Two Week Wait Demand and Capacity

Model User Guide
1. Introduction

The Intensive Support Team (IST) has developed a series of demand and capacity models designed to help organisations achieve an appropriate and sustainable balance between demand and capacity, and to ensure waiting lists are of an appropriate size. These models can act as a helpful starting point for organisations to better understand demand and plan capacity accordingly. They also form a useful starting point for conversations around service delivery which reduces dependence on anecdotal evidence. The models are freely available via the NHS IMAS website using the following link: www.nhsimas.nhs.uk/ist

The IST recommends operational managers work with information colleagues to pull together the various data items required to complete the models. It is important to agree a standard dataset for each model, including, where possible, a standard data source so the models are consistent across the Trust.

This user guide is aimed primarily at users new to the Two Week Wait Demand and Capacity Model and should be read alongside the information and instructions contained in the model. The guide follows the same structure as the model with a section for each of the tabs included in the model.

The model can be used at tumour site (e.g. urology, lower GI), sub tumour site (e.g. prostate, anal, etc.), geographical site or consultant level. The level at which it is appropriate to model will need to be determined by what is most suitable and useful for the service.

The model is Excel based and requires as a minimum Excel 2010 to operate correctly.

2. Welcome tab

This tab includes an overall introduction to the model and an overview of the data required to populate the model.

3. Data tab

- Select the Trust name from the drop down box
- Select the name of the tumour site from the drop down box. If the name of the service you wish to model is not included in the drop down list select ‘Other’ and enter the name manually in the box below.
- Using the slider enter the number of patients currently waiting for Two Week Wait appointment. Include all patients waiting to be seen i.e. those both with and without an appointment date.

3.1 Referral data

- Enter 52 weeks’ worth of referral data in date order i.e. week one longest ago and week 52 most recent. The 52 week period selected should be the most recent 52 week period where a full set of data is available. It is important to note the date range for this 52 week period, as other parameters within the model should be calculated based on this 52 week period where possible.
- Total referrals per week can be entered split by Choose and Book (C&B) and other, if that information is available but is not essential to the working of the model.
- Sense check referral data as you enter it – does it look right and reflect operational reality? Are there any unexpected peaks or troughs or patterns in the data? If so these need to be checked to ensure the data is accurate. Referral data is presented pictorially on the graph and SPC tabs where it may be easier to identify any anomalies or unexpected patterns in the data (see SPC section below).
• If Two Week Wait referrals are seen by a nurse (or other health care professional) on behalf of the consultant then the relevant referrals should be included in the data and the corresponding nurse led capacity must be included in the capacity tab.
• The model assumes the same demand profile in the future as that in the referral data entered, i.e. it does not include growth in demand. If growth is anticipated this will need to be calculated outside of the model, and the number of mean referrals per week adjusted in the parameter tab.

3.2 Attendance data
• This section allows entry of attendance data for 500 records or approximately three months of data depending upon the size of the service.
• Essential data to enter is ‘referral date’ and ‘date first seen’ – if the other information is available it can be entered but is not vital. Data entered here is used to show a snapshot of the distribution of waiting times in a histogram on the summary tab.
• Data entered here does not need to be the same time period as that entered elsewhere in the model but should be the most recent available.
• This data does not need to be entered in chronological order.

4. Capacity tab
This section of the model is concerned with what capacity is expected to be available to see Two Week Wait patients for the year going forward not what capacity has been available in the past. However, if there is a difference between these capacity levels, it could potentially explain significant capacity gaps that may be identified later in the model.

Core capacity can be defined as that which is included in consultant and Trust Grade job plans and is therefore regularly available (i.e. funded capacity). Ad hoc capacity might typically be waiting list initiative sessions that are planned or capacity provided by locums. Capacity may also include nurse or allied health professional capacity to see Two Week Wait referrals for their first two week wait attendance, where this is appropriate.

Models should be reviewed if staff changes result in additional or loss of capacity (for example the loss of a senior middle grade who reviewed Two Week Wait patients independently who is replaced with a junior middle grade who does not review Two Week Wait patients).

4.1 Mean core slots per week
• Enter core capacity i.e. what is in the job plans on left side of the spread sheet and ad hoc capacity on the right.
• Critical data to enter is the number of new patients per clinic and the number of weeks per year. 42 – 45 weeks is fairly standard for elective capacity, but potentially this could be more for Two Week Wait capacity as there should be mechanisms in place to provide cover for these clinics during periods of leave. In addition, the capacity might need to be reduced if there are on call commitments which impact upon elective activity or very specialist clinics which run for example monthly. It is unlikely that the number of weeks per year will be the same for all elements of capacity. Remember where clinics fall on a Monday a number will be lost due to bank holidays – this should be reflected in the number of weeks per year the clinic operates.
Capacity data is best entered in the two tables as it is easy to review and sense check against operational reality. If however this level of detail is not available for ad hoc capacity it can be entered manually using the slider at the top right of the page.

Where there is regular overbooking of clinic capacity and this is expected to continue in the year going forward, this can be accounted for in the ad hoc capacity table.

Where the slider is across to the far right of the slider box the number is calculated from data entered elsewhere in the model. If the slider is not at the far right of the slider box the data has been entered manually using the slider.

The ‘capacity calculator’ box should be selected in order for the model to calculate capacity from the information entered in the capacity tables.

The two tables at the bottom of the spread sheet page do not need to be completed as these are a look back at capacity delivered in the previous 52 week period and are not used by the model to determine capacity requirements. However, if populated the tables can be used to cross check previous activity against capacity, in which case the ‘toggle’ at the top of the sheet should be moved to select ‘historical data’ rather than ‘capacity calculator’.

5. Parameters tab

- A number of the data fields in this section (mean Two Week Wait referrals per week and per day, appointments where choice not given, Choose and Book referrals and rearranged appointments) are populated from data entered elsewhere in the model. Rearranged appointments is based on population of the ‘offer date’ field in the attendance data table in the data tab and is therefore based on patient choice, not hospital rebooking.

- Some new data entry is required. The DNA rate for the tumour site being modelled should be entered using the slider – this is important as it impacts on the capacity calculations. If modelling a sub tumour site level or specific element of a larger service the DNA rate for that element of service or sub tumour site should be entered and not the DNA rate for the entire tumour site.

The DNA rate should be sense checked against operational reality and any anomalies identified and checked.

- The percentage of DNAs discharged should be entered for the service being modelled. National Cancer Waiting Times guidance states that Two Week Wait patients are required to be offered a further appointment if they DNA their first outpatient attendance. It is therefore expected that the percentage of DNAs discharged to primary care will be very low (if not 0%) for Two Week Wait appointments.

- Data has to be entered manually into the ‘day appointments commence’ and ‘target waiting time’ boxes using the sliders. These should be entered in days and should be the number of days the service aspires to achieve, not what is currently being delivered. Setting a target waiting time of seven or ten days (rather than fourteen) will enable Trusts to rebook within the standard any patients who may cancel their appointment.

- The number of days entered in the ‘day appointments commence’ and ‘target waiting time’ boxes affect the calculation of sustainable waiting list size not the capacity calculation.

6. Summary tab

6.1 Current service

- The ‘indicator’ box summarises data entered elsewhere in the model.

- ‘Patient experience’ is drawn from the data entered in the attendance data table in the data tab and is shown graphically in the ‘waiting time frequency distribution graph’ on the right of the page.
• A reasonable distribution of waits indicates that the service may be more sustainable. Big blocks at the end of the target window could indicate that the service is under pressure.

6.2 Current capacity
• This summarises the core, ad hoc and total capacity available as entered elsewhere in the model and identifies the net weekly change to the waiting list.

6.3 Required capacity
• If capacity is set at the mean all patients will be seen across the year but waiting times will vary and some patients will experience a long wait as the Trust will only have enough capacity half the time on a weekly basis to meet demand. A sustainable service capacity for Two Week Wait is somewhere between the 75th and 85th percentiles\(^1\). Meaning the service has enough capacity to meet demand between 75% and 85% of the time.
• The model highlights in red type where current (core) capacity is less than that required at the mean, 75th and 85th percentiles.
• It is for services to determine where it is appropriate to set capacity within the approximate sustainable range.
• If there is a large degree of variation in demand for the service, greater flexibility will be required in order to effectively manage peaks in demand. The graph in this section shows the demand for the service for the 52 week period and shows visually the amount of variation in demand. A larger version of this graph is included on the SPC tab within the model.
• As a rule of thumb, the more variation in the level of demand and the shorter the waiting time the service is trying to deliver, the higher the percentile used for modelling needs to be.

6.4 Sustainable waiting list
• This graph shows how patients would be appointed over the course of the appointment period selected in the parameters tab and summarised in the table in this section.

6.5 Clearing a backlog
• The ‘estimated maximum waiting list size’ is calculated on the number of days within which the Trust wants the service to see people. Therefore adjusting capacity has no impact on the calculation of sustainable waiting list size.
• In the model the term ‘backlog’ refers to the number of patients waiting over the sustainable waiting list size not those waiting over two weeks. Therefore, the Trust may be challenged by addressing both patients waiting past the operational target, as well as patients in excess of the sustainable waiting list size.
• The model estimates the maximum (not target) waiting list size which will allow you to offer patients a range of dates and still achieve the median\(^2\) wait target.
• The ‘approximate required reduction’ is calculated from the difference between the estimated sustainable waiting list size and the size of the current waiting list.

\(^1\)Percentile - measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall, e.g. a score in the 86th percentile is higher than 85% of the other scores – this means that if capacity is set at the 85th percentile the service will have enough capacity in place to meet demand 85% of the time.
\(^2\)Median - lying at the midpoint of a frequency distribution of observed values or quantities, such that there is an equal probability of falling above or below it.
7. Graphs tab

7.1 Variation in demand

- The ‘range of distribution’ graph shows visually the amount of variation in demand (referrals) for the service. The less variation there is the more confident you can be to set capacity at the 75th percentile. If there is a lot of variation it may be better to plan capacity on the 85th percentile. This graph is only useful if there are at least 8 - 10 data points (referrals) per week otherwise the low number distorts the distribution.
- The same information is showed in a different graphical form in the second graph below.
- The graphs can be copied and pasted into other documents such as business cases.

8. Calculations tab

This section summarises key elements of data entered in the model and shows the methodology behind the calculations. It is included for information only and cannot be edited.

9. SPC (statistical process control) tab

- The graph shows referral demand plotted on an SPC chart. The chart includes Upper Control Limit (UCL) and Lower Control Limit (LCL) lines and the average (mean) of referrals. This graph again shows the level of variation in demand for the service but also identifies what is normal variation for the service and what is special cause variation (statistically significant unexpected data points).
- Generally speaking most data points within the UCL and LCL are part of the normal variation to be expected in demand for the service.
- Where there are unexpected data points or unusual patterns in the data these are identified on the graph by a red flag and an explanation is included under the graph.
- If there is a step change in the level of referral demand this can be seen on the SPC chart. If the step change in the level of referral demand is expected to remain at the new level the data in the SPC chart can be split to reflect the new level of demand. In this case the data should be split at the first data point of the new pattern using the ‘split chart at week’ drop down box under the chart.
- It would not be appropriate to split the data at less than a quarter of a year as there would be insufficient data points to calculate accurately. If a split is applied the model recalculates using the latest part of the data (after the split) and the changes can be seen in the summary tab.
- The ‘split’ function can be used to look at seasonality if this is a particular factor with the service.

10. Model outputs

Key outputs from the model include:

- Weekly waiting list net change - the variation that will be seen on a weekly basis in the waiting list size
- Capacity requirement – presented as a range at the 75th and 85th percentile
- Weekly capacity surplus / deficit - presented as a range.
- Backlog - based on the sustainable waiting list size for the service

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3 The upper and lower control limits are statistically calculated numbers that define the range of normal variation within the data. Typically they are set at 3 standard deviations from the mean value.
It is important to sense check model outputs against operational reality and with clinicians, including consultants. It may take a couple of iterations of the data before you are satisfied that it is accurate. This may be particularly challenging if data quality is poor.

11. **Reviewing the models**

The IST recommends that:

- A note is kept of data sources and any assumptions or exclusions applied through the modelling to inform future iterations of the model – a blank tab within the model can be used for this purpose.
- Trends in demand are monitored and capacity plans reviewed if required.
- The model is reviewed quarterly or sooner if things change.
- Data in the model is completely refreshed at least annually or sooner if things change.

12. **Using the models**

Further information on demand and capacity modelling is contained within the Elective Care Guide - 'Referral to Treatment Pathways: A Guide for Managing Efficient Elective Care' which is available from the following link:

http://www.nhsimas.nhs.uk/what-we-can-offer/intensive-support-team/rtt-pathways-guide/

If you have any questions regarding the IST demand and capacity models or would like support to use them within your organisation contact us by email to:

nhsimas.ist@nhs.net