Yorkshire and the Humber Mental Health Network

IAPT Demand and Capacity Workshop
12th May 2016

- Andy Wright, IAPT Clinical Advisor, Rebecca Campbell, Quality Improvement Manager and Sarah Boul, Quality Improvement Lead
- andywright1@nhs.net, rebecca.campbell6@nhs.net and sarah.boul@nhs.net
- Twitter: @YHSCN_MHDN
- May 2016
Yorkshire and the Humber and Intensive Support Team IAPT Demand and Capacity Workshop

Welcome!
IAPT Demand and Capacity Workshop

Welcome

Andy Wright, IAPT Clinical Advisor, Yorkshire and the Humber Clinical Network
Housekeeping:
Demand and Capacity – What is it? And why do I need to know about it?

Caroline Coxon, IST
Capacity and Demand – Why do I need to know about it?

What is it?

Caroline Coxon
Mental Health Intensive Support Team

12th May 2016
1. Why do I need to know about Demand and Capacity?
2. What is it?
3. The Impact on variation – A practical demonstration
4. The Model – An Introduction
The History – the 5 W’s

Where has Demand and Capacity come from?
Why is this important in Mental Health now?
Who is this for?
What is it?
When should I start this?

And….
How – your next steps?
Words and Definitions

What is:
- Demand
- Capacity
- Activity
- A queue
- Bottle Neck and Constraints
- A backlog
- Variation
**Demand** is all the requests and referrals coming in from all sources.

**Capacity** is the resources available to do the work. This includes all equipment (rooms) and the staff hours available to treat or patients.

**Activity** is all the work done. It is the actual clinical work carried out by clinical staff.
Queues occur where demand has not been dealt with and results in a backlog.

The main reasons why queues occur is because:

- Demand exceeds the available capacity.
- There is a mismatch between variation in demand and capacity at specific times, because the right people or equipment are not always available to deal with the demand in a timely manner.
- Patients are not always discharged to accommodate new patients.
- Every time the demand exceeds the capacity, the queue is carried forward to the following day. However every time the capacity exceeds the demand, the extra capacity is lost in the fixed session, or it is filled from the queue.
**Bottlenecks and constraints**: A bottleneck is any part of the system where the patient flow is obstructed causing waits and delays. It interrupts the natural flow and hinders movement along the care pathway. However there is usually something that is the actual cause of the bottleneck and is the constraint. This is usually a skill (not enough trained therapists in a particular modality) or piece of equipment (rooms or the availability of the therapists on a particular day).
**Backlog** is the previous demand that has not yet been dealt with, showing itself as a queue or waiting list at all stages of the pathway.

**Variation:** there are three types
1. Natural
2. Artificial
3. Normal
**Natural variation**: Is not within our control but can often be predicted
- Differences in presentation that patients present with
- The socio-economic or demographic differences between patients
- Seasonal variation
- Staff skills

**Artificial variation**: A large part of artificial variation is within our control
- The way we schedule services
- The working hours of staff and how staff leave is planned
- The order in which we see and treat patients
- How much work we group and deal with in ‘batches’
- How we manage waiting lists

**Normal Variation**: There are ups and downs in new referrals (demand) and in our available capacity but in most cases they are predictable.
Demand and capacity theory

What we should do

What we plan to do

What we actually did

What we could do

What stops us from doing
Capacity cannot be carried forward

You can’t pass unused capacity forward to next week
Variation

An example of variation in demand coming into a service (52 weeks of past data)

Most variation is predictable and can be used for planning purposes
Introduction of a Demand and Capacity Model?

The model helps you to:

• Understand your **demand** and also the **variation** in demand
• Understand your current service
• Understand the **core capacity** you genuinely have available to see patients and the **ad hoc / flexible capacity** you rely on to deliver the service

The model will provide:

• An estimate of the capacity you need to meet your demand
• An estimate of the **backlog** that may need to be cleared to sustainably deliver national and locally agreed waiting times standards
Limitations to the Model

• Any model is by definition a theoretical guide and should be used with other tools to help you to better understand, plan and manage your service.
• No model can give an absolute assurance of waiting times.
• The use of this model does not give any assurance of waiting times performance and should not be taken as a guarantee.
• The outputs of any model are only as good as the information entered.
• Whole numbers are used where appropriate and may result in minor inaccuracies due to ‘rounding’.
• Does not automatically assume growth (you will need to adjust the parameters in the model manually).
Important Information

• To use this tool you will need to have a good understanding of basic demand and capacity theory and terminology.

• The benefits of using this tool are maximised when the whole team are involved in the discussions and are engaged from the beginning of the process: Operational and Clinical Lead; Information / Data analyst; administrative/booking staff
In Summary

Remember: plans based on matching the average daily demand to the average daily capacity are fundamentally flawed: they guarantee the very queue they are trying to eliminate.

Thus there are only two ways to make improvements at a bottleneck either by:

- Making changes to reduce the demand OR
- Making changes to increase the capacity.
Any Questions?

Caroline Coxon
IAPT Intensive Support Team
carolinecoxon@nhs.net
07917 597153
IAPT Demand and Capacity Workshop

The Impact on variation in a pathway – a practical demonstration

Michael Watson / Caroline Coxon
IST
The impact of variation in a pathway: a practical demonstration

Michael Watson
Intensive Support Manager

12th May 2016
How does it work?

• Organize yourselves into two teams of six.

• Sit in a line – the first in the line is the demand source and the last is the discharge process
How does it work?

You each have:

- a workstation
  - i.e. a sheet of paper with two boxes “Patients waiting” & “Patients Treated”
- a die
- 4 soldiers (in the “Patients Waiting” box)
  - except the referrer who has limitless supply (60)
Starting Positions

Referral: 60
Triage: 4
Opt-in: 4
Assessment: 4
First Treatment: 4
Discharge: 4

20 Patients “waiting” in the system
Instructions for each round (1)

When instructed to THROW, roll your die and note the number. Move that number of patients from ‘Patients waiting’ (your IN BOX) into ‘Patients “treated”’ (your OUT BOX). If you don’t have enough patients, move all that you have (i.e. if you throw a 5 and only have 2 patients, only move 2).

“Throw”

Patients waiting (IN)

Patients treated (OUT)

3
Instructions for each round (2)

When instructed move the patients from your ’Patients treated’ area into the next person’s ‘Patients waiting’ area. You will also receive more patients into your ‘Patients waiting’ area.
How many patients will the system treat?

As a service commissioner, how many patients can I expect you to treat based on 10 throws of the dice?
What will you deliver?

<table>
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<th>Mean Average</th>
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</table>
What do you think you will deliver?

- 10 throws = 10 days’ work
- In the example, the mean average score was 3.5
- Expect 35 patients to be treated (10 x 3.5 = 35)
- There are 20 patients in the system (if 6 people are playing one is the referrer, therefore 4 in each ‘in tray’)

NHS Improvement
Round 1

Days 1-10
Report your scores

• How many patients did you discharge?
• How many patients are now in the system?
• What happened?
• How did this make you feel….?
Observations

- Output (activity/capacity delivered) is not the same as capacity you put in.
- Each step does not work in isolation.
- A level of annoyance in receiving patients; feeling dumped on; out of control.
- Wanted to cheat.
- Variability of demand combined with variability of capacity.
- Is this a commissioner or provider issue?
Round 2

Extra resources at a fixed point
What impact will giving extra resources to one point in the system have?

- Take 1 extra die and allocate it where you think extra resources will have the greatest benefit.
- That “station” can throw both dice together
- Hint – don’t give it to the GP!
Starting Positions

20 Patients “waiting” in the system
Round 2

Days 1-10
Report your scores

• How many patients did you discharge?
• How many patients are now in the system?
• What happened?
• How did this make you feel….?
Observations

- Output (activity/capacity delivered) is not the same as capacity you put in.
- Each step does not work in isolation.
- A level of annoyance in receiving patients; feeling dumped on; out of control.
- Wanted to cheat.
- Variability of demand combined with variability of capacity.
- Is this a commissioner or provider issue?
Extra resources deployed by a manager

OR

Remove one step from the pathway
Decisions

Cohort One

• Take one person out of your team
• The remaining stations only have one die each

Cohort Two

• The observer on your team is a manager
• The manager can allocate the extra die where they feel it has the greatest benefit and they can move it between throws
Starting Positions – Cohort One

20 Patients “waiting” in the system
Starting Positions – Cohort Two

- Referral: 60 patients
- Triage: 4 patients
- Opt-in: 4 patients
- Assessment: 4 patients
- First Treatment: 4 patients
- Discharge: 4 patients

20 Patients “waiting” in the system
Round 3

Days 1-10
Report your scores

- How many patients did you discharge?
- How many patients are now in the system?
- What happened?
- How did this make you feel….?  
- Which cohort fared better?
Observations

• Output (activity/capacity delivered) is not the same as capacity you put in.
• Each step does not work in isolation
• A level of annoyance in receiving patients; feeling dumped on; out of control
• Wanted to cheat………
• Variability of demand combined with variability of capacity
• Is this a commissioner or provider issue?
Learning

• Sporadic increases in capacity does not work
• Additional investment may mean people work harder but does not change the output
• More steps, lead to greater levels of variation (LEAN works!) (more queues also leads to greater levels of variation).
• Need to set capacity above the average level of referrals at each step in the pathway (and for every queue)
• To deliver a waiting standard this needs to be carefully managed, all the time
• So how much capacity do you need to put in place??
Contact

Michael Watson
Intensive Support Manager
Intensive Support Team (Mental Health)

M 07879 113 249
E M.Watson@nhs.net | W improvement.nhs.uk

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Time for a break?

15 minutes only please!
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Modelling Demand, Capacity and Backlog - Introduction to the Model

Michael Watson, IST
Capacity and Demand Modelling

Michael Watson
Mental Health Intensive Support Team

12th May 2016
Why all models are wrong

- They cannot predict the precise variations of reality
- Models are simply a series of mathematical relationships

However
- Some are helpful in that they increase the level of understanding
- They can support more informed, less anecdotal discussions
- But they are not designed to replace them!
Purpose of Modelling

• A model helps you to:
  • Understand your demand and the variation in demand
  • Understand the core capacity you have to see patients
  • Understand the current service (median waits, DNAs and re-bookings) i.e. factors that impact on delivery

• A model will indicate:
  • An estimate of the capacity you need to have in place to meet your demand
  • The size of the waiting list that will deliver a particular waiting standard.
  • The backlog that may need to be cleared to achieve a sustainable position
Limitations

- **All models are theoretical guides!**
- Any model is by definition a theoretical guide and should be used with other tools to help you to better understand, plan and manage your service.
- No model can give an absolute assurance of waiting times!
- The use of this model does not give any assurance of waiting times performance and should not be taken as a guarantee.

- **Rubbish in – rubbish out!**
- The outputs of any model are only as good as the information entered.

- **Also!**
- Errors made when using very small numbers are exacerbated
- Whole numbers are used where appropriate and may result in minor inaccuracies due to ‘rounding’
- Does not automatically assume growth (you will need to adjust the parameters in the model manually)
Maximum Sustainable List Size

• The size of the waiting list that will deliver a particular waiting standard will depend on:

  • The size of the service (the mean demand)
  • The maximum wait

• DNAs that are rebooked
• Length of booking ‘window’
• (Attrition rates)
Why is list size important?
Why is list size important?
Why is list size important?
Why is list size important?
Sustainable waiting list size calculation

decay of demand received in one week

A Sustainable Waiting List requires this shape of decay for demand received in one week.
How to calculate a sustainable waiting list (1)

Patients

100 -

left to see

The 100 patients who came in this week are still waiting
How to calculate a sustainable waiting list (2)

There are still 90 people waiting who arrived last week.

Patients

100 -

100

left to see

90

to see

Weeks Waited
How to calculate a sustainable waiting list (3)

Patients

100 -

<table>
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<th>Weeks Waited</th>
<th>Patients left to see</th>
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<td>2</td>
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<td></td>
</tr>
<tr>
<td>9</td>
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</tr>
</tbody>
</table>

Plus patients waiting who arrived in previous weeks add up to the total size of waiting list that will deliver the standard (6W) sustainably.

Total 380
Decay of demand that arrives in one week

A Sustainable Waiting List requires this shape of decay for demand received in one week

Follow the 100 patients over the next six weeks
A sustainable waiting list will always have variation

In reality numbers waiting will go up and down due to normal variation.
An Unsustainable ‘Cliff’ Waiting List

Any peak in demand or reduction in capacity is likely to lead to appointments booked beyond the standard.
Demand

• What needs to be done, could be
  – Referrals
  – Opt-ins
  – First/Subsequent treatment waiting list additions
  – Step-ups
• How many patients referred/added per week?
• How/can you break down by
  – Modality?
  – Locality?
• What is the attrition rate, i.e. patients who only have a first assessment/treatment
• What is the total appointments required i.e. how many subsequent appointments (follow ups).
• What is the conversion from first course of treatment to second/subsequent courses of treatments (additions to that waiting list)
# Entering Demand

Enter here how many patients were added to each waiting list stage each week over the past (or most recent available) 52 weeks.

If you are able/need to split referrals into those received and added directly to the waiting list and those patients who were asked to opt in then use the two respective columns provided; if not then please enter all referrals in the Direct Referrals' column.

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<tr>
<th>Week</th>
<th>Demand</th>
<th>Additions to First Treatment Waiting List</th>
<th>Additions to Subsequent Treatment Waiting List</th>
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<td>2,057 393 991 77</td>
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<td>65&lt;sup&gt;th&lt;/sup&gt;</td>
<td>72.3</td>
<td>43.0 8.2 22.0 2.0</td>
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<td>85&lt;sup&gt;th&lt;/sup&gt;</td>
<td>87.4</td>
<td>48.0 11.0 24.0 3.0</td>
</tr>
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<td>Direct Referrals</td>
<td>Opt ins</td>
<td>Step 2  CBT  Counseling  PTSD  Modality 4</td>
<td>Step 2  CBT  Counseling  PTSD  Modality 4</td>
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<td>82</td>
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<td>20</td>
<td>59</td>
<td>36  7  14  2</td>
<td>20  2  14  3</td>
</tr>
</tbody>
</table>
What does it look like?

We are using past demand as a predictor of what will happen in the future. But sense check and adjust as necessary.
What does it look like?

There was a change in weekly referrals from this point. The latter period that is more likely to represent the demand going forward and will be taken forward in modelling.

Same data but the weekly average is adjusted to more accurately reflect each period. The latter period that is more likely to represent the demand going forward and will be taken forward in modelling.
Capacity

Capacity is the slots for which you have staff, equipment and accommodation available (the slots you put on)

How many therapists?
• Which modalities?
• How can this be split?
• How is time allocated to assessment / first/ subsequent appointments?
• How much annual leave?
• What about training and maternity leave
• How many groups do you run, for how many patients?
• How many hours do you expect to be delivered per week?
• What about DNAs?
• News and follow ups

Activity is what those slots deliver
### Calculating Capacity

#### A. N. Other Provider

Total Net Weekly 1:1 Capacity: **461.6 Hours**

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<tr>
<th>Therapist</th>
<th>Current</th>
<th>Plan</th>
<th>Triage</th>
<th>Step 2</th>
<th>CBT</th>
<th>Counselling</th>
<th>PTSD</th>
<th>Modality A</th>
<th>A/L Hours</th>
<th>Study Leave Hours</th>
<th>Other Leave Hours</th>
<th>Bank Holiday Hours</th>
<th>Total Actual Hours</th>
<th>Weekly Mean Hours</th>
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#### Service Sickness Absence Rate: 8.1%
## Entering Groups

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<th>Group</th>
<th>Mean Size</th>
<th>Groups / Year</th>
<th>Staff Minutes / Session</th>
<th>Sessions / Group</th>
<th>Modality</th>
<th>Expected Annual Patients</th>
<th>Staff Minutes / Year</th>
<th>% Discharged</th>
<th>% First Treat</th>
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### Notes
- **Mean Size**: Average number of patients per group.
- **Groups / Year**: Average number of groups per year.
- **Staff Minutes / Session**: Average staff minutes per session.
- **Sessions / Group**: Average number of sessions per group.
- **Modality**: Type of treatment modality.
- **Expected Annual Patients**: Expected number of patients per year.
- **Staff Minutes / Year**: Total staff minutes per year.
- **% Discharged**: Percentage of patients discharged.
- **% First Treat**: Percentage of first treatment sessions.
As a rule, for most outpatient services the capacity (slots) required to deliver the run rate of at least the average (Mean) demand of 42 new per week is around the 65\textsuperscript{th} percentile of the variation in demand. In this case 47.

However for some services the capacity required to deliver at least the average demand per week needs to be closer to the 85\textsuperscript{th} percentile of the variation in demand. In this case 66. For example where:

- waiting standards are short, (e.g. 2WW);
- there is large variation in demand or capacity
- in a small service or queue,
- where there are inefficient processes and high wasted slots (e.g. DNAs).
In this case the mean demand is the same as before (43). However, the variation is much less. As a result the 65th and 85th percentile are lower (around 48 and 50) so the required activity can be delivered week on week with less capacity.
Key Points

• What demand and capacity modelling has been done? Is it at the appropriate level?
• Do you know
  – Ideal waiting list sizes?
  – Ideal capacity to match current demand?
  – The size of any backlogs?
• Where is the imbalance? Which areas or modalities?
• Where in the pathways? First treatment, step two, step three?
• What has led to the imbalance? Decreasing capacity or increasing demand?
• Drill down into reasons why. Can commissioners help?
Don’t Underestimate

• The culture change required to deliver and maintain waiting standards
  – From all staff
  – Relationship between Information team and the service

• The reporting Challenges
  – IT systems are a provider responsibility

• Data, data, data
  – ‘Getting it right first time’
  – Senior sign off – Delegated responsibility
  – Local sign off

• Delivery
  – End to end written pathways with agreed waiting standards
  – All standards written in local Access Policies
  – Weekly PTL meetings and director overview
  – Intelligent performance reports
Any questions?
Contact

Michael Watson
Intensive Support Manager
Intensive Support Team (Mental Health)

M 07879 113 249
E M.Watson@nhs.net | W improvement.nhs.uk

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IAPT Demand and Capacity Workshop

Summary and Closing Remarks

Andy Wright, IAPT Clinical Advisor, Yorkshire and the Humber Clinical Network

www.england.nhs.uk
IAPT Demand and Capacity Workshop

Thank you for Attending!

Please don’t forget to fill out your evaluation forms!