Chat time

What is your experience? Do you have a capacity and demand problem? What sort of problem?

Please type briefly into the chat box. The box is below where it says ‘All participants’ at the bottom right of your screen.
Some definitions...
Measuring demand

Demand on the service:

All the requests or referrals from all sources into a service

How to measure:

All patients needing a service x time taken to process

Example:

5 patients referred for an endoscopic procedure that takes 45 minutes to complete

5 x 45 = 225 minutes (3 hours 45 minutes)
Measuring capacity

Capacity is all of the resources required to do the work and includes equipment, rooms and the people with the necessary skills to use it.

How to measure:
Number of resources available × staff time available to run resources

Example:
Two treatment machines with 480 minutes of session time
2 × 480 = 960 minutes (16 hrs per day)
Measuring activity

It is the actual work done, the throughput of the system.

How to measure:
Number of patients seen $\times$

time taken to process a patient

Example:
100 patients processed $\times$ 20 minutes each
100 $\times$ 20 = 2000 minutes
Measuring backlog

Backlog:

Demand which has not been dealt with - manifests as a queue or waiting list. Forms whenever demand exceeds activity or when demand and capacity are mismatched.

How to measure backlog:
Number of patients in the queue \( \times \) time taken to process them.

Example:
100 patients waiting \( \times \) 20 minutes per treatment
100 \( \times \) 20 = 2000 minutes backlog.
Key message

Measure everything in the **same units** for the **same period**
How do they fit together?

**Demand:** All the requests for a service – from all sources

**Backlog =**
**Queue =**
**Waiting List**

**Bottleneck:** Constraint is the cause of the bottleneck

**Capacity:** All that we can do

**Activity:** What we actually did
Bottlenecks

A bottleneck is where the queues form - it will slow down the whole process

Two types of bottleneck:

- Process
- Functional
Process bottleneck

Process bottlenecks are the process stage that takes longest to complete. Sometimes referred to as ‘rate limiting’ step or task.

Which step or task is the bottleneck?
Functional bottleneck

Functional bottlenecks caused by services that have demand from a number of sources e.g. radiology, pathology, porters

Functional bottleneck interrupts flow of patients in all three processes
Constraints

Bottlenecks caused by a constraint
This restricts the capacity (flow) of the service
It may be a particular skill or piece of equipment

Constraint examples:
- Number of treatment rooms
- Specialist skills i.e. surgeon, radiologist
- Decontamination washer/machine
- Theatres
- CT scanner
- Phlebotomist

How to deal with them:
Maximise utilisation of constraint - as not easily increased?
Examples from the group?
6 Common reactions to dealing with queues
Waiting list initiatives

Waiting list numbers
52 weeks from Jan to Jan
Luton and Dunstable NHS Trust

Was the reduction sustained?
High Utilisation

Utilisation is a measure of how much capacity is used.

Services often aim for 100% however these services are set up to fail as the pressure to fully utilise resources will lower staff morale and trigger adverse changes in behaviour.

Force booking
Churn - based on urgency

“Churning the waiting list and skimming off the froth”

Patients who are not seen in date order and do not chase their appointment have longer and longer waits.
Ignore variation

Variation mismatch = queue

Cannot pass unused capacity forward
# Carve out

| Specialists ➔ | Surgeon | | | | | Physician | | | | | | R |
|---------------|---------|---|---|---|---|---|---|---|---|---|
| **Appointment type** | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 | 5 |
| Flexi Sig     | | | | | | | | | | |
| Urgent        | | | | | | | | | | |
| Soon          | | | | | | | | | | |
| Routine       | | | | | | | | | | |
| Colonoscopy   | | | | | | | | | | |
| Urgent        | | | | | | | | | | |
| Soon          | | | | | | | | | | |
| Routine       | | | | | | | | | | |
| OGD           | | | | | | | | | | |
| Urgent        | | | | | | | | | | |
| Soon          | | | | | | | | | | |
| Routine       | | | | | | | | | | |
| ERCP          | --      | | | | | | | | | | |
Backlogs form because....

1. There are mismatches in capacity and demand
   -caused by variation and exacerbated by initiatives

2. We see people out of turn
   -churn and force booking

3. We batch patients
   -to keep us busy and give high utilisation

4. We ring fence capacity
   -to protect time for urgent patients
Chat time

What is your experience? Which of these common reactions have you seen or been responsible for?

Please type briefly into the chat box. The box is below where it says ‘All participants’ at the bottom right of your screen.
What can we do differently?
7 ways to no delays
Seven Ways to No Delays

1. Balance capacity and demand
2. Focus on the whole patient journey
3. Plan ahead along all stages of a patient’s pathway
4. Pool similar work together and share staff resources
5. Keep things moving - see and treat patients in order (consider clinical priority)
6. Reduce things that do not add value to patients
7. Keep the flow - reduce unnecessary waits
1. Balance capacity and demand

There are two key strategies:

- Look for ways of gaining capacity or flexing capacity
  - Role redesign, reduce lost time
- Look for ways of reducing the variation in demand
  - Divert the peaks, reduce the peaks

Setting capacity (theoretical) at 80% of the variation in demand will allow for flexibility in the demand

6 common reactions:
Mismatched capacity and demand
Role redesign

City Hospitals Sunderland NHS Trust
Barium Enema Waiting List January - June (18 months)

An advanced practitioner role in radiology was introduced and reduced waiting times
2. Focus on the whole patient journey

The efficiency of the whole patient journey is more important than the individual teams’ efficiencies.

Taking steps to reduce waiting times in one part of the hospital service often highlights something else that prevents further improvement.
Managing constraints
Area with least capacity is the bottleneck. This constrains the entire end-to-end process – think “thumb on hosepipe!”
Managing constraints

Tackle the bottleneck – Widen the highway
Managing constraints

What next? - continue in A&E?

But constrained by the next bottleneck... remember – the new bottleneck could be an earlier process...
Managing constraints

Step 5 - Tackle the “new” bottleneck
Example

After extensive and detailed further improvement work in ultrasound, the service improvement lead stated: “without improving transport we can go no further to improve ultrasound services.”

As a result the hospital decided to review porter services.

Theory of constraints

Introduced by Eli Goldratt in “The Goal” 1984
3. Plan ahead: along all stages in a patient’s journey

“If everyone knows what’s going on, it’s easier to stay on track.”

**Example:** The enhanced recovery programme

- Plan developed in pre-operative assessment tells patients what to expect
- Patients whose recovery doesn’t go to plan stand out and have more focus

**Result:** reduced readmissions and length of stay down from *12.6 days to 6.0 days.*
4. Pool similar work together and share staff resources

Pool the work of consultants, clinicians, technicians and administrative staff where there is common and equivalent work.

Referrals to 5 named consultants

Ovarian cancer pathway (days – referral to treatment):

6 common reactions:

Carve out
5. See and treat patients in order

Patients treated by a single consultant –
Transurethral Resection of Prostate (TURP).

6 common reactions:
Force book & churn
6. Reduce things that do not add value to patients

A lot of our work adds value to patients: right referral, right diagnostic tests, right diagnosis, right information and communication, right advice, right treatment, right aftercare and right handover.
7. Keep the flow – reduce unnecessary waits

Every decision every:
Month to Week to 2 Days to Day to Hour

Average number of patients waiting with weekly decision making
Average number of patients waiting with daily decision making

Effect of reducing batch size.

The availability/timeliness of decision making has directly impacts the number of patients in hospital
Creating a capacity model
The 5 step guide to estimating required capacity

1. Estimate demand

2. Convert to time

3a. Describe the trends
   Calculate the average and a measure of variation

3b. Chart the trend
   Show the variation in demand over time

4. Derive session capacity
   Use the measure of variation to estimate capacity required

5. Convert to facility
   Using number of sessions per week
Calculate the typical weekly variation

2 Upper and lower limits to demand
   Red lines

1 Average demand
   Dotted orange line

Mr X Net clinic hours
Weekly totals from Trust Net clinic hours
LTHT

Average (3.0)
Lower limit (0.0) Upper limit (7.1)
Set capacity - options

2 Sprint capacity

Lower utilisation and stable waits

3 Immediate response

Low utilisation and no waits

1 Average demand

High utilisation and volatile waits

Mr X Net clinic hours
Weekly totals from Trust Net clinic hours
LTHT

0 5 Apr 04 05 May 05 Jun 05 Jul 05 Aug 05 Sep 05 Oct 05 Nov 05 Dec 05 Jan 05 05 Feb 05 05 Mar 05

Mr X Net clinic hours
Average (3.0)
Upper limit (7.1)
Capacity req'd (4)

Average demand
High utilisation and volatile waits

Immediate response
Low utilisation and no waits

Sprint capacity
Lower utilisation and stable waits
Any questions?