NHS Improvement

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Process templates

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Process templates

What is it?

Process templates provide a visual representation of what happens to one patient as they go through a process, measured in time. Using templates to represent patients' journeys through a process can help you identify any constraint or rate limiting step within that process. This will enable you to then schedule work more effectively and to actively manage any constraints, maximising the efficiency of the process.

Evidence suggests that this approach can increase the capacity of existing resources because it enables the identification of any rate limiting steps, which can then be the focus of improvement efforts. This in turn should enable an increase in throughput through the system and help to prevent mismatches between capacity and demand.

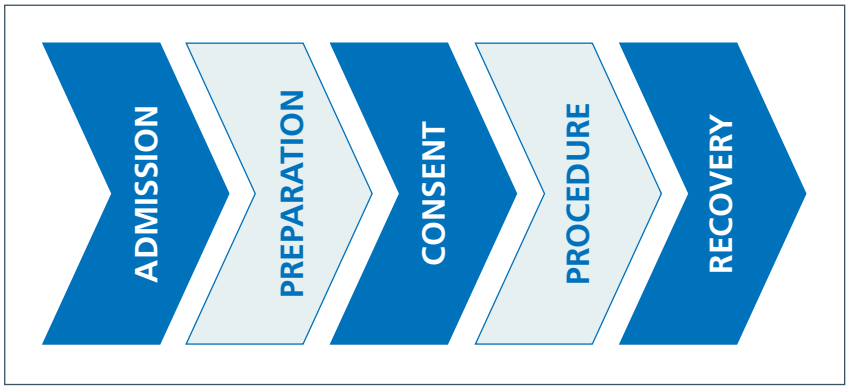
When to use it

Use process templates when you have undertaken a **process map** or **value stream map** and have identified the bottlenecks and constraints in the patient journey.

How to use it

When you are mapping out the processes, identify the start and end points of the process, ie from the patient's arrival in the department through to discharge.

Figure 1: Start and end points of process



Agree how many key activities are undertaken – for example, patient clerking and consent, any pre-procedure preparation, getting the patient into the procedure room and positioned, carrying out the procedure, reporting findings, patient recovery and discharge.

- Follow a sample of patients (10 to 15) through each procedure, recording the time taken to complete each step. If you track 10 patients, your grid might look like this:

Figure 2

	Clerk in (reception)	Clerk in (nursing)	Patient gets changed	Pre-observations
Patient 1	2.1	14	3	2.1
Patient 2	2	15	4	2
Patient 3	5	21	5	4
Patient 4	1.3	17	8	1.3
Patient 5	2	15	6	2.1
Patient 6	1.5	15	4	2
Patient 7	1.9	15	3	2.1
Patient 8	2	14	5	2
Patient 9	1.5	13	4	2
Patient 10	1.7	14	5	2

Don't calculate the average length of time – instead look at the 80th percentile, or in this example, the eighth longest time out of 10 patients. This links up the **Pareto** principle.

One way of doing this is to sort the patients in order (for example by clerk in time). This gives you a result of two minutes.

Figure 3

	Clerk in (reception)
Patient 4	1.3
Patient 6	1.5
Patient 9	1.5
Patient 10	1.7
Patient 7	1.9
Patient 2	2
Patient 5	2
Patient 8	2
Patient 1	2.1
Patient 3	5

Expanding the table, it looks like this:

Figure 4

	Clerk in (reception)	Clerk in (nursing)	Patient gets changed	Pre-observations
Patient 1	2.1	14	3	2.1
Patient 2	2	15	4	2
Patient 3	5	21	5	4
Patient 4	1.3	17	8	1.3
Patient 5	2	15	6	2.1
Patient 6	1.5	15	4	2
Patient 7	1.9	15	3	2.1
Patient 8	2	14	5	2
Patient 9	1.5	13	4	2
Patient 10	1.7	14	5	2
8th longest	2	15	5	2

The result for the whole pathway using the 80th percentile looks like this:

Figure 5

	Time (minutes)
Clerk in (reception)	2
Clerk in (nursing)	15
Patient gets changed	5
Pre observations	2
Consent	10
Procedure	30
Post observations	2
Type up report	5
Patient in recovery	45
Discharge	5

2. Allocate a colour to each step like this:

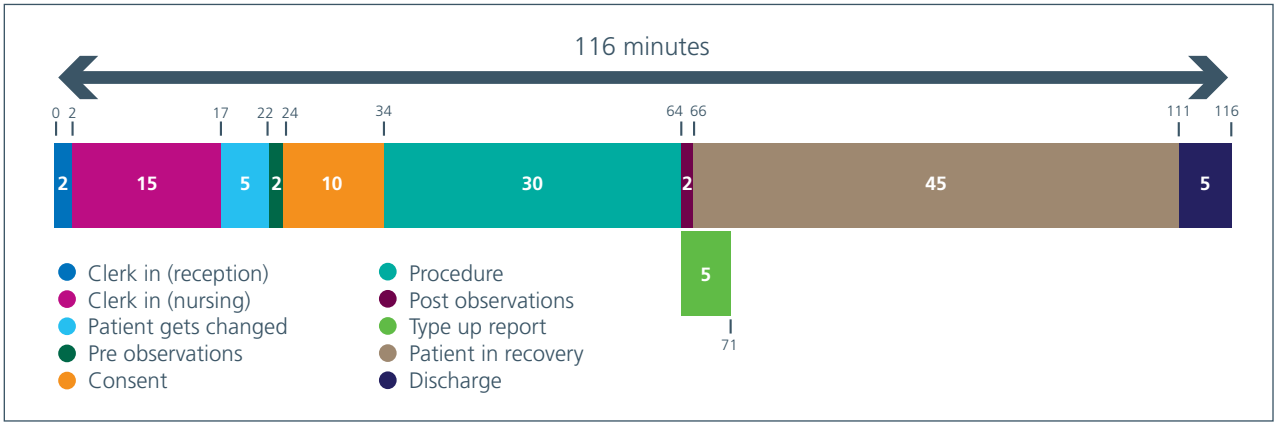
Figure 6

	Time (minutes)	Code
Clerk in (reception)	2	
Clerk in (nursing)	15	
Patient gets changed	5	
Pre observations	2	
Consent	10	
Procedure	30	
Post observations	2	
Type up report	5	
Patient in recovery	45	
Discharge	5	

3. Line up the colour steps in sequence, in blocks that are proportional to the timescale – don't include waiting times. You can create the template as a spreadsheet or by simply cutting and sticking coloured bits of paper together. Whichever way you choose, keep a consistent scale of the times along the top of the template.

   The following illustration also shows the cumulative time taken in minutes at the start of each step above the coloured sequence.

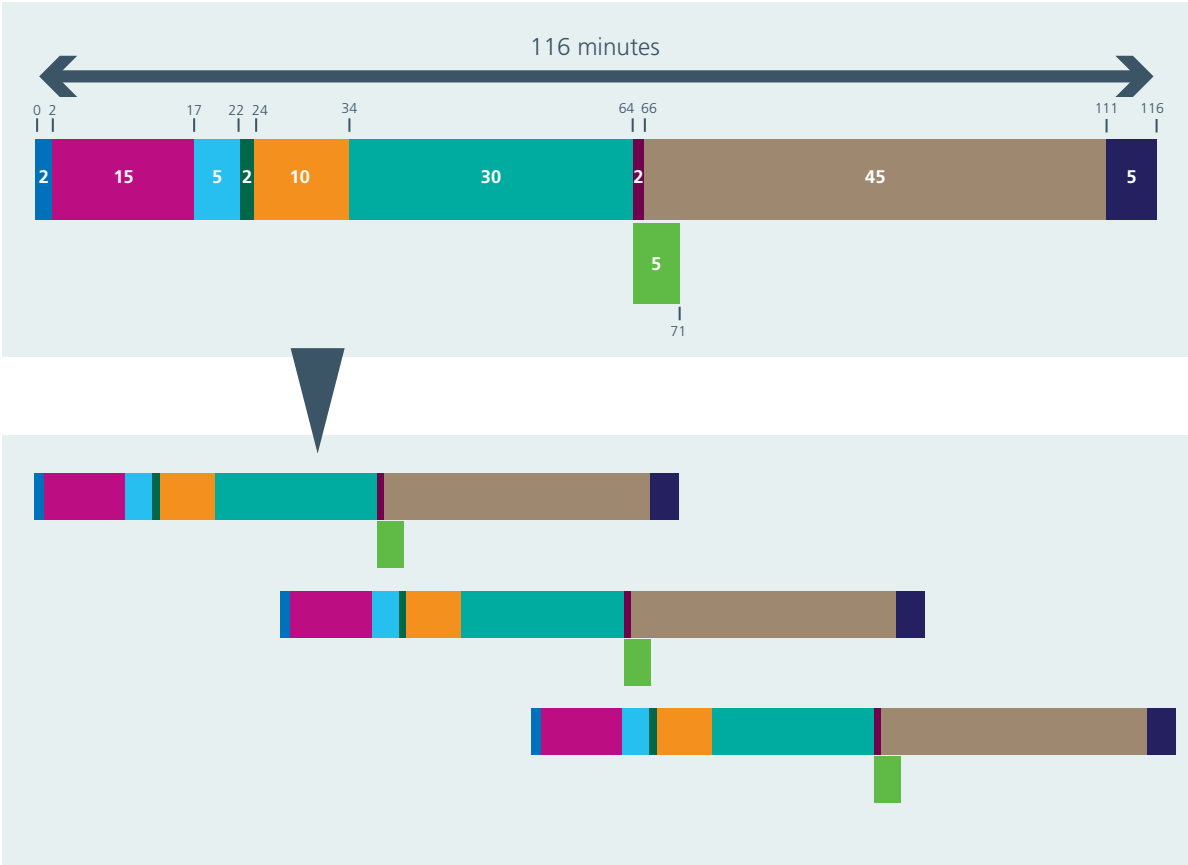
Figure 7: Cumulative time taken in minutes



The green box below the main sequence (type up report) shows a process that is running parallel to the patient pathway. It is helpful to identify any parallel processes in this way. Sometimes there may be a series of parallel steps taking place that can be a significant process template on its own.

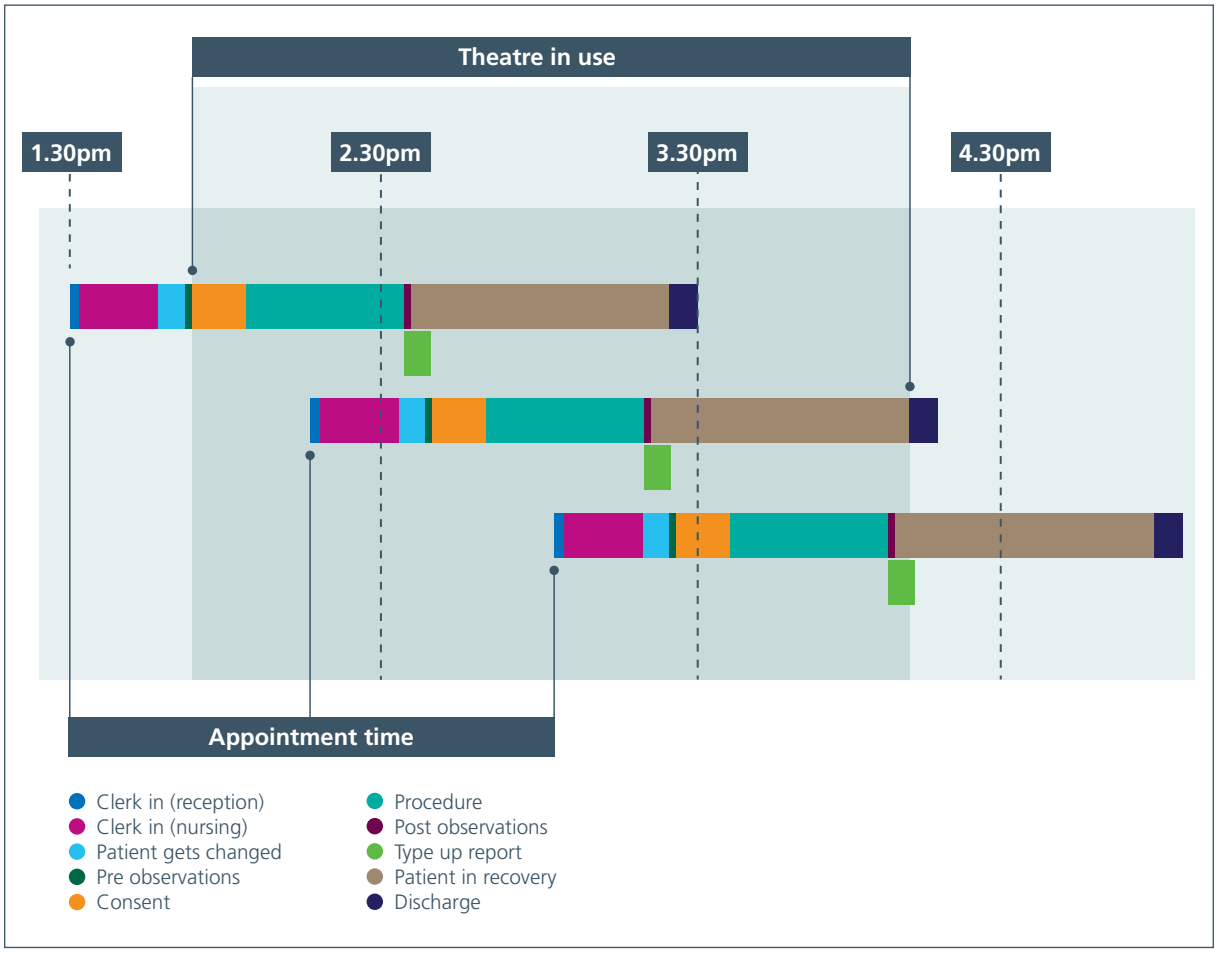
4. Now line up several of the same templates. You can change where each template starts in relation to the previous template. You should line up the templates in such a way that the constraint in the system is minimised. You can try outlining the templates up in different ways, eg to minimise patient waiting. This will help you understand the process better and to explore the relationship between different process steps.

Figure 8: Line up the templates



5. Position a real timescale (ie time in the day) along the top to work out the best time for patient appointments to start, as well as considering the impact on the constraint, eg the optimum theatre usage.

Figure 9: Real timescale



6. Use the process template to schedule resources and staff for the number of procedures. If you have different groups of patients in your clinic, you may wish to develop separate templates if their resource requirements vary – for example, follow-up patients compared to new patients. Alternatively, you may find general templates easier and sufficient to reduce the complexity of what you are trying to plan.

7. There are lots of different things you can try using the process template:

   (a) Demand at the constraint

   - Use the time required at the constraint and multiply this by the number of patients seen in a day – this is the activity at the constraint.
   - Identify patterns of demand over time (daily, weekly, monthly) and by groups of patients.

   (b) Scheduling

   Timings for the other process steps give very useful information about the current approach to scheduling in comparison to the capacity available.

Consider using the following rules to organise your schedule:

- Order groups of patients that are highlighted as a variable in the constraint towards the end of the day.
- Arrange long templates first and then arrange smaller and shorter procedures around these.

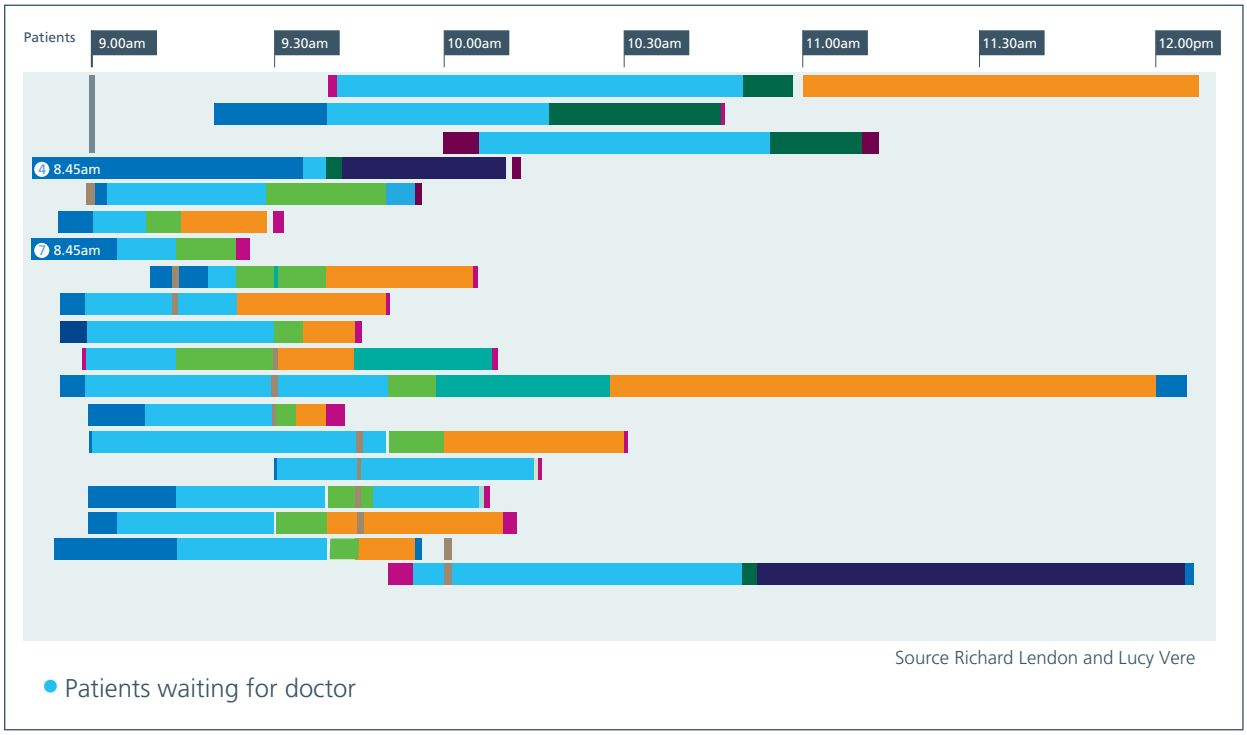
The process templates provide useful information to help identify key constraints in the process, related to available capacity. Availability of endoscopes, availability of recovery beds, equipment turnaround times and so on can all impact the time it takes to complete a procedure. Taking account of all constraints in your future scheduling should help to eliminate their impact. You can also use process templates to understand the impact of changes in the process or adding in additional resources. The process templates will help you understand how other process steps would need to change to make the most of the additional resource.

Examples

1. A real clinic schedule

How could you organise this better? Both patients and staff would benefit from improved scheduling.

Figure 10: Real clinic schedule



2. Cancelled operations

Operations were being cancelled due to a lack of beds, which was identified as the likely constraint.

A simple process template was developed just for bed use. As beds are ring-fenced for men and women, they have a separate template. The picture below shows how this looked for 15 patients who had planned admissions on the week beginning Sunday 15 February.

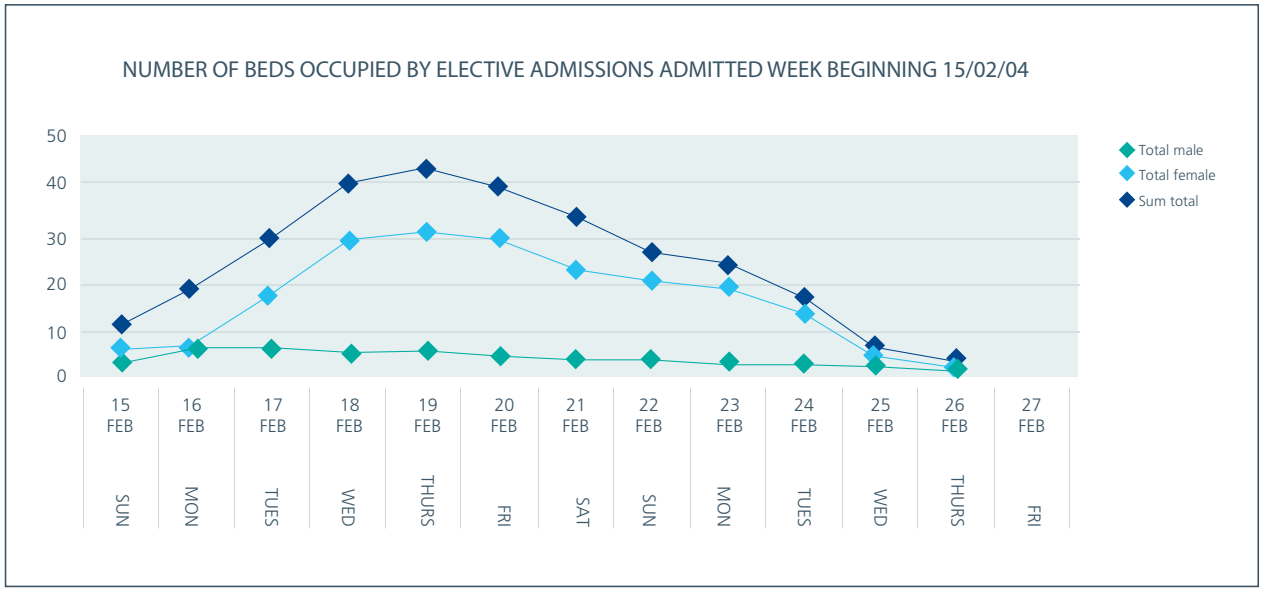
Figure 11: Bed use for 15 patients with planned admissions

OPERATION	SUN	MON	TUES	WED	THURS	FRI	SAT	SUN	MON
Hemicolectomy epidural N	M 1	M 1	M 1	M 1	M 1	M 1	M 1	M 1	M 1
Bilat hernia	M 1	M 1							
Lap and chole	M 1	M 1	M 1						
Lap and chole	F 1	F 1	F 1						
Hernia repair			M 1	M 1					
Lap and chole warfarin			F 1	F 1	F 1	F 1	F 1	F 1	
Lap and chole			F 1	F 1	F 1	F 1	F 1		
Bilateral breast red	F 1	F 1	F 1	F 1	F 1				
Right uncemented total hip	F 1	F 1	F 1	F 1	F 1	F 1	F 1	F 1	
Total hip	F 1	F 1	F 1	F 1	F 1	F 1	F 1	F 1	
Right total knee	F 1	F 1	F 1	F 1	F 1	F 1	F 1	F 1	
Trapeziectomy	F 1	F 1							
Arthroscopy shoulder		M 1	M 1						
Total knee		F 1	F 1	F 1	F 1	F 1	F 1	F 1	F 1
Dupuytren's			F 1	F 1					

Each coloured block represents one day in bed. Green boxes represent men and blue women, as their beds are on separate wards (ie beds are not a shared resource for patients). Patients are discharged in the morning.

Process templates were used to map out the beds used. In total, there were 64 patients admitted during this week. This spreadsheet was completed for all the patients. As each coloured box had a 1 in it, it was possible to add up the planned bed usage across the week. These were then plotted in the following graph.

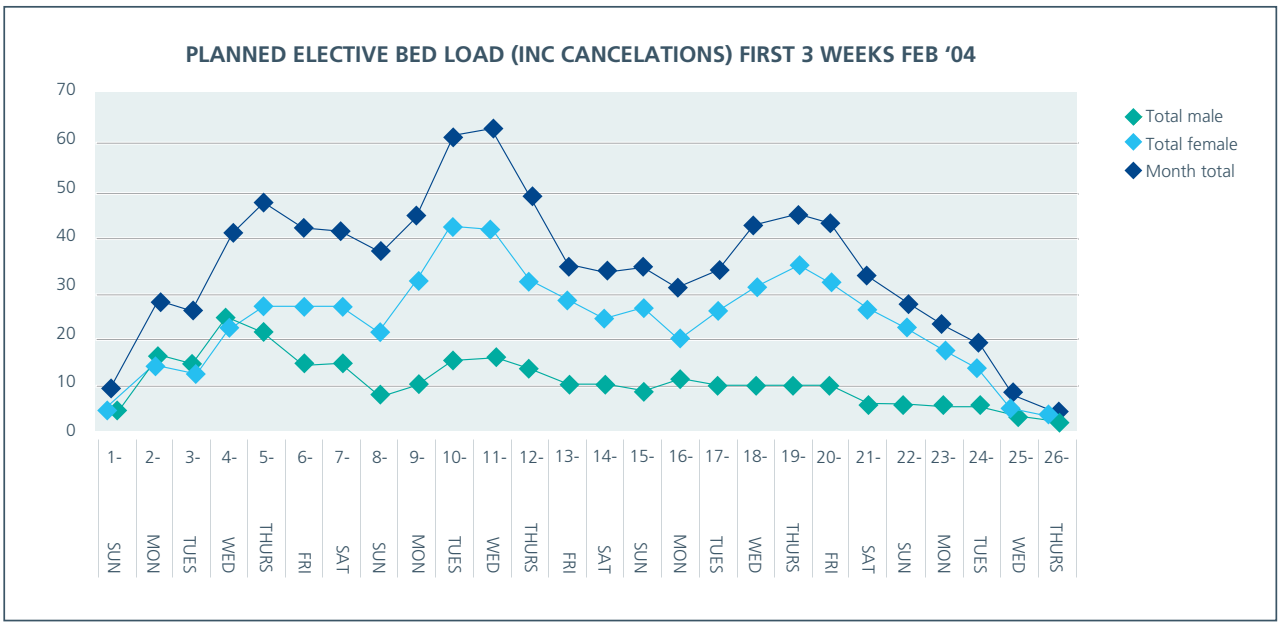
Figure 12: Planned bed usage over one week



The graph shows that there was a peak in demand for beds on a Thursday. In fact, the hospital needed four times the number of beds on a Thursday compared to a Sunday. More female beds were needed than male beds. It also took a while for bed demand to clear after admission.

It was decided to build up this picture by adding two more weeks' worth of admissions. The result is shown in the graph below.

Figure 13: Planned bed usage over three weeks



This demonstrates the variation in demand for elective care beds. As beds had been identified as a constraint, further analysis was performed and the following two strategies were recommended to alleviate the pressure:

- Plan for discharge (reduce the demand for beds per admission.) (See **reducing length of stay**)
- Plan along bed utilisation rather than theatre utilisation, as the beds were the constraint.

What next?

If your focus is managing clinic workload, you can anticipate the best time for patients to start their appointment and have a good idea of what will happen if something unexpected occurs.

Having involved administrative staff in the process mapping, you need to make sure there is a simple system in place for booking different types of patient into the next available slot. Consider how many slots you need for each group daily and weekly. Colour code the slots by group, making it easier for staff to book the right patient into the right appointment. This approach can be built into computer based systems - the key is to make sure that each type of slot is easily recognisable.

Make sure the booking system templates are not making your capacity management more difficult. The system needs to fit what the procedure needs, not the other way around.

Improve the impact

This approach works best if resources are being pooled for non-specialist activity or the most common procedures. Process templates for individual clinicians do improve their individual throughput, but aren't necessarily the most effective use of this tool.

Improving workflow of the clinic

If you are looking for continuous improvement, there are some other tools and techniques you may find useful. For example, having simple visual cues so that everyone knows the patient has left the room and the next room is ready. Tools like **spaghetti diagram**, **identifying frustrating problems** and **6S** may also help to smooth the daily workflow of a clinic.

Background

This approach has its origins in the manufacturing industry where it was first used as a sensible way of scheduling work to take account of the resources required from start to finish.

References

There are lots of free templates on the internet that can be useful (try a quick internet search to find some).