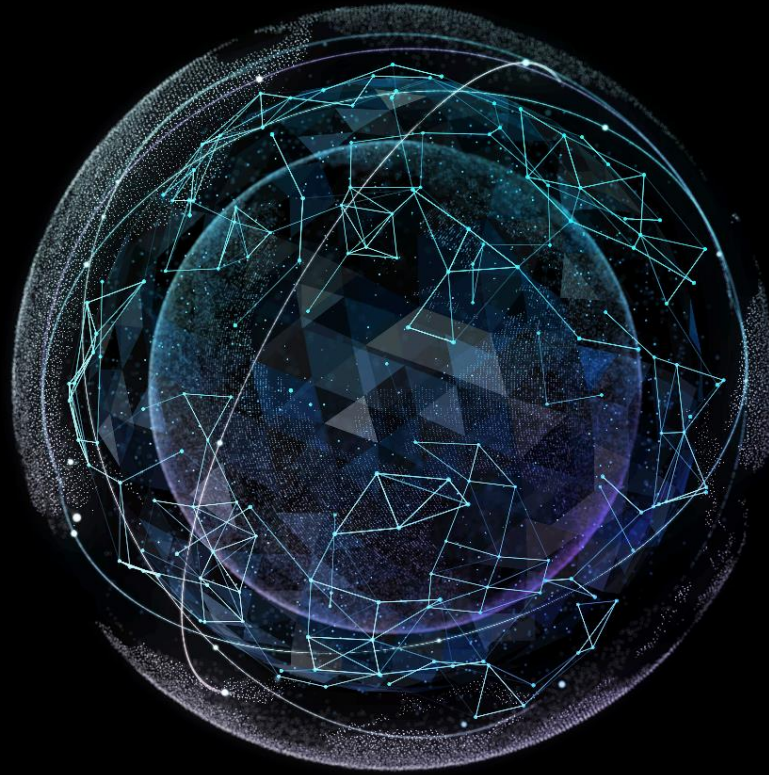# Deloitte.

Elective Recovery (Theatres / ATOM)

Tuesday 16th June 2020

Where are we right now with Elective Care?

We have completed low levels of Elective care for 10+ weeks

Our Surgeons are keen to start operating again

Patients are Categorised based upon Urgency / Need

Donning & Doffing of PPE

Possible bed Constraints (Estimate of 30% reduction in beds due to distancing)

Waiting for sufficient air changes

Our Anaesthetists and Nurses have been working on Direct COVID care, are fatigued and may even have levels of PTSD

Patients may be recovered in Theatres due to Recovery capacity and staffing levels

Concerns over reliability of PPE supplies

The threat of a second wave of COVID

Abdominal Procedures are not being conducted Laparoscopically

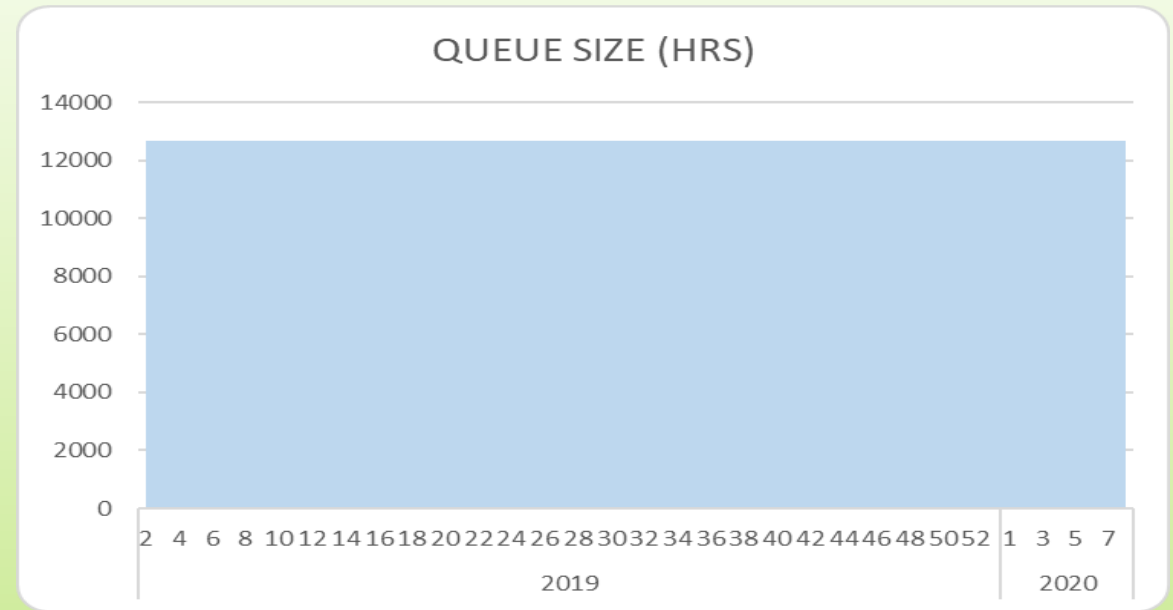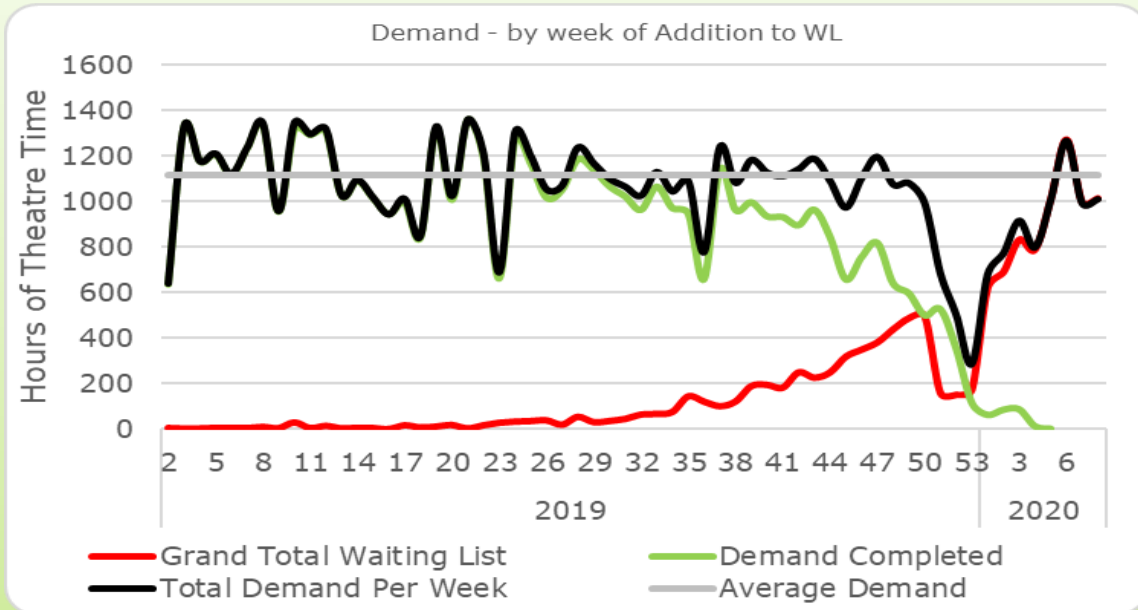Concerns over Anaesthetic Drug availability

- **Is now REALLY the best time to be introducing more change?**

What does COVID actually mean for our Demand & Capacity?

*If we account for this complexity **"perfectly"**…….*

Pre Covid
Waiting List is Stable, and Activity in line with Demand

Green Line is the Activity Completed (hrs of Theatre Time vs Week of Addition to WL
Red Line is the Hours of Theatre Time currently waiting vs the week of Addition to WL
**Black Line is the total demand per week.**
The AREA under the red line is the "Snapshot" of the queue size at any one given moment in time.
Stability in Queue results in these lines being the same shape, but the axis moves forward in time.

What does COVID actually mean for our Demand & Capacity?

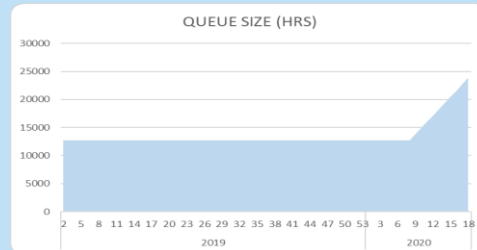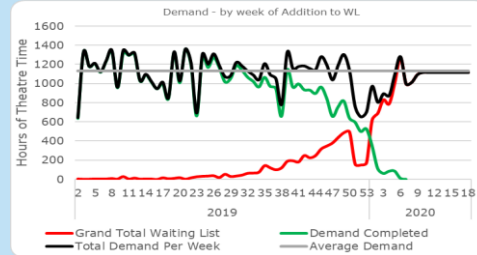*If we account for this complexity **"perfectly"**…….*

Pre Covid

Waiting List is Stable, and Activity in line with Demand
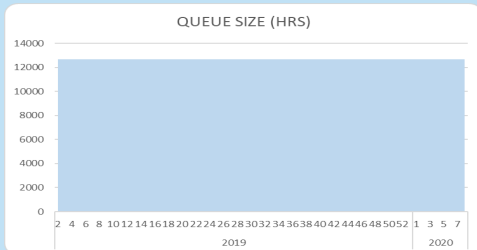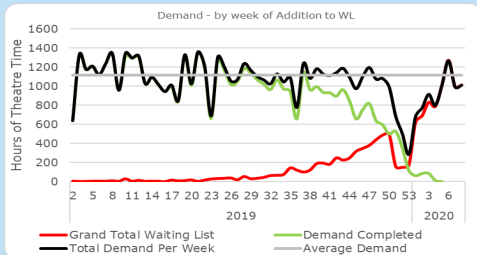
Queue is Stable

Peak Covid

Almost No Elective Care
Low GP consultations
Low Referrals
Low OPD Appointments
Waiting List Growth

Queue Has Doubled over 10 weeks

Clean finish

Waiting List grew over the period of Peak COVID, but Post COVID Capacity matched demand – resulting in a growth of the Queue, but that queue has become stable again
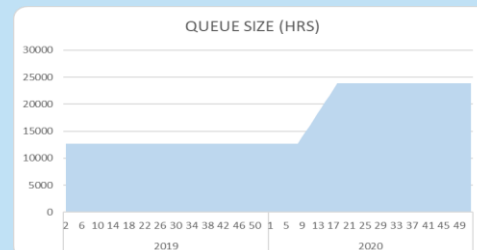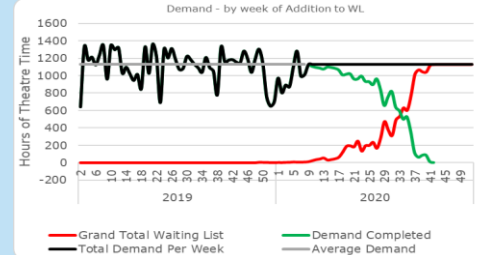
Queue has Doubled but has stabilised

Transition

Due to COVID operational Constraints, the actual demand for a period has been higher, and remains high until normality is reached.
This leads to a continued growth in waiting lists during transition
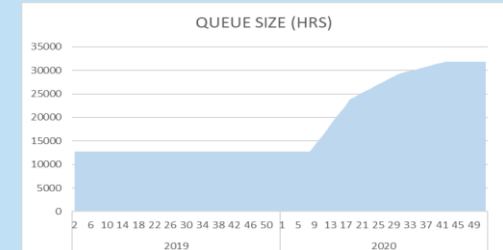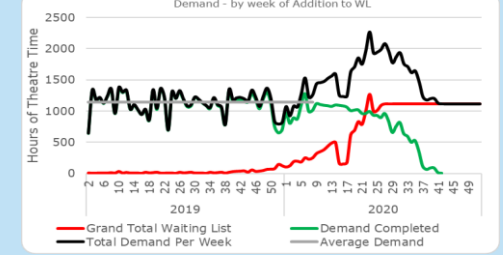
Queue has Tripled

Theatres – ATOM (Pre-COVID)

Using ATOM to provide a continuous improvement approach and maximise the use of theatre time.

ATOM is an evidence based improvement approach to generate optimal capacity and use of Theatre Sessions. It uses Artificial Intelligence to classify procedures based upon the Surgeon / Patients notes at the time of addition to the waiting list, as well as data science to calculate highly accurate procedure times, moving away from averages and taking into account surgeon and patient specific co-morbidities or complexities whilst also allowing for natural down time.

Key elements of our approach

Clinically developed AI, over 8 years and using >1,500,000 patient procedures

Uses advanced data science to calculate accurate procedure times designed to prevent overbooking, cancellations and staff frustration, whilst also maximising the patient mix to finish "slightly early"
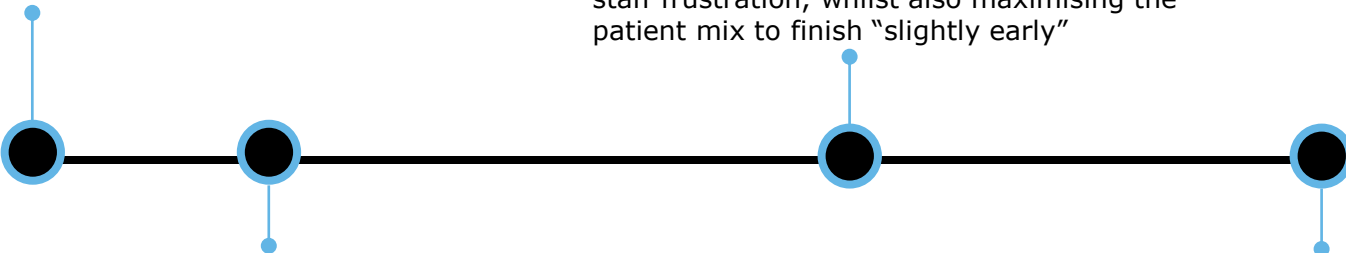
PDSA Cycles are used at every step of development to ensure the changes to the process are congruent with staff's needs

The implementation methodology is central to its success. We deploy a process of testing and contrasting predicted procedure times with all staff groups to demonstrate accuracy before formal sign off and deployment.

Key features

Reads & Classifies surgeon free text

Calculates accurate consultant specific times

Generates Demand and Waiting list in Hrs

Provides optimal Session Templates

Provides Optimal Session Fill

How does ATOM establish the foundation of Demand?
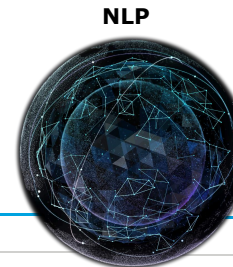
ATOM Demand Prediction

ATOM Procedures are a repository of procedures developed over 8 years with NHS Trusts. Procedures are at a lower level of granularity than the NHS Digital OPCS codes.

ATOM time prediction is generated from historic Procedures (classified through the NLP) and incorporates the range of times and typical theatre flow

NLP

Time Prediction

Mrs Jones Waiting List

Patient	Surgeon Notes	ATOM Procedure
Johnathan Wilkinson	ACL reconstruction knee	Anterior Cruciate Ligament (ACL) Reconstruction
Josh Lewsey	ACL reconstruction left knee	Anterior Cruciate Ligament (ACL) Reconstruction
Jason Robinson	left ACL arthroscopic reconstruction	Anterior Cruciate Ligament (ACL) Reconstruction
Michael Tindall	arthroscopy + all reconstruction right knee ga	Anterior Cruciate Ligament (ACL) Reconstruction
William Greenwood	ACL reconstruction left knee hams	Anterior Cruciate Ligament (ACL) Reconstruction
Benjamin Cohen	ACL reconstruction left knee (hams)	Anterior Cruciate Ligament (ACL) Reconstruction
Mathew Dawson	ACL reconstruction of right knee	Anterior Cruciate Ligament (ACL) Reconstruction
Stephen Thompson	ACL reconstruction of the left knee arthroscopic approved	Anterior Cruciate Ligament (ACL) Reconstruction
Phillip Vickery	arthroscopic ACL reconstruction (left) | farsi interp booked 12/9	Anterior Cruciate Ligament (ACL) Reconstruction (Complex)
Martin Johnson	ACL reconstruction right	Anterior Cruciate Ligament (ACL) Reconstruction
Benjamin Kay	ACL reconstruction right knee na 29.07.16-05.08.16 canc x1	Anterior Cruciate Ligament (ACL) Reconstruction
Lawrence Dallaglio	ACL reconstruction right knee 24 wks	Anterior Cruciate Ligament (ACL) Reconstruction

Mrs Jones, when performing a simple ACL Reconstruction requires 82 Minutes of Theatre Capacity

How does ATOM establish the Impact from COVID?

We are supporting Trusts who are already using ATOM to understand the new Theatre process and modify the ATOM times to be able to book accurately in the COVID transition period, categorise the waiting list, and plan increases in planned activity in order to mitigate over time.
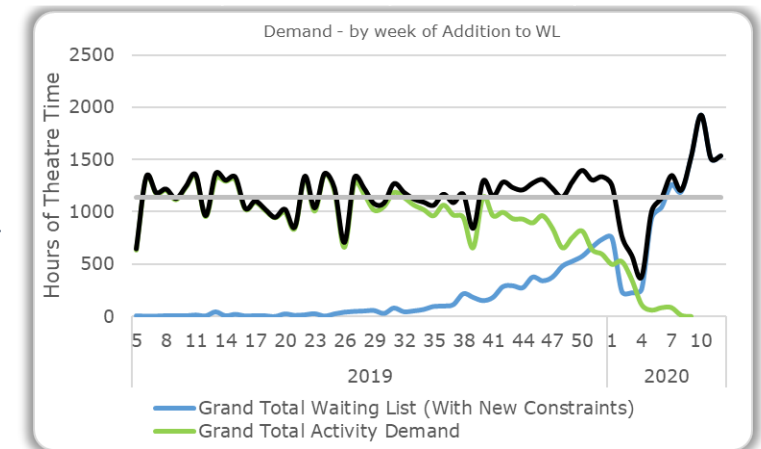
Waiting List Categorisation

Day to Day Theatre Process

COVID Operational Constraints

ATOM®

Key:

Inputs
Challenges

Outcomes

The following shows new post-COVID procedure times based on the ATOM scheduler

Procedure Description	Category	Usual Conditions	COVID Conditions
Abdomino Perineal Excision of Rectum (APER) (Laparoscopic / Swedish)	3	415 (06:55)	464 (07:44)
Advancement Flap	3	93 (01:33)	126 (02:06)
Anterior Resection (High / Unspecified / Laparoscopic) + Adhesiolysis	3	357 (05:57)	403 (06:43)
Anterior Resection (Low / Laparoscopic) + Ileostomy	2	400 (06:40)	448 (07:28)
Appendicectomy (laparoscopic)	1a	113 (01:53)	147 (02:27)
Colonoscopy (with or without biopsy)	2	66 (01:06)	97 (01:37)

Benefits

- Improved waiting list
- Improved booking process
- Development of a recovery plan (enhanced provision)
- React dynamically to challenges in your operating environment
- Gives the speed to initiate change
- Impartiality
- Set KPIs
- Tailor-made and bespoke to individual surgeons

New weekly Demand (Not including backlog)

Demand - by week of Addition to WL

Hours of Theatre Time

2500
2000
1500
1000
500
0

5 8 11 14 17 20 23 26 29 32 35 38 41 44 47 50 1 4 7 10
2019   2020

— Grand Total Waiting List (With New Constraints)
— Grand Total Activity Demand
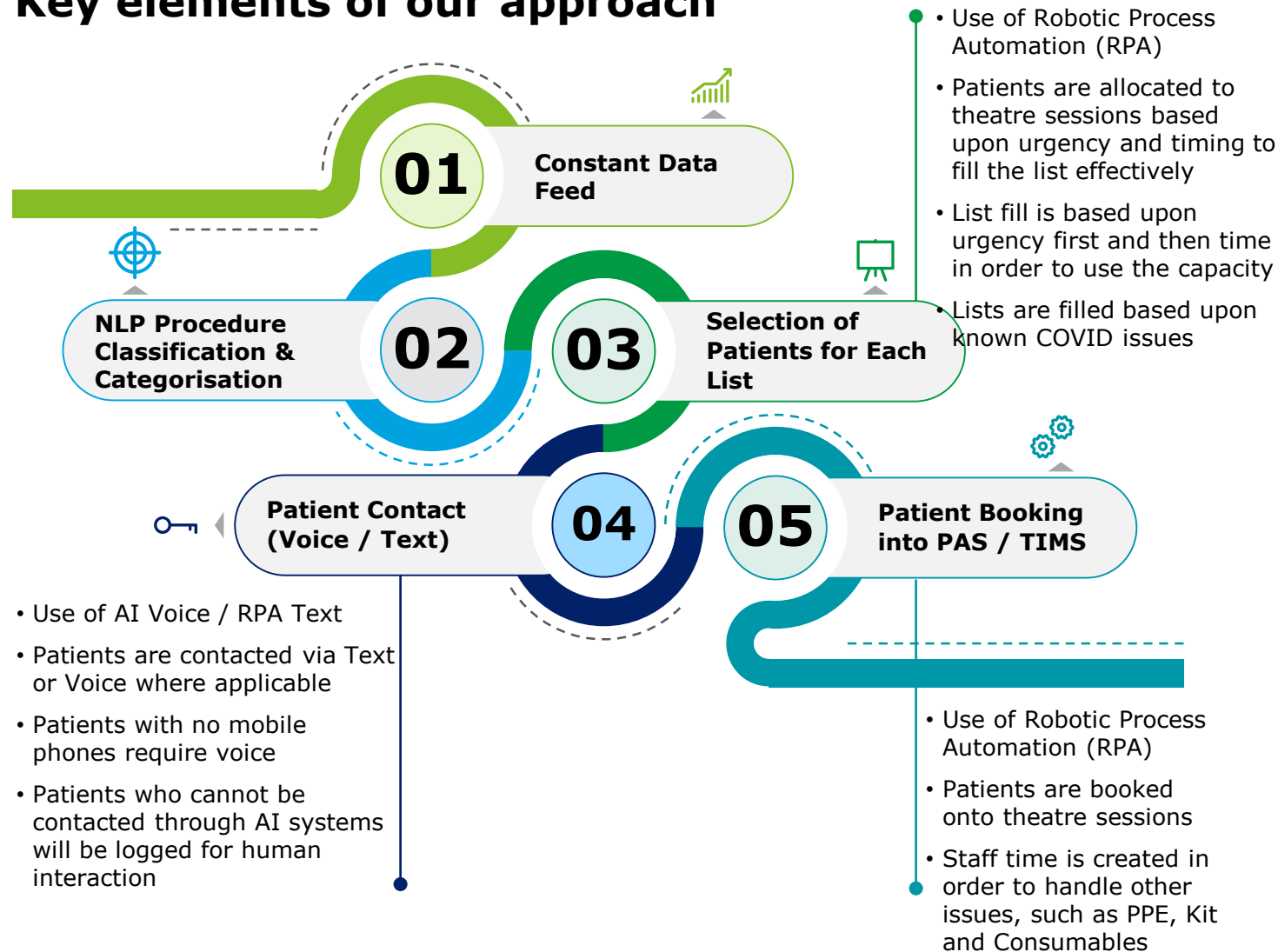
ATOM Automated List Fill

Our AI performs the task of processing patients on waiting lists through to effective list booking, including patient contact

Key elements of our approach

01 Constant Data Feed

02 NLP Procedure Classification & Categorisation

03 Selection of Patients for Each List

04 Patient Contact (Voice / Text)

05 Patient Booking into PAS / TIMS

- Use of Robotic Process Automation (RPA)
- Patients are allocated to theatre sessions based upon urgency and timing to fill the list effectively
- List fill is based upon urgency first and then time in order to use the capacity
- Lists are filled based upon known COVID issues

- Use of AI Voice / RPA Text
- Patients are contacted via Text or Voice where applicable
- Patients with no mobile phones require voice
- Patients who cannot be contacted through AI systems will be logged for human interaction

- Use of Robotic Process Automation (RPA)
- Patients are booked onto theatre sessions
- Staff time is created in order to handle other issues, such as PPE, Kit and Consumables

Outcomes

- Autonomous AI working from addition to Waiting List to patient being treated
- Clinical Involvement and input into the decision points and hand offs for the AI
- Accurate and Agile compilation of Patient Mix to ensure optimal use of capacity whilst preventing over runs or cancellations
- Management of the Waiting list is optimised for a changing landscape during the Transition period and beyond
- Waiting list growth is minimised during the Transition period
- Staff time is generated in order to focus on other elements of Elective care provision, such as ensuring PPE and ben availability
- Speed of Implementation results in benefits being seen rapidly and within the COVID period

Deloitte.