



Bwrdd Iechyd Prifysgol  
Bae Abertawe  
Swansea Bay University  
Health Board



<b>Meeting Date</b>	<b>17 November 2021</b>	<b>Agenda Item</b>	
<b>Report Title</b>	<b>Demand and Capacity – Methodology</b>		
<b>Report Author</b>	Deputy Chief Operating Officer		
<b>Report Sponsor</b>	Chief Operating Officer		
<b>Presented by</b>	Deputy Chief Operating Officer		
<b>Freedom of Information</b>	Open		
<b>Purpose of the Report</b>	This paper documents the methodology adopted by the Health Board in developing its demand and capacity plan for its recovery from the impact of the pandemic and in its longer term development of sustainable services.		
<b>Key Issues</b>	This report will highlight areas where there are significant service delivery challenges.		
<b>Specific Action Required</b> <i>(please choose one only)</i>	<b>Information</b>	<b>Discussion</b>	<b>Assurance</b>
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Recommendations</b>	<p>Members are asked to:</p> <ul style="list-style-type: none"> <li><b>NOTE AND APPROVE</b></li> </ul> <p><b><u>Items for information will not be allocated time for consideration within the Board/Committee meeting.</u></b></p>		

## TITLE OF REPORT

### 1. INTRODUCTION

This paper documents the methodology adopted by the Health Board in developing its demand and capacity plan for the recovery from the impact of the pandemic and in its longer term development of sustainable services.

### 2. BACKGROUND

The Health Board currently does not have formal, signed off demand and capacity plans at specialty level, which is an organisational and service delivery risk. The CEO has been explicit in his expectation that plans will be developed at specialty and Service Group level and that these plans will be further monitored via a more formal, operational performance management structure, led by the Deputy Chief Operating Officer.

This paper sets out the methodology to be used to develop these plans and focuses on:

- Recovery during 2021/22
- Developing sustainable services 2022 onwards

#### Context and Current Position

The NHS in Wales does not have a reputation for robust demand and capacity planning within its core services. This is because it is not a quick and easy exercise to undertake and relies on robust, accurate information on both the referral patterns and the available capacity. In the post-COVID era this becomes an even more difficult exercise as any pattern of referral has been decimated by the pandemic and we have a yearlong “special cause variation” to contend with. The referral drought during the pandemic is now being replaced with a glut of referrals, not seen in “normal variation”. Therefore, to plan the recovery and sustainability of our services we need to develop iterative demand and capacity plans based on:

- current increased referral patterns matched by reduced capacity – **recovery**
- “normal” referral patterns matched by core commissioned capacity and backlog reduction plans – **sustainability**.

The mismatch between capacity and demand is one of the main reasons why waiting lists or backlogs develop and waiting lists and waiting times increase. The understanding of the outputs of robust demand and capacity modelling are a fundamental requirement for the planning and delivery of healthcare services in a modern health and social care system.

We will be working on developing a shared understanding between the “provider” and “commissioner” functions of the Health Board on demand, capacity, bottlenecks and constraints which will help to:

- Understand the reasons why waiting lists grow – **our queues**
- Model the required level of **capacity** to keep pace with demand

- Understand the **gap** between the required capacity and the current capacity of a service
- Calculate the maximum waiting list sizes that are consistent with the clinical pathway milestones – **sustainable waiting list volumes**
- Identify any potential inefficiencies
- Support better decision making around service changes
- Reduce waiting times and improve experience for our patients

The Healthcare Systems Engineering and Digital Services Teams have collaborated with various clinical and managerial stakeholders to develop models that will facilitate this exercise. The methodology of this model has been published by Chris Jones, Head of Healthcare Systems Engineering in the *Journal of Improvement Science* (@Jones C. *Using Visual Feedback Loops and Prospective Stock and Flow Modelling to Help Plan our Surgical Recovery Post Covid-19. Journal of Improvement Science 2021; 86: 1-21*).

The model was developed to give the HB the ability to do the following:

- See everyone waiting for all operations (emergency and planned care) requiring a theatre visit, and consuming theatre time, including operations that are not reportable under the RTT policy.
- See where all the patients who were not seen in outpatients during the last 18 months have gone. Are they still waiting to see the GP or are they sitting in a Stage 1 queue awaiting a first outpatient appointment?
- See if the compositions of the queues are the same for all specialties, or is there variation from speciality to speciality and if so, how much?
- Produce a high-level summary view of the data, but also meet the need for the ability to drill down into the detail, by speciality, procedure and surgeon.
- Identify what theatre load will be generated by each patient and not just the number of patients in each queue. In other words, each patient needs to be converted to a load in hours and minutes of theatre time based on the surgeon completing their intended procedure and the procedure they will be undergoing.
- Simulate different scenarios and predict the outcome of implementing different initiatives at different stages of the RTT and non-RTT reportable queues, and on the whole system.
- “Smart” schedule into the available theatre capacity, to make the best use of every valuable minute of theatre time.

To ensure we have a common understanding of the language used in this exercise we have defined the terms used as follows:

- **Demand** is the number of tasks that arrive at a point in a process in a time interval. The unit of measurement is count per time. For example, the number of tasks entering each bucket of the queue per week from first outpatient stage through to surgery.
- **Activity** is the number of tasks completed in a time interval. The unit of measurement is the same as demand i.e., counts per time. For example, this might

be the number of patients seen at first outpatient appointment per week or the number of operations completed per speciality per week.

- **Work in Progress (WIP)** is another name for inventory, stock, or a queue. It is the number of patients in each queue at a point in time. WIP is a very useful process metric to use for real time monitoring because it reacts quickly and is relatively sensitive to small-and-sustained differences between demand and activity so provides a good early warning signal.
- **Lead-Time** is the interval between two events for a specific task passing along a stream. In the case of the surgical RTT targets this is the time between first referral into the hospital to receiving their first definitive surgical treatment.
- **A stream** is a process that transforms an input (demand) into an output (activity) and can deliver a service or a product. A stream comprises of one or more sequential steps and can split, join and cross.

We require the model to also use the measured variation in the inputs to generate estimates of the range of likely variation in the outputs (a stochastic model) and we need our stochastic model to replicate the behaviour observed in our real system therefore we need to be able to:

- set the start date for our model.
- vary the time interval between 1 and 7 days.
- set the duration over which our model generates data.
- prime the model with a queue of patients equal to the size of the actual queue at a point in time.
- generate a demand at a rate which is the same as that measured in our real system, and we need to be able to change that demand at any point in time.
- generate an activity at a rate which is the same as the activity measured in our real system, and we need to be able to change that activity rate at any point in time.
- change the amount of random variation present in both demand and activity independently of each other.
- account for steady growth or shrinkage in both demand and activity.
- add in WLI capacity whenever the patient wait exceeds a user defined level.
- vary the WLI capacity whenever the WLI threshold is exceeded.
- calculate the additional cost of the WLI capacity.
- switch between 5 days a week and 7 days a week pattern of demand.
- switch between 5,6 and 7 days a week pattern of activity.
- generate a visual output that quickly and simply shows us how our queue (WIP), demand and activity and lead time (wait for patients) is predicted to behave over time i.e. a prognostic Vitals Chart®.

## **Recovery Period – to 31<sup>st</sup> March 2022**

As routine activities are resumed, many of the measures required to support safe working mean that services will have to operate at lower levels of activity. The pandemic has completely changed the patterns of demand for NHS care, and the virus continues to affect the demand for services and may do for some time to come.

Nobody knows how demand will change over the coming months while the virus is still circulating, or what the eventual levels of demand will look like when everything settles down. This makes D&C planning even more complex than usual. We are now seeing a return to more normal patterns of referrals but there is a significant question around whether the “lost” demand will materialise. If we plan that it will then we could be building in too much capacity, which currently will be at inflated costs to the system. Therefore we have to “watch and wait”.

Since our capacity remains constrained as we recover from the pandemic, it is futile to build the recovery D&C plan based on job plans that were signed-off pre-March 2020 as much of that capacity still cannot be realised. Therefore, our Recovery D&C planning will be based on derived demand, actual activity being delivered and additional activity being planned (outsourcing, insourcing and WLI sessions).

An example of how this will work in practice is illustrated in Appendix 1.

### **Sustainable Demand and Capacity**

Whilst we have recognised above that the current period remains an anomaly both in terms of demand and capacity, we must work towards building services that have balanced demand and capacity plans aligned to them. To achieve that we must develop plans that are baselined on what the Health Board is commissioning at specialty and sub-specialty level.

Therefore, in parallel to the work being undertaken above, we are also working at service level to build the foundations for balanced plans. The initial work has highlighted significant data quality issues which need to be worked through to ensure our source data system are clean. In essence the work will identify how much capacity has been commissioned via job plans for:

- New outpatients
- Follow-up outpatients
- Diagnostics
- Surgical interventions

This bottom-up analysis will be used in conjunction with other parameters to define:

- Any recurrent capacity gap / surplus within services
- Specialties where demand per head of population is more than those seen in peer organisations
- The maximum RTT wait by specialty
- The sustainable waiting list volume by specialty.

### **Performance Monitoring**

Given the current challenge in our service delivery, the timeline for the development and sign-off of the demand and capacity plans is tight.

The ambition is to complete the recovery plans by the end of November. These will remain live plans as more capacity hopefully comes on line via our recovery schemes, outsourcing and insourcing plans. These will be closely monitored via bi-weekly

performance review meetings at divisional level, chaired by the Deputy Chief Operating Officer. Updates will be provided formally monitored by the Planned Care Programme Board with higher level scrutiny also taking place via the Service Group Performance Reviews.

The sustainable service plans will take more time to finalise, mainly due to the significant data “housekeeping” issues that need to be addressed to agree capacity templates. The aim is to complete these by the end of March 2022. These will then be monitored in the same way as the recovery plans.

### **3. GOVERNANCE AND RISK ISSUES**

No matters addressed in this report carry any significantly increased level of risk for the Health Board. The current capacity gaps within service delivery are already visible to the Board.

### **4. FINANCIAL IMPLICATIONS**

There are no direct financial implications associated with this paper. Inputs (additional activity) into the demand and capacity models are funded via Recovery Money. However, the outputs from the modelling will inform the development of the Health Board’s IMTP and financial plans for sustainable services

### **5. RECOMMENDATION**

Management Board is asked to:

- **APPROVE** the use of the HCSE Model for demand and capacity plans covering outpatients, day cases, in-patients and diagnostics.
- **APPROVE** the focus on Demand and Capacity / Productivity plan and all specialties in these areas between 1<sup>st</sup> December and 31<sup>st</sup> March 2022
- **NOTE** the commitment to have RTT trajectories by 1<sup>st</sup> December 2021
- **NOTE** that these trajectories will then be used to manage performance going forward via bi-weekly performance review meetings and the monthly Planned Care Board

<b>Governance and Assurance</b>		
<b>Link to Enabling Objectives</b> <i>(please choose)</i>	<b>Supporting better health and wellbeing by actively promoting and empowering people to live well in resilient communities</b>	
	Partnerships for Improving Health and Wellbeing	<input checked="" type="checkbox"/>
	Co-Production and Health Literacy	<input type="checkbox"/>
	Digitally Enabled Health and Wellbeing	<input checked="" type="checkbox"/>
	<b>Deliver better care through excellent health and care services achieving the outcomes that matter most to people</b>	
	Best Value Outcomes and High Quality Care	<input checked="" type="checkbox"/>
	Partnerships for Care	<input checked="" type="checkbox"/>
	Excellent Staff	<input checked="" type="checkbox"/>
	Digitally Enabled Care	<input checked="" type="checkbox"/>
	Outstanding Research, Innovation, Education and Learning	<input type="checkbox"/>
<b>Health and Care Standards</b>		
<i>(please choose)</i>	Staying Healthy	<input type="checkbox"/>
	Safe Care	<input checked="" type="checkbox"/>
	Effective Care	<input checked="" type="checkbox"/>
	Dignified Care	<input type="checkbox"/>
	Timely Care	<input checked="" type="checkbox"/>
	Individual Care	<input type="checkbox"/>
	Staff and Resources	<input checked="" type="checkbox"/>
<b>Quality, Safety and Patient Experience</b>		
<p>Accurate, comprehensive demand and capacity plans can increase safety and quality whilst reducing risk, and can lead to efficiency gains within clinical services. They will also facilitate more timely treatment of patients and enhance patient experience.</p>		
<b>Financial Implications</b>		
<p>There are no direct financial implications associated with this paper. Inputs (additional activity) into the demand and capacity models are funded via Recovery Money. However, the outputs from the modelling will inform the development of the Health Board's IMTP and financial plans for sustainable services.</p>		
<b>Legal Implications (including equality and diversity assessment)</b>		
<p>There are no legal implications to consider.</p>		
<b>Staffing Implications</b>		
<p>There are no immediate staffing implications as a result of this paper but there is a need to be mindful that this is a very specialist area and we need to build robust and sustainable capacity in this area.</p>		
<b>Long Term Implications (including the impact of the Well-being of Future Generations (Wales) Act 2015)</b>		
<b>Report History</b>	The Management Board is the first forum to consider this paper.	

**Appendices**



D&C Methodology  
Paper - Appendix 1.d