issues</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Link to FISH</td>
<td></td>
</tr>
<tr>
<td>Teach the A3 process</td>
<td>Using the measurement data to diagnose the constraints in the system</td>
<td></td>
</tr>
<tr>
<td>13.30</td>
<td>Modelling St Elsewhere’s: Design (boxes 6-7)</td>
<td>Use analysis to design the future system</td>
</tr>
<tr>
<td></td>
<td>• Design: using takt &amp; cycle times, calculate required capacity at each letter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• List Improvements/ changes required</td>
<td></td>
</tr>
<tr>
<td>15.00</td>
<td>TEA (during which set up St Elsewhere’s)</td>
<td></td>
</tr>
<tr>
<td>15.15</td>
<td>Modelling St Elsewhere’s: Test and Measure (boxes 8-9)</td>
<td>Use a test to validate the design. Use further data to refine it. To avoid confusion</td>
</tr>
<tr>
<td></td>
<td>• Run the game a second time and capture the data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Run chart of cycle times</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Make the links between A3 and 6M process at the end</td>
<td></td>
</tr>
<tr>
<td>4.00</td>
<td>The nerve curve and the drama triangle</td>
<td>Recognise the emotions we feel on the journey of discovery</td>
</tr>
<tr>
<td>4.30</td>
<td>Give out homework and CLOSE</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Objectives</td>
</tr>
<tr>
<td>-------</td>
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<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>09.00</td>
<td>Arrival &amp; Registration</td>
<td>Introduce 4N process and surface any niggles that can be addressed on day two</td>
</tr>
<tr>
<td>9.15</td>
<td>Review of day 1</td>
<td>Introduce 4N process and surface any niggles that can be addressed on day two</td>
</tr>
<tr>
<td></td>
<td>• 4Ns for the flow team</td>
<td>Introduce 4N process and surface any niggles that can be addressed on day two</td>
</tr>
<tr>
<td></td>
<td>• Niggle-o-gram for flow team</td>
<td>Introduce 4N process and surface any niggles that can be addressed on day two</td>
</tr>
<tr>
<td>10.00</td>
<td>COFFEE &amp; TEA</td>
<td>Ensure everybody knows how to process map</td>
</tr>
<tr>
<td>10.15</td>
<td>Process map for patient flow</td>
<td>Create a real map of chosen process</td>
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<tr>
<td></td>
<td>• Walk the process ‘backwards’ as this means we are less likely to miss out steps</td>
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<tr>
<td></td>
<td>• Introduce the 3 types of projection; SBAR; medically fit date for discharge</td>
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<tr>
<td></td>
<td>• Data Collection for all steps for ‘touch’ time and delays</td>
<td></td>
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<tr>
<td></td>
<td>Homework - add data to the map</td>
<td>Effective communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Capture what data needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>we need the data to enable us to design the system</td>
</tr>
<tr>
<td>12.00</td>
<td>Tools for Design</td>
<td>So they can design their new system when they have the right data</td>
</tr>
<tr>
<td></td>
<td>Use data from Warwick assessment area as example</td>
<td></td>
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<tr>
<td></td>
<td>• Process templates - create one</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Discovering Takt time - use arrivals data to estimate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Exercise: use above to estimate staffing required in Assessment area</td>
<td></td>
</tr>
<tr>
<td>1.15</td>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Notes</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>2.00</td>
<td>Big Room Process - The heartbeat of the programme</td>
<td>- What it consists of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- how to set up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- agenda</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- timetable for setting it up</td>
</tr>
<tr>
<td>3.15</td>
<td>COFFEE &amp; TEA</td>
<td></td>
</tr>
<tr>
<td>3.30</td>
<td>Action Planning</td>
<td>So they are ready to support the pathway flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To feed into communication plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know how to engage Stakeholders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clarity on what it is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Allocate roles &amp; responsibilities</td>
</tr>
<tr>
<td>4.30</td>
<td>CLOSE</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix 3 A glossary of FISH terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
<td>Output of completed work from a process in a given period. It can be less than, more than or the same as the demand for the same period (3.5)</td>
</tr>
<tr>
<td><strong>Backlog Time</strong></td>
<td>Part of cycle time - waiting for another resource to complete the work</td>
</tr>
<tr>
<td><strong>Batching</strong></td>
<td>A number of similar tasks done one after the other to minimise the total setup time - creates queues (2.3)</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>General ability to process the work required - comes in many different forms (3.3)</td>
</tr>
<tr>
<td><strong>Changeover time</strong></td>
<td>Part of the cycle time - non value add but required (2.3)</td>
</tr>
<tr>
<td><strong>Cycle time</strong></td>
<td>Time interval between the same event for consecutive tasks (e.g. time between surgeon starting an operation and being ready to start the next) Cycle time is often much longer than the time taken to complete the task (2.2)(3.4). It is a stage metric</td>
</tr>
<tr>
<td><strong>Demand</strong></td>
<td>Flow of tasks into the value stream process (3.1) (3.5)</td>
</tr>
<tr>
<td><strong>Demand interval</strong></td>
<td>Rate at which tasks arrive to start the process</td>
</tr>
<tr>
<td><strong>DLCA</strong></td>
<td>Demand, Load, Capacity and Activity (3.5)</td>
</tr>
<tr>
<td><strong>Flow Capacity</strong></td>
<td>Same units as demand and activity - Jobs per unit time (3.3)</td>
</tr>
<tr>
<td><strong>Flow Constraint</strong></td>
<td>Rate controlling/limiting step (3.4)</td>
</tr>
<tr>
<td><strong>Gantt Chart</strong></td>
<td>Visual resource use, Process template chart, swim lane map, scheduling chart (2.1)(2.5)</td>
</tr>
<tr>
<td><strong>Hand offs</strong></td>
<td>Transfer of work from an upstream to a downstream step on the value stream. Rich source of worthless work (2.8)</td>
</tr>
<tr>
<td><strong>Idle time</strong></td>
<td>Part of cycle time - Resource waiting for more work</td>
</tr>
<tr>
<td><strong>Idle Time</strong></td>
<td>Resource is ready and waiting for customer (2.7)</td>
</tr>
<tr>
<td><strong>Lead Time</strong></td>
<td>Interval between two events e.g. time between patient arriving at ED and leaving. A stream metric which may include or overlap with a number of stage metrics</td>
</tr>
</tbody>
</table>
| **Little’s Law**      | Average waiting time = average Work in Progress (WIP) x Average supply interval  
Average supply interval = average waiting time/average length of queue (3.6)  
*Is very useful for relating average lead time. Average WIP and average supply interval but is limited when individual processes exhibit variation - one reason for designing out as much unnecessary variation as possible* |
| **Load**              | Product of the demand x unit work (3.3)(3.5)                                                                                                                                                               |
| **Motion Time**       | Time taken for the resource to travel to the task and back (2.7)                                                                                                                                          |
| **Niggles**           | Things that happen repeatedly and which irritate people (patients and staff) but not so much that they are forced to stop and address the problem. They point to design flaws that are sources of waste (2.10) |
| **Non value add - required** | e.g. theatre set up (time), operating theatre (resource)                                                                                                                                                    |
| **Pareto Analysis**   | Way of categorising and visualising the different types of demand - shows which cause has the greatest proportion of total effect (3.1)                                                                 |
| **Pareto Effect**     | A rule of thumb that approx 80% of effects arise from 20% of causes (3:2) - improvements or deteriorations in the 20% will have a  

---

67
<table>
<thead>
<tr>
<th><strong>Proportionately high overall effect</strong> (focus on your 20% to get the maximum benefit)</th>
<th>(3.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Lines</strong></td>
<td>Similar streams of work collocated that require similar sequences/resources/steps. May require duplication of resources to ensure flow (2.04) The better design is the one that is productive for the whole system rather than just more efficient for the individual stages</td>
</tr>
<tr>
<td><strong>Productivity</strong></td>
<td>The ratio of required output to necessary input. Productivity metric = stream output metric divided by stage input metric. It is a measure of the system. <em>Adding additional resource, slot, space and flow capacity to a process that contains a lot of “waste “is likely to reduce productivity. Being busy does not equate to being productive</em> (3.7)</td>
</tr>
<tr>
<td><strong>Queue</strong></td>
<td>Tasks waiting to be processed. Form of inventory - time spent in a queue is always wasted/worthless (2.3)</td>
</tr>
<tr>
<td><strong>Queue length</strong></td>
<td>Length when the request joined the queue (3.6)</td>
</tr>
<tr>
<td><strong>Resource</strong></td>
<td>Anything that is required to enable a task to proceed along its value stream. Abstract, physical, fixed, mobile (2.6)</td>
</tr>
<tr>
<td><strong>Resource Capacity</strong></td>
<td>Same units as Load (time) and is allocated on the basis of load (3.3)(3.5)</td>
</tr>
<tr>
<td><strong>Rework</strong></td>
<td>Waste from having to repeat work - often originates from errors and variation created by ineffective hand-offs (2.8)</td>
</tr>
<tr>
<td><strong>Setup time</strong></td>
<td>Part of the cycle time/changeover time - non value add but required</td>
</tr>
<tr>
<td><strong>Storage area</strong></td>
<td>Chair in waiting room, inpatient bed (2.2)</td>
</tr>
<tr>
<td><strong>Storage Capacity</strong></td>
<td>Same units as Work in Progress (WIP) - jobs (3.3)</td>
</tr>
<tr>
<td><strong>Supply interval</strong></td>
<td>Rate at which completed tasks emerge from the process</td>
</tr>
<tr>
<td><strong>Takt Time</strong></td>
<td>Required average supply interval. Demand period/Demand volume <em>the concept of Takt time is a starting point and requires modifying when demand is variable)</em> (3.4)</td>
</tr>
<tr>
<td><strong>Time Traps</strong></td>
<td>The amount of time wasted bears little relationship to the flow of the stream e.g. batching work after it has been completed (2.7)</td>
</tr>
<tr>
<td><strong>Touch time</strong></td>
<td>Part of cycle time – can be value or non value add</td>
</tr>
<tr>
<td><strong>Transport Waste</strong></td>
<td>The resource (cost and time) to move the task or customer to get the required work done in the required sequence (2.3)(2.9)</td>
</tr>
<tr>
<td><strong>Travel Time</strong></td>
<td>Time taken for the task to travel to the resource (2.7)</td>
</tr>
<tr>
<td><strong>Unit Work</strong></td>
<td>Amount of work required to complete each task (3.3)</td>
</tr>
<tr>
<td><strong>Utilisation</strong></td>
<td>Amount of time a resource is in use. High utilisation of an individual resource does not necessarily mean high productivity (3.7)</td>
</tr>
<tr>
<td><strong>Value</strong></td>
<td>Worthwhile treatment and care that the patient experiences that meets their expectation (1.2)</td>
</tr>
<tr>
<td><strong>Value add</strong></td>
<td>Worthwhile work</td>
</tr>
<tr>
<td><strong>Value stream</strong></td>
<td>From the patient perspective - an expected sequence of necessary steps that follow in the correct sequence, without excessive delays and which together create the desired outcome in an acceptable time at an affordable cost (1.4)</td>
</tr>
<tr>
<td><strong>Value Stream Map (VSM)</strong></td>
<td>A diagram that represents the time sequence order of how work is done and how resources are used (2.1)</td>
</tr>
<tr>
<td><strong>Visual reports</strong></td>
<td>Using and presenting data in a way that enables understanding of the system and patient flow (for diagnosis, measurement for improvement</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>and system performance e.g. gantt charts, run charts, pareto, SPC etc</td>
<td></td>
</tr>
<tr>
<td>Waiting Time</td>
<td>Customer is ready for the resource but supplier is not available (2.7)</td>
</tr>
<tr>
<td>Waste</td>
<td>Work that is not required by the customer or supplier- time and money consumed for no benefit.</td>
</tr>
<tr>
<td>Wasted Time</td>
<td>Time doing things that that add no value for the patient (2.7)</td>
</tr>
<tr>
<td>Work in Progress (WIP)</td>
<td>Inventory. Work in the system stored or otherwise (2.2)</td>
</tr>
<tr>
<td>Worthless work</td>
<td>Any time spent and work done (resources used) that does not directly contribute to meeting the customer expectation</td>
</tr>
<tr>
<td>Worthwhile work</td>
<td>In health - data for diagnosis, analysis for decision making, delivery of treatment and monitor for maintenance/improvement (1.3)</td>
</tr>
<tr>
<td>Yield</td>
<td>The percentage of the output that is correct - that doesn’t have defect/require rework</td>
</tr>
</tbody>
</table>
## Lean A3 Problem solving process

<table>
<thead>
<tr>
<th>Box 1 Issue or Problem:</th>
<th>Box 4 Current State Map: Current condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What is happening currently?</td>
</tr>
<tr>
<td></td>
<td>Map here</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Box 2 Background</th>
<th>Box 5 Analysis: DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>How has this problem come to light?</td>
<td></td>
</tr>
<tr>
<td>How important is it to:</td>
<td></td>
</tr>
<tr>
<td>Business?</td>
<td></td>
</tr>
<tr>
<td>Customers?</td>
<td></td>
</tr>
<tr>
<td>Suppliers?</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td></td>
</tr>
<tr>
<td>Type of waste</td>
<td></td>
</tr>
<tr>
<td>How often?</td>
<td></td>
</tr>
<tr>
<td>5 why's</td>
<td></td>
</tr>
<tr>
<td>DCLA WIP, cycle, takt, batch quantity</td>
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<tr>
<td>Gantt</td>
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<table>
<thead>
<tr>
<th>Box 3 Stakeholders</th>
<th>Box 6 Future State Map (target condition)</th>
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<tbody>
<tr>
<td>Who is affected by this problem?</td>
<td></td>
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<tr>
<td>Who is involved in the process?</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
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<tr>
<th>Box 7 Improvements required</th>
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<tbody>
<tr>
<td>(countermeasures to reach the future state)</td>
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<tr>
<td>What changes are required?</td>
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<table>
<thead>
<tr>
<th>Box 8 Weekly Review Meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>What Change</td>
</tr>
<tr>
<td>By Who</td>
</tr>
<tr>
<td>By when</td>
</tr>
<tr>
<td>State of completeness</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Box 9 Measures for Improvement</th>
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</thead>
<tbody>
<tr>
<td>Time</td>
</tr>
<tr>
<td>Cost</td>
</tr>
<tr>
<td>Quality</td>
</tr>
<tr>
<td>e.g. Yield/requests</td>
</tr>
<tr>
<td>Target condition achieved by: Date</td>
</tr>
<tr>
<td>Cost / benefit</td>
</tr>
<tr>
<td>Signed off by</td>
</tr>
</tbody>
</table>

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**Appendix 4 An A3 template**

**Lean A3 Problem solving process**

**Box 1 Issue or Problem:**

**Box 4 Current State Map:**

*Current condition*

*What is happening currently?*

*Map here*

**Box 2 Background**

*How has this problem come to light?*

*How important is it to:*

*Business?*

*Customers?*

*Suppliers?*

**Box 5 Analysis: DATA**

*Why are these problems happening?*

*Problem Type of waste How often? 5 why’s*  

*DCLA WIP, cycle, takt, batch quantity*  

*Gantt*

**Box 6 Future State Map**

*(target condition)*

*What would the process look like if all the waste was eliminated and supply = demand?*

*Map here*

**Box 7 Improvements required**

*(countermeasures to reach the future state)*

*What changes are required?*

**Box 8 Weekly Review Meetings**

*What Change*  

*By Who*  

*By when*  

*State of completeness*

**Box 9 Measures for Improvement**

*Time*  

*Cost*  

*Quality*  

*e.g. Yield/requests*  

*Target condition achieved by: Date*  

*Cost / benefit*  

*Signed off by*
Appendix 5 A Big Room example agenda

BIG ROOM

1 Hour Standing Meeting

AGENDA

1. Welcome and Introductions
   (Membership will vary as projects progress and evolve - particularly early on)

2. Patient Story
   (Relevant to the measurement or a test of change - emotional reminder to stakeholders of patients experience and what needs to be achieved)

3. Review measurements and diagnostics or tests of change
   (Review of updated how are we doing - the rational response to changes

   Followed by discussion: what did we learn?
   • Nuggets (what went well and what do we want to keep)
   • Niggles (what is not good and what needs changing - captured on chart)
   • Nice-ifs (things to include in tests of change)
   • NoNos (things that could happen and must not happen as a result of changes)

4. Plan the next test of change:
   (Need to develop/ refine this part and how we manage/visualise using post-its and assigning management responsibility)

5. Any other Issues
   (Including brief feedback from other meetings etc)

6. Close
### Appendix 6 The Milestone Checklist

<table>
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<tr>
<th>When?</th>
<th>What is it?</th>
<th>What do I need to do?</th>
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</thead>
</table>
| 16<sup>th</sup> Dec 2013 | Learning Session 1 (LS1)                                 | • Health Board’s shared their Warwick charts  
• Simon Dodds – outlined FISH training  
• Kate Silvester introduced *Flow, Cost, Quality* work at Sheffield & Warwick |
| Dec 2013 – March 2014 | FISH Online Training                                     | • All Flow Collaborative team members to complete all 4 online modules of the Foundations in Improvement Science for Healthcare (FISH) programme. |
|                  | FISH Workshops – Days 1 & 2 (with Dr Kate Silvester)     | • Identify Flow Team members to attend  
• Book 2-day workshop with Kate Silvester  

**Workshop Pre-requisites**  
The following pre-requisites **must** have been completed for the workshop to take place:  

5. All team members to have completed modules 1, 2 and 3 (as a minimum) of the online FISH training  
6. The Excel Flow Data Tool must be fully populated and sent to [carys.jones4@wales.nhs.uk](mailto:carys.jones4@wales.nhs.uk) at least 3 working days prior to the workshop (see Appendix A).  
7. The patient pathway to be worked on by the project team is identified  
8. Team members to have tried out using the Gantt charts on 1 or 2 steps in a pathway they are familiar with. Gantt charts are covered in the online FISH training. |
|                  | Executive Workshop with Dr Kate Silvester               | • Book 2 hour exec session with Kate Silvester  
• Pre-requisites: |
1. **Board members** attending this session are asked to complete the **FISH online training in advance** of the session (information on how to access this is attached). As a minimum the first module should have been completed.

2. The session will be focused on your own Health Board data. Data Analysts are requested to **populate the** Excel Flow Data Tool for this session and e-mail to carys.jones4@wales.nhs.uk 3 days in advance of the session (see Appendix A).

3. Provide a copy of the latest **Performance Board Report**, including performance against Tier 1 measures.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Details</th>
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| 13<sup>th</sup> March 2014, Cardiff | **Learning Session 2 (LS2)** | - Each Health Board brings a 'Bragging Board' based on the A3 problem solving format to share feedback and learning from their FISH 2-day workshop  
- Present the process map for the patient flow you have decided to work on |
| May – August 2014      | **FISH Workshops – Days 3 & 4 (with Dr Kate Silvester)**  | Complete the second 2-day workshop with Dr Kate Silvester to review and plan:  
- The order of implementation of changes at each of the constraints to patient safety and flow programme plan.  
- Measures for monitoring improvement.  
- Strategy and plans to maintain improved performance. |
| 19<sup>th</sup> June 2014, Cardiff | **Learning Session 3 (LS3)** | - Health Board’s present progress so far using 'Bragging Boards’ using A3 problem solving format  
- Glen Burley, CEO South Warwickshire NHS FT (SWNHSFT), presenting lessons from SWNHSFT in engaging their Board |