

# Flow\_ology

How to make sense of unscheduled care data



information training for the NHS

Version 2.0



*"We have lots of information technology. We just don't have any information."*

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Kurtosis provides training courses, seminars and events for clinicians, managers and information professionals in the NHS. We specialise in the field of information analysis and management. We believe that the quality of NHS decision-making can be improved by removing the barriers to effective communication in the dialogue between information specialists and decision-makers.

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# Why **Flow\_ology**?

**UNSCHEDULED CARE IN THE NHS.** Crowded A&E.  
Four-hour breaches. Outliers. Safari ward rounds.  
Cancelled operations. Delayed discharges.

Mismatches between demand and supply. Data—if we use it properly—should help us solve these problems.

Using data properly means:

- 1 / Visualize the unscheduled care system in a recognisable way
- 2 / Explore the causes of dysfunction
- 3 / Initiate a data-driven dialogue

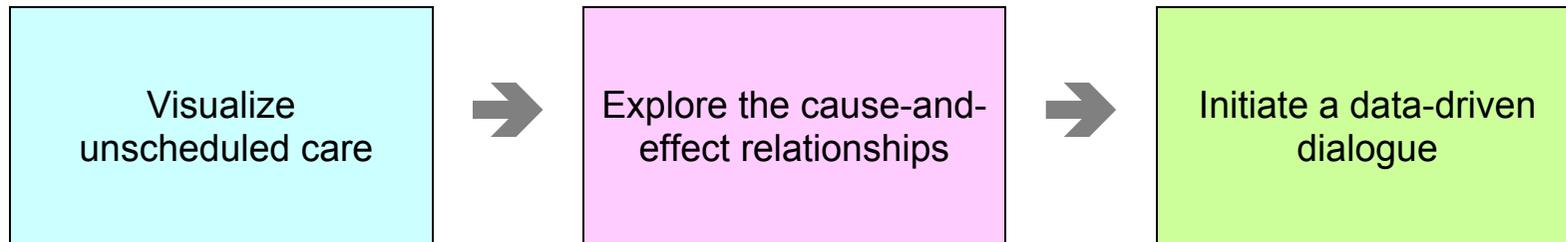
**Flow\_ology:** making sense of unscheduled care data.



# What is Flow\_ology?

**Flow\_ology** is a suite of training workshops for NHS organisations that want to jump-start the way they use data to make sense of unscheduled care.

Secondly, it shows us how to use data not just to *describe* unscheduled care but also to understand the *cause-and-effect* processes that underpin it.



Data *ought* to be running right through the middle of an issue that's all about matching capacity to demand. But when it comes to unscheduled care, too many NHS organisations make too little use of data.

**Flow\_ology** does three things.

First, it draws a picture of unscheduled care that's simple enough for people to grasp quickly, but also with enough detail to capture the sub-specialty reality that clinicians inhabit. We can't choose between big-picture vision and messy Monday morning reality. We need a diagram that does both.

Thirdly, it recognises that we'll only achieve this if we establish a meaningful *dialogue* between the number-crunchers on the one hand and the managers and clinicians on the other. We have to learn how to talk to each other about data.

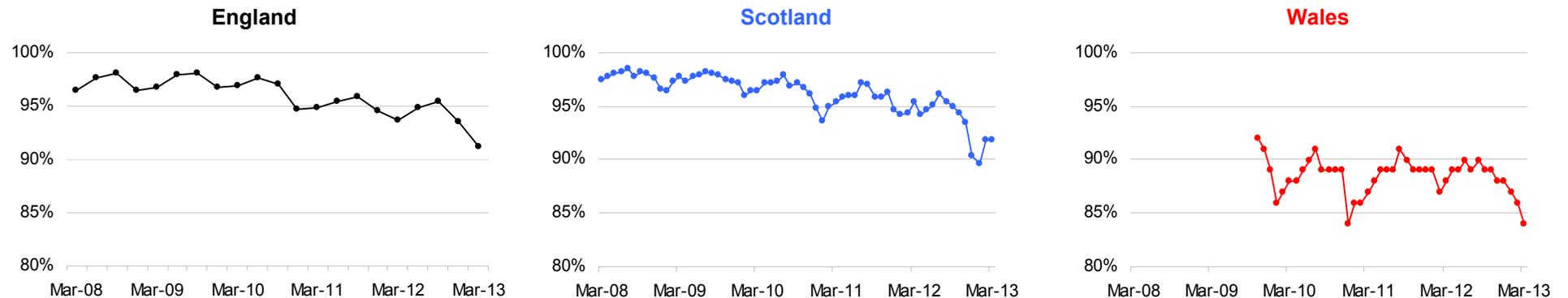
**Flow\_ology** isn't just about helping you decide on the data you need; it's also about helping you work out a mechanism for developing and modifying these data requirements into the future.

# The unscheduled care problem

The four-hour target is the easiest, the “traditional” way of measuring the unscheduled care problem.

in demand, activity or capacity can tip them into crisis. You'd think we'd be watching our systems like hawks.

## Percentage compliance with the four-hour A&E target: March 2008 to March 2013



Sources: *Department of Health (England); ISD (Scotland); StatsWales (Wales)*

But there are other indications of the problem, too: outliers, delayed discharges, cancelled operations, re-admissions, and so on.

However, the surprising thing about the unscheduled care problem this: given that it's mainly a problem of matching capacity to demand, you'd think *data* would be centre-stage in our efforts to solve it.

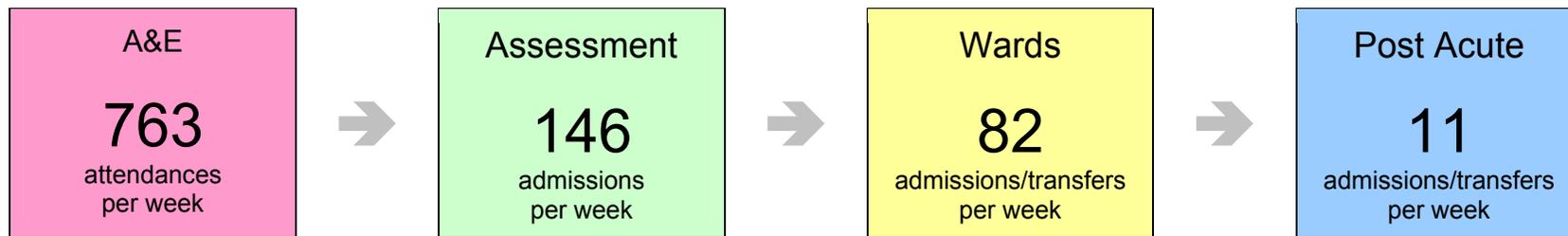
Everywhere we have highly-g geared emergency care systems that are always running hot. Small changes

But we often don't. We use the wrong data. Or we use the right data in the wrong way. Or it's piecemeal. Or the data just seems to make the problem more complicated than it already is. Or we don't use data at all.

**Flow\_ology** connects the data with the problem.

# Visualize unscheduled care

If we want to connect the data to the problem, we should start with a map. We need a map that depicts unscheduled care in a way that'll allow everyone to recognise it when they see it.



We have to be able to describe the unscheduled care process in a way that has *resonance* with the managers and clinicians who inhabit the process. It's a tricky balancing act. The map has to be *simple* enough for it to generate meaning, but it also has to be capable of representing the *complexity* of the system when that complexity matters.

If we can achieve this, then we will have created a framework within which every individual piece of unscheduled care data will always have a place. It should mean an end to the piecemeal approach.

We'll know where everything belongs.

But it's not enough just to identify the staging-posts in the unscheduled care journey. We also have to make decisions about *what* we measure for each staging-post.

We can apply a logical and structured approach to identifying the indicators for the different staging posts. And this effectively converts the map into a grid.

If we measure **activity**, **length of stay** and **utilization (occupancy)** for each of the four main staging posts in the system, we will have established base camp.

# Explore the cause-and-effect relationships

The data map provides us with context and a better understanding of the relationships between the different parts of the system. But the data map on its own only allows us to use data to describe the *status quo*.

We need to move beyond that. We need to use data to find the **cause-and effect** dynamics underlying the emergency care system. We don't just want to know what the bed occupancy is; we want to know what the *right* bed occupancy is. We don't just want to know what length of stay is; we want to know what the *right* length of stay is.

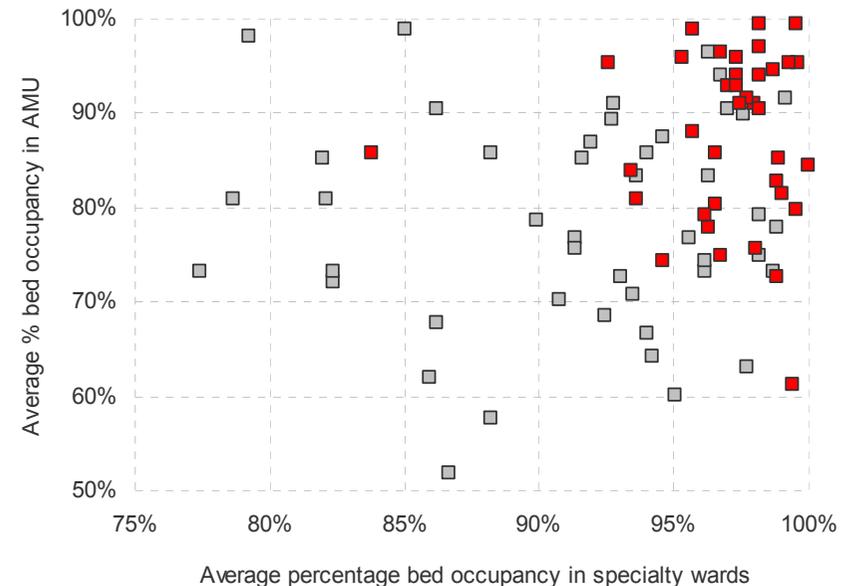
This means separating the dysfunction indicators from the grid indicators. We need to combine what we know about a functioning system (find a week when the system achieved 98% compliance, for example) with what we know about a non-functioning system (for example: a week when four-hour compliance was only 90%) to draw conclusions about what the numbers are that are consistent with an unscheduled care process that is in balance.

As an example, one of the relationships we needed to understand is that between bed availability and

A&E delays. So here is a scatterplot that explores that relationship:

## The Top Right Hand Corner of Doom

The relationship between AMU bed occupancy (y-axis) and specialty ward bed occupancy (x-axis): January to March 2013. Red points are the days when A&E compliance fell below 98%



Correlation is not causation. But it can certainly provide us with hints.

# Initiate a data-driven dialogue

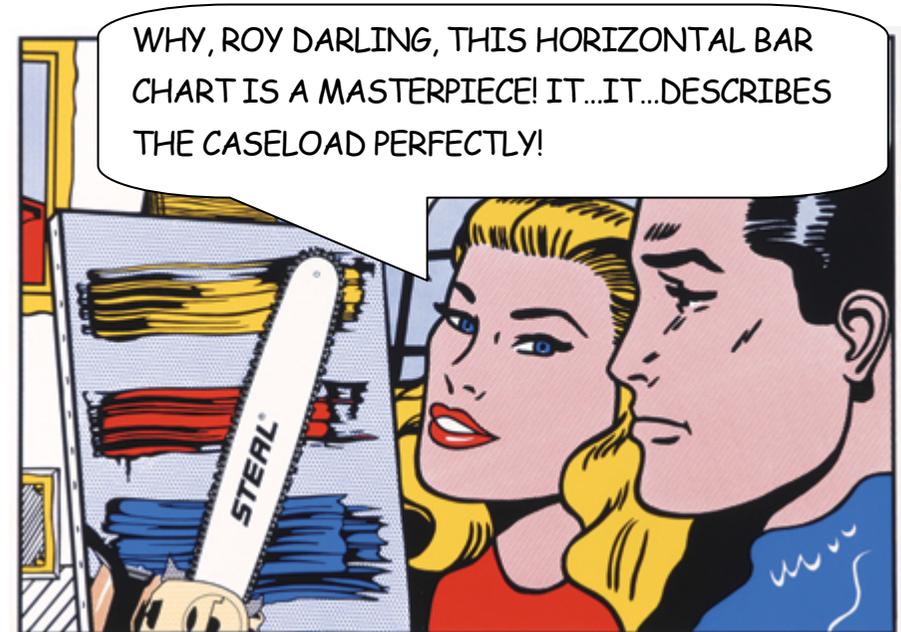
The third element of **Flow\_ology** addresses the “behavioural” problem of data.

You can have the best computer systems, you can have the best data, and you can have the best analytical expertise in the world. But if the technically-adept analysts are somehow *disconnected* from the world they are trying to describe, then it will come to nothing.

The best data analysis—the most *useful* data analysis—is generated by *dialogue* involving analysts, clinicians and managers.

**Flow\_ology** deals explicitly with this issue. It teaches the techniques that analysts need to learn if they are to initiate and maintain data-driven conversations. It shows them what they need to do in order to prepare for face-to-face meetings with managers and clinicians, the things they need to do first in order to get the encounter off on the right foot.

This element of the training (which is covered in **Flow\_ology 3**) is about the techniques involved in *presenting* unscheduled care data, both in one-to-one encounters and in more formal presentation and workshop settings.



...with apologies to Roy Lichtenstein...

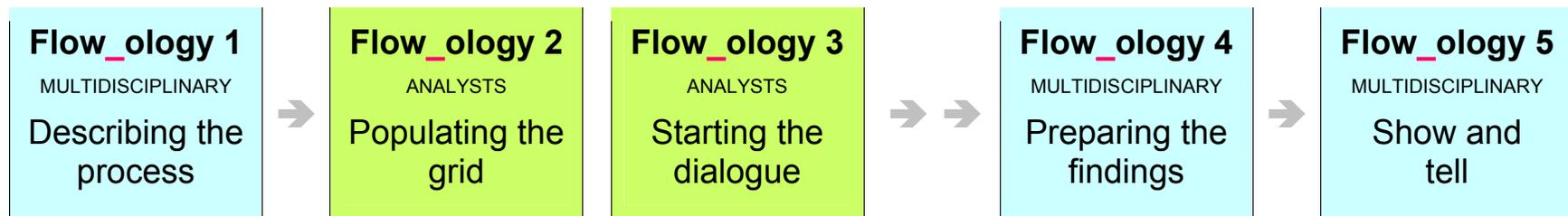
But it's not just about how to present data in person. If we are going to do this properly we also need to find the right ways of *publishing* the data so that it feeds the dialogue.

**Flow\_ology** also covers that: the ways of disseminating unscheduled care data.

# What does **Flow\_ology** look like?

All three **Flow\_ology** themes (1 visualizing the process; 2 exploring the cause-and-effect relationships; 3 initiating a data-driven dialogue) come together as a suite of five workshops:

Secondly, because of the rapidity of unscheduled care journeys, your systems need to be recording reasonably accurate times of admission, transfer and discharge.



But **Flow\_ology** isn't just a suite of workshops; it requires a hefty investment of time and commitment outside the training room, particularly on the part of analysts. You can't do **Flow\_ology** in a half-hearted way.

Moreover, there are three data preconditions.

One is that you have to ensure that your data systems can collect data at ward level. Because the two middle "staging posts" (*Assessment* and *Wards*) are defined by ward stays as opposed to hospital stays or episodes, you need to be able to generate and maintain a ward stay data extract.

Thirdly, the flip-side of those two detail requirements is that you simultaneously have to be able to deal with the *imprecision* you will encounter when it comes to populating the *Post Acute* staging post. Even the simplest of the post-acute indicators (for example, counting the number of patients who are transferred from an acute hospital ward to a community hospital) can be tricky. When you start to look at the data on patients discharged home with packages of social care, the task becomes a lot harder.

# Flow\_ology 1: describing the process

A multi-disciplinary half-day (for managers, clinicians and analysts) that frames the unscheduled care problem

Session 1 / 30 mins

## The role of data

Unscheduled care is a highly-gearred process that runs hot nearly all of the time. Small changes in demand and supply can make a disproportionately big impact.

We have to watch the emergency care process like a hawk. Because we can't physically see all of the process all of the time, we need to use data to help us watch it.

- What data have we already got that describes the unscheduled care process?
- How well does that data help us connect together the individual bits of the system?

We need to initiate meaningful conversations about the data that describes unscheduled care.

Session 2 / 30 mins

## Describing dysfunction

When the unscheduled care system is under-performing, it's not enough to describe these failings *anecdotally*. We have to be able to describe and measure dysfunction using data, using *evidence*.

Measures of dysfunction will commonly include such things as:

- Breaches of the four-hour target
- Inpatients being accommodated in beds of the wrong specialty (outliers / boarders)
- Delayed discharges
- Re-admissions

But each local unscheduled care system is different so we need to be able to accommodate local ways of measuring dysfunction.

Describing dysfunction means we can distinguish between periods when the system is working well and periods when it is in crisis.

Session 3 / 60 mins

## The logic of the grid

Being able to measure and describe dysfunction is only part of the story. We have to see how the "objective" measures of performance are connected to dysfunction.

- First, we have to draw a map of the unscheduled care system that resonates with the way managers and clinicians it. These are the **staging posts**, the columns in the grid.
- Second, we have to decide what to measure for each of the staging posts. These are the three grid **indicators**, the rows of the grid.
- Third, we have to choose the most appropriate and meaningful ways of *displaying* the data – for example, as static numbers, as trends, or as distributions.

With a grid in place, we can then use it as a **springboard** for looking at other things. Not everything we need to know will fit neatly into the grid: we will need to go off on tangents. But we do need to get the grid in place first.

Session 4 / 60 mins

## Enabling the connections

With the grid in place, we can now connect the data to the measures of dysfunction so that we can better understand why things go wrong.

For example:

- Are delays in A&E caused by too much demand or by too little downstream capacity?
- How do bed occupancy levels in different parts of the system affect the measures of dysfunction?
- How can we use data to model the impact of changes that we might make to the system?

This session closes with a summary of the next steps, of the plan of action of work that will be undertaken before the next plenary sessions.

# Flow\_ology 2: populating the grid

A full day for analysts that shows how to generate the first high-level description of the unscheduled care system

Session 1 / 90 mins

## Measuring dysfunction

The backdrop to the whole **Flow\_ology** approach is that we have to know when the system is working and when the system is not working. This distinction is critical. We have to be able to measure dysfunction.

We begin with “traditional” measures of dysfunction and set about ensuring that we can measure and describe them in ways that have resonance for local managers and clinicians:

- A&E breaches
- Outliers / boarders
- Delayed discharges
- Re-admissions

We use pre-prepared data sets to practice the ways of measuring dysfunction properly.

Session 2 / 90 mins

## Staging posts

Next, we have to make sure that we can separate out our activity data into the relevant staging posts. We need to be clear about how we define where one staging post ends and the next one begins.

- **A&E** is relatively easy (because it's usually recorded on a separate system) but we need to investigate the possibilities of disaggregating it into – for example – majors and minors
- **Assessment** presents definitional problems because we have to decide which ward stays make up the Assessment element of the process
- **Wards** are also potentially tricky since we need to make decisions about different types of ward moves
- **Post-acute** is the most nebulous staging post of all.

We will use pre-prepared data sets to practice ways of separating out the various staging post elements of the process.

Session 3 / 90 mins

## Grid indicator definitions

For each staging post in the unscheduled care journey we have to be able to measure **1** activity levels; **2** length of stay; and **3** occupancy or utilization.

In this session we therefore use our pre-prepared data sets to ensure that we are defining these indicators in ways that are feasible, logical and relevant to managers and clinicians.

- **Activity** is usually the easiest indicator to define: attendances, admissions and transfers
- **Length of stay** can present difficulties that we need to surmount
- **Occupancy** will need to be measured using visual techniques

In this session we use pre-prepared data to practice the techniques needed to measure the grid indicators.

Session 4 / 90 mins

## Populate the grid

With extracts and definitions in place, we can now populate the grid. Using pre-prepared data the delegates split into four groups, with each taking responsibility for populating one staging-post.

In this session we cover the different ways of presenting the grid indicators:

- As **static numbers**
- As **trends**
- As **distributions**

This also serves as a first practice session for presenting the grid to managers and clinicians.

# Flow\_ology 3: starting the dialogue

A full day for analysts that shows how to initiate and develop data conversations with managers and clinicians

## Session 1 / 90 mins Cause-and-effect 1

Having populated the grid, we can now turn our attention to working out cause-and-effect relationships.

In the first cause-and-effect session we look at the theory and technique behind how we analyse and visualize relationships, with a particular focus on:

- How to draw scatter plots
- How to draw bubble plots
- How to calculate the coefficient of correlation
- When and when not to use the coefficient of correlation
- How to explain correlation and scatter plots to lay audiences

## Session 2 / 90 mins Cause-and-effect 2

In this second session we look at three case studies of cause-and-effect analysis:

- The relationship between the length of the queue in A&E at the time you arrive and the length of time you are likely to spend in the A&E department
- The relationship between bed occupancy in Assessment and specialty wards and the likelihood of having outlier events
- The relationship between how full the hospital is and how likely patients are to be re-admitted following discharge

## Session 3 / 90 mins How to talk about data

Data-driven dialogue means that number-crunchers need to be able to initiate conversations with managers and clinicians in order to elicit their information needs.

- Asking managers and clinicians how they recognise and measure dysfunction
- Asking managers and clinicians how they define and visualize the staging posts in the system
- Asking managers and clinicians how they define and visualize the staging posts in the system

To facilitate these dialogues, we teach (using unscheduled care data examples throughout) the techniques that help with:

- presenting a table or chart in a one-to-one setting
- presenting a series of tables or charts with a coherent narrative
- explaining your thinking and showing your workings

## Session 4 / 90 mins The medium is the message

When we are engaged in data-driven dialogue we need to make decisions about the medium we choose to present and discuss our data.

In some one-to-one discussions, for example, you will probably need to use paper and pen more than you use laptop and mouse. But—equally—there will also be encounters when you will need the interactivity that only Microsoft Excel can provide.

When it comes to thinking about presenting data to larger groups, you also need to consider how and when to use PowerPoint slides. But in general if we want to develop dialogue we will need to employ media that allow for interaction.

# Flow\_ology ASSIGNMENT: dialogue and analysis

Four weeks of analysis-fuelled conversations

Theme 1 / 4 weeks

## Accuracy

**Flow\_ology** can mean that a spotlight gets shone on your data like never before. You will therefore need to be ready for the criticism that your data is not accurate.

The need for accuracy is itself reason enough to start a data-driven dialogue. You need to get out there speaking to the people whose fears about accuracy need to be assuaged. You need to be checking that your data makes sense, that you haven't said anything ridiculous with your numbers.

Clearly, the need for accuracy should be obvious, but it's also important to recognise that your data simply has to be accurate enough.

Theme 2 / 4 weeks

## Have we got the right staging posts?

As well as accuracy, you need to go out and speak to managers and clinicians about how they visualize the unscheduled care system in their own minds. You don't have to adopt the four staging posts suggested here as gospel. You need to listen to their version of events in order to ensure that your local model makes sense at local level.

So you need to speak to people about whether you need to change the dimensions and content of your local grid. Does it need to be made more complicated? Or can it be simplified? Do different stakeholders need different versions of the grid?

Theme 3 / 4 weeks

## "In your view, why does that happen?"

The real core content of data-driven dialogue starts to happen when you move beyond the accuracy ("Have I got the numbers right?") and the description framework ("Am I visualizing it in a sensible way?") and onto the detective work around finding out why one thing causes another thing to happen.

So you need to ensure that you have time to begin conversations about cause-and-effect. The objective here is to generate hypotheses about why things happen and to test those hypotheses using data.

We will ensure that you have some cause-and-effect starter for ten examples ready to get this aspect of the assignment moving.

Theme 4 / 4 weeks

## Keeping the conversations going

Data-driven dialogue isn't just about *starting* a conversation; it's about keeping the conversation going, turning it into an ongoing thing.

The obligation is on the analyst to keep testing the hypotheses generated by the managers and clinicians. And, as time goes by, managers and clinicians become more aware of what data is collected and what can be done with it. So the quality of the dialogue will improve.

# Flow\_ology 4: preparing the findings

A multi-disciplinary day that shows how to prepare the data and findings for feedback to the wider group

Session 1 / 90 mins

## Function / dysfunction

The key thing you have to be clear about is what were the good times and what were the bad times?

How have you defined good and how have you defined bad?

Make sure you explain that you consulted people about their definitions of good and bad – engage with people in the room.

Draw trend lines of the function and dysfunction.

Session 2 / 90 mins

## Describe the status quo separately for good times and bad times

You need to clearly describe the grid indicators for periods of dysfunction and periods of function.

At this stage your intention is to get the wider group to start drawing their own conclusions from your presentation. But you need to be able to explain that you've already done your homework, and that you've already had conversations with relevant managers and clinicians about what some of the likely cause-and-effect relationships are.

So: try and stick to just description here

Session 3 / 90 mins

## Move to cause-and-effect

There will be a range of cause-and-effect scenarios that you will have already investigated as part of Theme 3 from the assignment work.

This is where you will prepare the presentation of your cause-and-effect findings so that the larger group can pitch in with their own ideas on what causes what.

Session 4 / 90 mins

## How to present data to a meeting

The final session of **Flow\_ology 3** is devoted to teaching the specific tips and techniques involved in presenting data to a larger group.

- Describing data verbally – how to set context and choose words that enable the audience to read the chart
- Creating narrative shape for multi-exhibit data presentations
- Generating narrative flow to keep the audience's attention

We will also teach some of the techniques involved in making the most of PowerPoint's special properties in terms of displaying data.

# Flow\_ology 5: show and tell

A multi-disciplinary half day that showcases the findings of the programme

It's hard to describe what **Flow\_ology**'s final plenary sessions(s) are going to look like because the content will depend heavily on what has happened as part of the assignment work and what themes have emerged from the data-driven dialogue.

However, the basic shape of the content might look something like this:

Session 1 / 45 mins

## Good times and bad times

**Flow\_ology** 5 should probably begin with a clear statement of when the local system was—and was not—functioning well. This is the critical starting-point.

Moreover, everybody in the room needs to agree on how “functioning well” and “not functioning well” have been defined. So this first session is also an opportunity to describe the outcome of the conversations about how managers and clinicians recognise and measure dysfunction,

Session 2 / 45 mins

## The good times grid and the bad times grid

The second session (which will probably flow on seamlessly from the first session) is where we explore the relationship between system dysfunction and the activity, length of stay and occupancy indicators in the grid.

Again, this will not simply be a case of presenting the data; *it will also be about presenting the outcome of discussions about data*. So this is when we will start to introduce theories of why things turned out the way they did, along with any analytical work that we've had time to do that tests those theories.

Session 3 / 45 mins

## Cause-and-effect case studies

One of the key findings from the data conversations will be that individual managers and clinicians will have their own ideas and theories about why delays and problems occur in the unscheduled care pathway.

In this session, those ideas and theories will be *evidenced*. Using data.

This is an opportunity for a series of mini-presentations that may well be jointly delivered by analyst and clinicians together.

Session 4 / 45 mins

## Next steps: maintaining the dialogue

The plenary session has to close with agreement on;

- Has the best way of visualizing the system been achieved?
- Have the right cause-and-effect relationships been investigated
- Have we identified a way of disseminating unscheduled care data in an effective way?
- How can we *maintain* the data dialogue in unscheduled care?

# Flow\_ology FAQs

## Explain how the full Flow\_ology package works

**Flow\_ology 1** is a half-day, but it usually makes sense to schedule two half-days on the same day in order to fit in with people's diaries.

**Flow\_ology 2** and **Flow\_ology 3** can happen straightaway, as soon as **Flow\_ology 1** has happened, and should ideally be done on consecutive days.

Then there's a gap of 4-6 weeks during which the assignment work is carried out. A consultancy day is included in the full **Flow\_ology** package that can be scheduled during this 4-6 week period.

**Flow\_ology 4** is where the data gets tied together and prepared for presentation. It can be followed immediately by **Flow\_ology 5** (either one or two half-days), which marks the end of the intervention.

## Pick and mix

**Flow\_ology** works best as a full suite of workshops but you don't *have* to do it like this. Modules can be done on a stand-alone basis.

## Numbers of participants

The analyst modules (2 and 3) have a maximum

class size of eight. The other modules can be delivered for groups of up to 16.

## Facilities required

**Flow\_ology** is delivered on-site, on your premises, to your people. Most of the training requires participants to have laptops in front of them (even the training that is aimed at managers and clinicians) so you need to provide a meeting room big enough to give participants plenty of elbow and laptop room.

## How much time do people need to commit to this?

If you opt for the full **Flow\_ology** package, it's not just time for attendance at the modules that needs to be factored in: there are assignments to complete, too. For the analysts who will be working on this, this will require a big investment of their time.

## How much does it cost?

The full **Flow\_ology** package (six consultancy days in total) will cost £5,500+VAT. If you want to pick and mix, each individual **Flow\_ology** day will cost £1,100+VAT. All expenses included.

## How to book or ask questions about Flow\_ology?

You can contact Kurtosis by email on [info@kurtosis.co.uk](mailto:info@kurtosis.co.uk) or by phone on 0131 555 5300.

# About Kurtosis

Kurtosis is Neil Pettinger. And Neil Pettinger was an information manager in the NHS for twenty years before he re-invented himself as a freelance training consultant.

After joining the NHS as a National Management Trainee, most of his career was spent in acute hospitals. He worked in information and performance management posts in London, Edinburgh and Yorkshire before becoming NHS Lanarkshire's Head of Planning in 1999.

His last health service post was as the Information Manager on NHS Scotland's Unscheduled Care Collaborative Programme (2006-08).

Since then, as well as training managers, clinicians and analysts in how to make better use of data in decision-making, he has carried out a lot of freelance consultancy in unscheduled care data analysis.

As well as an MA in Sociology from Edinburgh University, Neil has a Postgraduate Certificate in Health Information Science from Warwick University and an MSc in Clinical Evaluation from the

University of York. He's also written on health service management topics for the *Guardian*, the *New Statesman* and the *Health Service Journal*.



The content of **Flow\_ology** reflects Neil's belief in the idea that the best, most relevant, most useful data analysis emerges out of conversations between analysts, managers and clinicians.





*"Are we thinking here, or is this just so much pointing and clicking?"*



information training for the NHS