

ICS Waiting list

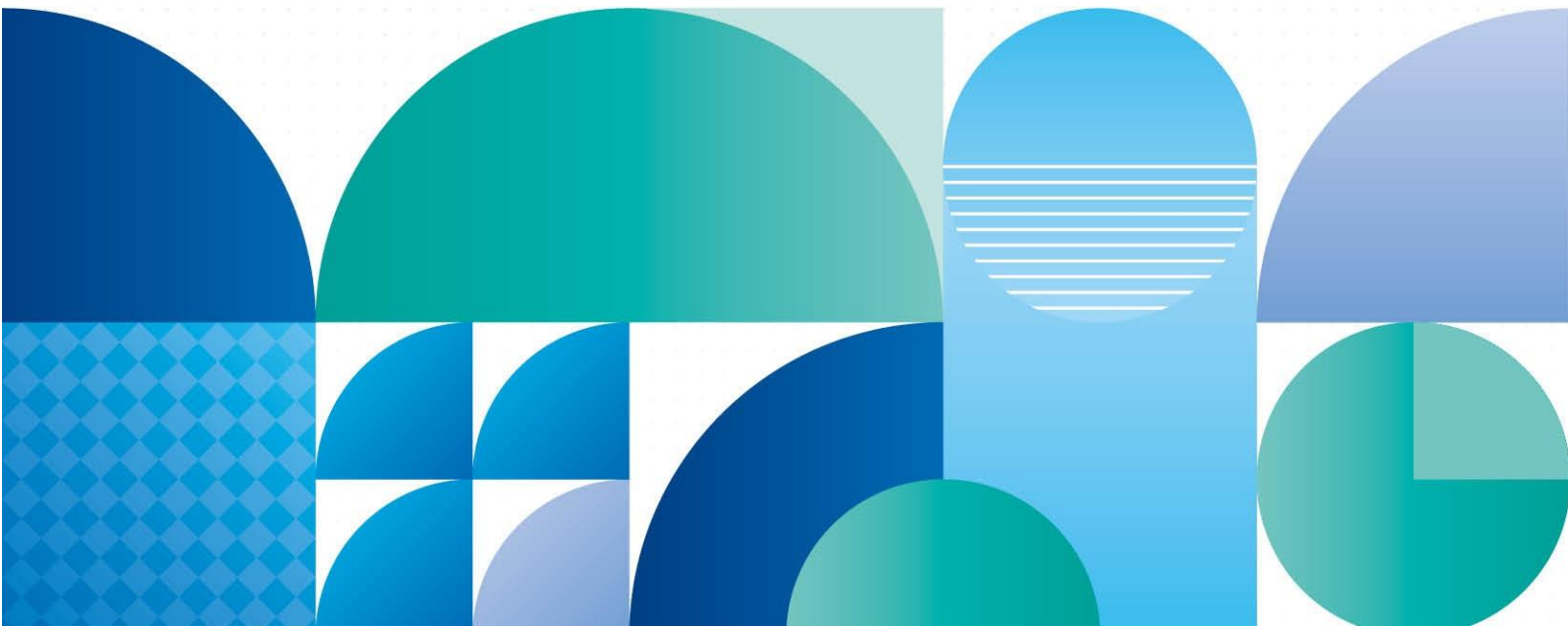
Resource Impact Evaluation of Chatbot

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Terminology and abbreviations

Definitions

Default estimate

These are the existing values populating the model and were determined for the specific setting during the evidence review. They were set at the time of evaluation design, based on the best available evidence and are white cells to indicate that they can not be directly changed. If alternative estimates are required, they can be entered as described in the next paragraph.

Alternative estimate

These cells are dark blue on the Populations and Parameters tab of the model. If values are entered in these cells, the model uses these values instead of the corresponding default estimate for that value. They are the only aspects of the model that can be changed post evaluation as new evidence becomes available that supersedes the research informing the default values or in the case of the user interacting with it to understand the impact of changing certain parameters based on new information.

Year 1 and Year 2

These terms are used in the model to mean the first year of running the new system and then the following year, Year 2. However, there is an important implied distinction in that by applying different costings for Year 1 and Year 2, a user will be able to see the initial cost expected in the “implementation year” (Year 1) which may have additional set-up costs, etc., alongside what they might expect in subsequent years after the initial investment year, for example thinking about what impact the added operational and running costs of Chatbot might have on the ongoing “cost per patient” under different “alternative assumptions” in Year 2.

Validation

A patient’s position on the waiting list can be validated by contacting the patient to ascertain whether or not their health status has changed. After successful validation using either the Chatbot pathway or via a phone call made by an NHS staff caller, a patient can either (i) remain on the waiting list, (ii) undergo a clinical review, or (iii) be removed from the waiting list.

Abbreviations

CB Chatbot

HEU Health Economics Unit

ICS Integrated Care System

IP Inpatient

LSC Lancashire and South
Cumbria

NICE National Institute for Health
and Care Excellence

OP Outpatient

Pt Patient

SC Staff caller (NHS provider
doctor or nurse/admin)

WL Waiting list

Y1 Year 1

Y2 Year 2

Executive summary

Aims

This report was commissioned by The Innovation Agency, AHSN for the northwest coast, in support and recognition of the innovative approach being taken in Lancashire and South Cumbria (LSC) Integrated Care System (ICS) with their chatbot waiting list validation programme. The Health Economics Unit (HEU) has evaluated the pilot of the chatbot project to understand the potential staff resource that could be released using this technology by determining the minimum number of patients Chatbot would need to validate to be cost neutral compared with current practice.

Methods

The model developed is a cost comparison analysis based on the limited amount of initial pilot data available from the client. While resource impact evaluation has been completed, some of HEU's standard recommendations for best practice on projects like this, such as development of a logic model, were not possible due to budget constraints.

The default data inputs were derived from the outputs of an 8 week pilot covering 174 inpatients (IPs) from general and plastic surgery and from and 2,108 outpatients (OPs) from general surgery, oral surgery, T&O, and urology from LSC ICS.

The ICS and the developers of Chatbot have negotiated a flat fee of £124,250 for 2022 and assumed the new pathway is able to validate 25,000 patients on IP and OP waiting lists, where the total combined ICS waiting list (WL) is comprised of 80% OPs and 20% IPs.

Findings

Under the flat fee arrangement for a 20:80 (IP: OP) WL composition, where all assumptions and defaults are constant except WL size, the ICS would need a total weekly WL size of 351 patients (Pts) (18,252) for cost neutrality, which is less than the predicted 481(25,012) Pts per week.

Under default assumptions, using Chatbot to validate IP waiting lists is £1.11 per Pt less expensive than the current pathway and £2.07 per Pt less expensive than the current pathway for OPs. Overall, for the current WL IP:OP ratio, the chatbot pathway saves the ICS £1.88 per Pt compared to the current pathway which is estimated to yield an annual savings for the ICS of £47,015.

Conclusion

Modelling results indicate substantial savings for the local system if the chatbot is deployed at scale to replace manual waiting list validation in appropriate patients.

We recommend caution in application of this model based on the limited availability of data from a short pilot study. While the results of the model are promising, further assessment of additional metrics including time spent by staff and more detailed costings would add detail and give a stronger picture of the economic potential.

The model provided is easily modifiable, user-friendly and can be adjusted, should new data become available. We recommend further study of the impact of the technology in a

scaled up, real life setting to add additional validity to the existing model by expanding the evidence base as well as the development of a logic model to complement this evaluation.

Introduction

Project background

Currently, NHS regulations require frequent re-assessment of Pts on surgical waiting lists, given that patient's health status is not static and can improve or deteriorate over time. This is designed to ensure accurate assessment of the prioritisation of Pts on waiting lists. Current practice is for clinicians and administrative staff to conduct this process on an ad hoc basis, in addition to their existing workload. However, the process lacks oversight and consistent standards.

The ICS Waitlist Validation Programme is a service that allows the ICS to outsource waitlist validations to an external provider for a set fee which then frees up staff time for other activity. The programme utilises a technology called Chatbot to conduct these validations and returns the results to the ICS. Chatbot is an automated dialler that can mass-call patients by phone to conduct a simple/complex conversation using low level Artificial Intelligence and speech recognition. Chatbot follows a pre-programmed call script and responds to the patients' answers automatically.

According to the Chatbot developers, there may be potential staff resource that could be reduced using this technology. The relative resource that could be saved for other use by implementing Chatbot's technology is demonstrated in this model by determining the minimum number of Pts Chatbot would need to validate to be cost neutral compared with current practice. If cost neutrality could be achieved, Chatbot could reduce clinical, administrative, and service managerial time that is consumed by these routine calls, freeing them up for other activity.

Project aims and objectives

The programme aims to reduce clinical and administrative resource required to validate Pt waiting lists using a call automation technology. The client wants to understand the potential staff resource that could be reduced using this technology by determining the minimum number of Pts Chatbot would need to validate to be cost neutral compared with current practice.

The aim of this evaluation is to use data provided by the client from the pilot completed in April 2022 to:

- Quantify the cost of outsourcing the validation of patient waitlist validations via an external provider compared with current practice where validations are completed by NHS staff.
- Build an outline cost model for existing validation compared with the Waiting List Validation Programme model.
- Calculate a minimum volume of patients the external provider would have to validate to allow cost-savings in comparison to current practice.

Methods

Evidence review

The model developed is a cost comparison analysis based on the amount of initial pilot data available.

To make best use of available budget, it was agreed that HEU would accept and use the figures provided by the client to inform the model. The primary source of data was provided by Adeeb Ahsan, the LSC ICS Senior Project Manager for the Chatbot pilot studies, and he provided all information related to the development of the pathway analysis the model is based on. As Chatbot is still being developed, this pathway is subject to change if the key assumptions and processes informing it alter as Chatbot evolves.

The default data inputs were derived from the outputs of an 8-week pilot covering 174 IPs from general and plastic surgery and from and 2,108 OPs from general surgery, oral surgery, T&O, and urology from LSC ICS.

The pilot dataset was limited in its ability to inform the model as it did not include any measure of the comparator group, therefore all the figures and ratios associated with the current pathway are estimates provided by the Adeeb Ahsan, LSC ICS pilot lead clinician.

Therefore, a minimum volume of Pts is required to be processed weekly by Chatbot for the Chatbot pathway to achieve cost neutrality or a lower per Pt cost than the current system.

Model specification

Perspective

The economic evaluation is done from the perspective of the NHS - specifically, from an ICS level perspective. The setting of care for the comparator is NHS provided secondary care in England. The setting of care for the novel pathway spans across both NHS provided secondary care in England and an external provider of services, i.e., the ICS Waitlist Programme.

Population

The model considers the costs of validating a set of inpatients and outpatients on the surgical waiting list, with and without the redirection of eligible patients through the Chatbot provider. The success rate of successful contact and validation of waiting list status is considered. The main resource associated with the new pathway that is being appraised in this evaluation is staff time.

Costs

The staff costs have been derived from the Personal Social Services Research Unit's annual report on the unit costs for hospital-based scientific and professional staff. These figures were then adjusted for inflation using Treasury rate of 3.5% per annum to derive the figures for 2022/23, in line with NICE recommendations.

The costing inputs for Chatbot were based on the contract negotiated between the ICS and the providers of the Chatbot service. For the year 2022, the ICS paid a set payment of £124,250 and they have assumed the new pathway will be able to validate 25,000 Pts from combined IP and OP waiting lists, where 80% of validations are for OPs and 20% are for IPs. This may significantly vary in other settings impacting the transferability of the findings.

For purposes of early evaluation of Chatbot, the implementation of a new service pathway is considered to be included in the fixed one-time payment the ICS has agreed to pay for a year of Chatbot.

The implementation costs, operational costs, and running costs for the model were not provided at the time of model development and therefore are left as £0 inputs to allow for future additions once known. As we assume there would be additional costs associated with the widespread use of a new care pathway, the ability to add the descriptions and the costs to the model has been included. Operational, running, and implementation costs were determined to be out of scope due to project budget limits and lack of data. Additional efficacy tests or quality investigations needed as well as any additional infrastructure requirements are not directly addressed in the model. However, the ability to estimate these into the costing is provided under optional adjustments.

Time-Horizon

The model is programmed to consider a set volume of Pts that Chatbot would be required to successfully validate to be cost neutral with current standard practice in one year. A two-year time span has been included as optional to allow user to explore impact of implementation or one time only costs on the overall costs.

Discounting

Discounting of costs is not normally required in a cost-comparison analysis, but can be applied if relevant, according to NICE guidance¹. Discounting has not been applied given the surrounding context.

Comparator

Implementation of a system utilising Chatbot is compared with current practice (i.e., absence of the Chatbot technology) where all calls are made by a staff caller in an ad hoc process. For simplicity, it is assumed there are no other comparators available.

Model assumptions

Data informing the model

All materials provided by the client were reviewed and used in informing the figures referenced in the model. Rates and measures provided by Adeeb Ahsan, LSC ICS Senior Project Manager (Adeeb.Ahsan@elht.nhs.uk) are assumed to be accurate for the 2021/2022 year.

¹ Process and Methods, Nice

User assumptions

Pilot figures have been included to 2 decimal places for user experience and to maintain accuracy of the model calculations.

We assume staff role (doctor/nurse/admin) has no impact on the average time spent on the phone with patients and is equivalent in IP and OP settings. The average time a staff caller takes to make calls is equal via both pathways and the same for different types of NHS staff callers (doctor or nurse/administrator) and is assumed to last 9 minutes based on estimates provided by Adeeb in conversations with the HEU team.

Default costs

The implementation costs, operational costs, and running costs for the model were not provided at the time of model development and therefore are left as £0 inputs to allow for future additions once known. As we assume there would be additional costs, the ability to add the descriptions and the costs to the model has been included.

Additional efficacy tests or quality investigations needed as well as any additional infrastructure requirements are not directly addressed in the model. However, the ability to include these into the costing is provided under optional adjustments.

Validation rates

The rate of validation result allocation is equivalent whether through the Chatbot system or NHS staff caller - i.e., algorithm has perfect result rate compared with the gold/current standard (human staff caller).

The categorisation of patients into the remove, remain, or review category is assumed to occur in the same ratios for patients the Chatbot system redirects to a human caller (i.e., anyone who the algorithm flags as needing a review or to be removed) as the patients who are initially determined to be ineligible for the Chatbot pathway and are thus evaluated by NHS staff. In other words, whether a NHS staff caller is calling because the patient was ineligible for validation via Chatbot or whether Chatbot staff are calling because Chatbot flagged them as needing further interaction, the time spent on the call, the staff ratios who handle the calls, and the resulting distribution into categories is consistent due to lack of evidence to the contrary.

Where current practice outcome rates are not available, the rates observed in the pilot have been assumed to be reflective of the true population rate.

Pathway

Processing capacity (i.e., size of waiting lists)

The model assumes that the same size waiting list is validated (processed) by both the Chatbot pathway and the current system (the status quo). This does not account for the substantial increase in capacity that Chatbot may free up in comparison to the capacity of current staff levels in hospitals.

Staff mix and relative salaries

The precise staff mix of consultants, Band 5 nurses and other staff roles who have the potential to make equivalent calls in the absence of Chatbot was not provided. The ability

to alter the average pay of each staff role (for example, if alternate banded employees were engaged in making the calls, such as Band 3 or 4 admin staff instead of band 5 nurses) as well as the ratio of each staff role making the calls can be altered by entering alternative estimates, however, for simplicity, this is the extent to which the staff role assumptions can be adjusted.

Outcomes

We assume the time required for an extensive, in-person review is the same whether identified as necessary via the Chatbot system or via NHS staff calling. As this exists outside the predetermined scope of the project, which only covers the impact of the Chatbot system on waiting list processing times, the additional activity is excluded from the model. The model only accounts for the costs related to the action of flagging them for the review via either NHS staff calling manually or via outsourcing the eligible patients to the ICS WL Programme.

Interpretation notes

When interpreting the results and using the outputs of this model, it is important to note that, while the function for the current pathway is a flat, linear line, this is not the case with the new Chatbot system. There is a direct, linear relationship between cost per Pt and size of waiting list in the current pathway because the only cost input applicable is cost of staff time.

However, in the Chatbot system, the relationship between cost per Pt and size of waiting list validated per week is non-linear. It is not possible to say that there is a cost per Pt under a Chatbot system without knowing the number of validations – thus these figures will always be volume dependent – i.e., determined by the size of the waiting list.

In the new pathway, the cost per Pt is driven by the relative size of the waiting list. Under the current pricing scheme for Chatbot, a certain volume of Pts will always need to be validated, in all service types, for the alternative system to be cost neutral. Therefore, a minimum volume of Pts is required to be processed by the Chatbot pathway for the Chatbot pathway to achieve cost neutrality or a lower per Pt cost than the current system.

Results

There is broad indication that Chatbot is cost saving in both IP and OP applications.

Cost per patient

Using Chatbot to validate IP waiting lists is £1.11 per Pt less expensive than the current pathway and £2.07 per Pt less expensive than the current pathway. The combined IP/OP pathway therefore costs £1.88 less per Pt and costs £47,015 less per year than the current pathway.

Table 1 Cost per IP, OP, combined IP: OP lists and the net change with Chatbot implementation, assuming baseline assumptions (i.e., no alternative assumptions are entered)

	IP	OP	IP and OP
Current practice- cost per Pt	£12.54	£12.75	£12.71
New system with Chatbot - cost per Pt	£11.43	£10.68	£10.83
Impact on per Pt cost from implementing the CB model Y1	-£1.11	-£2.07	-£1.88
Impact on per Pt cost from implementing the CB model Y2	-£1.11	-£2.07	-£1.88

Figure 1 Cost per Pt by IP, OP, and Total WL

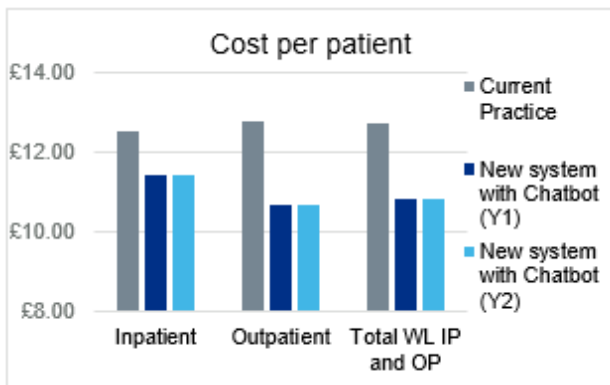
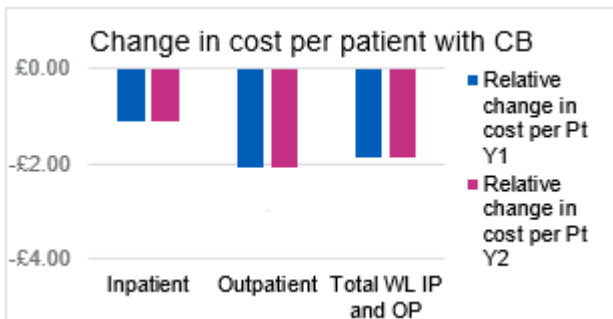


Figure 2 Change in cost per Pt in Y1 and Y2 stays the same using default values due to the flat fee arrangement.



There is a direct, linear relationship between cost per Pt and size of waiting list in the current pathway because the only cost input applicable is the cost of staff time.

However, in the Chatbot system, the relationship between cost per Pt and size of waiting list is non-linear. It is not possible to say that there is a cost per Pt under a Chatbot system

without knowing the number of validations – thus these figures will always be volume dependent – i.e., determined by the size of the waiting list.

In the new pathway, the cost per Pt is driven by the relative size of the waiting list. Under the current pricing scheme for Chatbot, a minimum volume of Pts is required to be processed weekly by Chatbot for the Chatbot pathway to achieve cost neutrality or a lower per Pt cost than the current system.

Univariate (one way) sensitivity analysis was applied in the model to examine the relationship between size of WL and (volume of calls) and cost per Pt. This is demonstrated in the model by varying the size of the WLs and holding everything else constant which allows the user to assess the impact WL size has on the model outputs in this case cost per Pt of IP, OP, and the combined WL.

Figure 3 Univariate analysis for IP: Cost per Pt by size of WL for IP

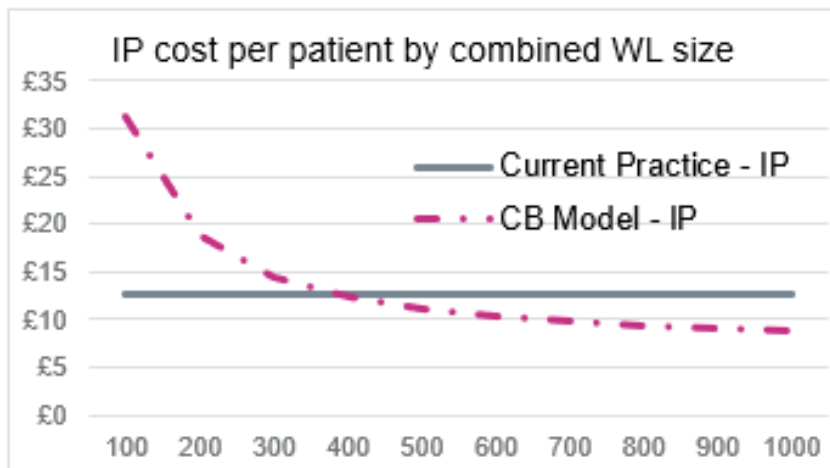


Figure 4 Univariate analysis for OP: Cost per Pt by size of WL for OP

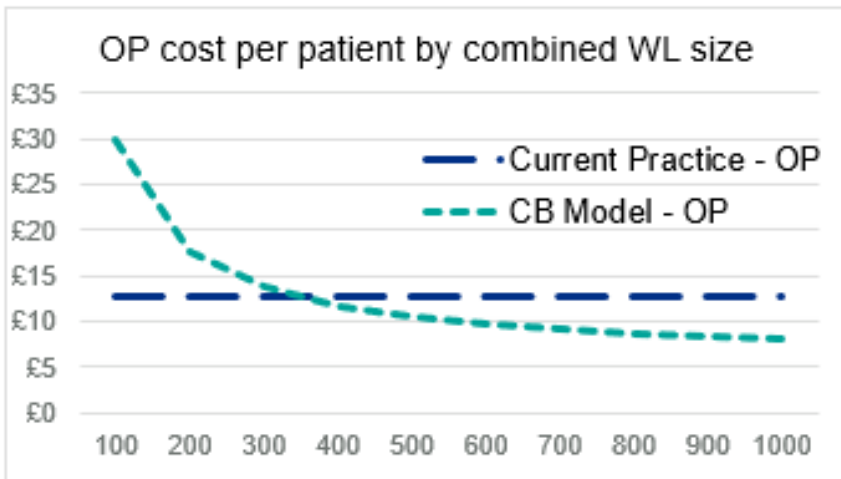
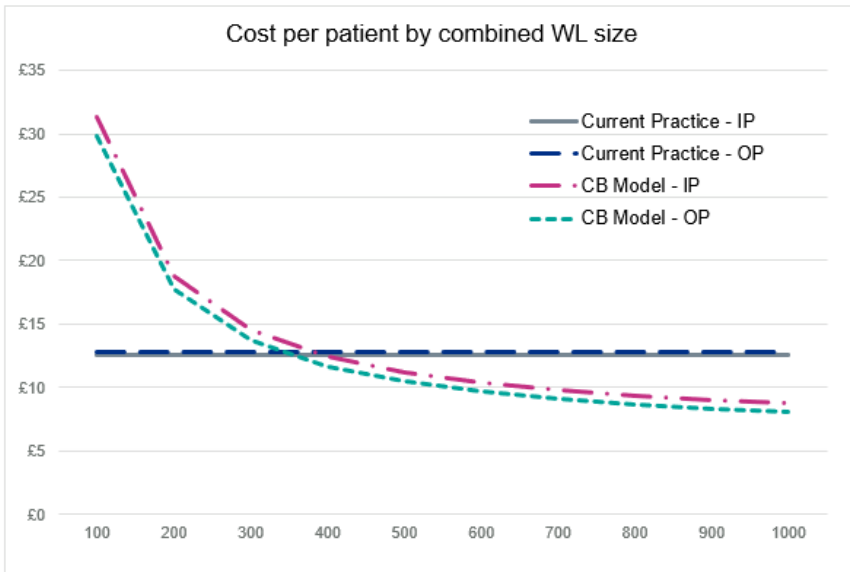


Figure 5 Univariate analysis for combined IP and OP WLs: Cost per Pt by size of WL for IP and OP in current pathway and in the CB pathway.



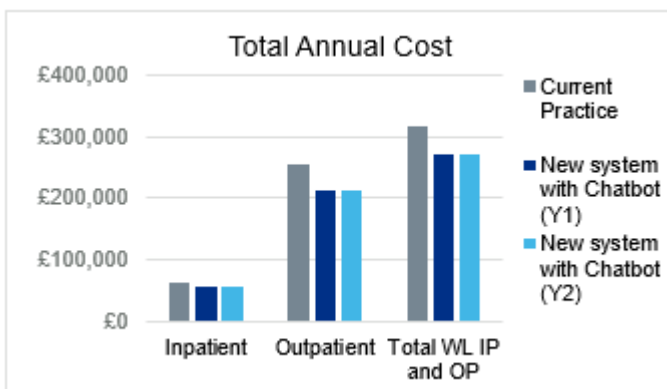
Estimated total annual costs

The following are included to give a sense of scale of potential savings on an ICS level from implementation of Chatbot in an ICS of similar size and population.

Table 3 Total cost of current pathway and Chatbot implemented pathways for IP, OP, and IP: OP combined and the net change with Chatbot implementation, assuming baseline assumptions (i.e., no alternative assumptions are entered)

	IP	OP	IP and OP
Current Practice – total annual cost	£62,728	£255,183	£317,912
New system with Chatbot – total annual cost	£57,179	£213,717	£270,897
Annual cost difference with CB Y1	-£5,549	-£41,466	-£47,015
Annual cost difference with CB Y2	-£5,549	-£41,466	-£47,015

Figure 6 Total annual cost for each pathway



Threshold for cost neutrality

To calculate a minimum volume of Pts needed to obtain cost neutrality, we removed the assumption that 25,000 validations will occur but kept other parameters unchanged, including the IP: OP composition of the WL.

Under the flat fee arrangement, for a 20:80 (IP: OP) WL composition where all assumptions and defaults are constant except WL size, the ICS would need a total weekly WL size of 351 Pts to achieve cost neutrality. Annually, this would be a WL of 18,252 Pts.

Cost per patient*	Inpatient	Outpatient	Total WL IP and OP
Current Practice	£12.54	£12.75	£12.71
New system with Chatbot (Y1)	£13.36	£12.54	£12.71
New system with Chatbot (Y2)	£13.36	£12.54	£12.71
Relative change in cost per Pt Y1	£0.82	-£0.21	£0.00
Relative change in cost per Pt Y2	£0.82	-£0.21	£0.00

IP and OP contribution to overall cost per patient calculations

Looking at the contribution from the IP pathway only and ignoring the contributions and results of the OP pathway, we evaluated the IP pathway independently. The results indicate that the IP service would need to process 79 validations per week, or 4,108 per year, for IP use of Chatbot to be cost neutral compared to current practice. Where a combined list has a 20:80 IP: OP composition, this would equate to a combined WL size of 397 which is lower than the current ICS estimate of 481 calls per week. Under the default weekly volume estimates for IP waiting lists, Chatbot cost per Pt is less than the cost in the current pathway.

Cost per patient*	Inpatient	Outpatient	Total WL IP and OP
Current Practice	£12.54	£12.75	£12.71
New system with Chatbot (Y1)	£12.53	£11.74	£11.90
New system with Chatbot (Y2)	£12.53	£11.74	£11.90
Relative change in cost per Pt Y1	-£0.01	-£1.01	-£0.81
Relative change in cost per Pt Y2	-£0.01	-£1.01	-£0.81

Looking at the contribution from the OP pathway only and ignoring the contributions and results of the IP pathway calculation, we evaluated the OP pathway independently. The results show that the OP service would need to process 273 validations per week, or 14,196 per year, for OP use of Chatbot to be cost neutral compared to current practice. Where a combined list has a 20:80 IP: OP composition, this would equate to a combined WL size of 341 which is lower than the current ICS estimate of 481 calls per week. Under the default weekly volume estimates for IP waiting lists, Chatbot cost per Pt is less than the cost in the current pathway.

Cost per patient*	Inpatient	Outpatient	Total WL IP and OP
Current Practice	£12.54	£12.75	£12.71
New system with Chatbot (Y1)	£13.57	£12.74	£12.91
New system with Chatbot (Y2)	£13.57	£12.74	£12.91
Relative change in cost per Pt Y1	£1.03	-£0.01	£0.20
Relative change in cost per Pt Y2	£1.03	-£0.01	£0.20

Table 2: Minimum Patients

	WL size per week	Net impact on total cost per Pt
Minimum criteria for IP to be cost neutral in its contribution to total cost / Pt	86 IP (430 Total WL size)	-£0.81
Minimum criteria for OP to be cost neutral (and therefore IP as OP costs less per Pt)	273 OP (341 Total WL size)	£0.20
Minimum criteria for IP/OP Combined WL to be cost neutral in CB pathway	356 (356 Total WL size)	-£0.01

Limitations

Single source of information

The findings are based on the pilot data provided and conversations with an ICS Senior Project Manager and may not reflect the performance of Chatbot in other settings.

A significant number of variables were informed by a single clinician as stakeholder input. The stakeholders who commissioned this work and provided the evidence used throughout this evaluation were provided by one stakeholder potentially with a vested interest in the success of Chatbot.

Due to budget constraint, HEU did not conduct a literature review which may have identified competitors of Chatbot or identified variations to the determined pathway which may impact transferability to other settings.

Transferability may be hampered further due to the small sample size in single study in one ICS. If different populations engage at different rates with Chatbot or require additional marketing and communications in order to trust the platform, results obtained may differ. While the model allows for variation in many of the rates, it is based on a limited number of possible outcomes which may not be valid in other settings.

Lack of comparator evidence

The current true rate of validations, the required number of patients annually, the precise amount of time staff spend on calls were not available, so stakeholder estimates were used to inform the parameters of the model. As these are all key cost drivers in the current pathway, variation of these values will impact the results.

Total cost of CB not accounted for in default settings of model

A system newly outsourcing their patient waiting lists through the Chatbot pathway would likely need to budget for some initial algorithm adaptation or staff training to effectively and efficiently utilise the pathway. Adding these costs has potential to substantially increase

the cost per Pt of a system implementing Chatbot. Therefore, the model's accuracy is highly dependent on the appropriate use and relative accuracy of variable inputs by the user.

Operational, running, and implementation costs were not provided. These potentially can be substantive. Additional efficacy tests or quality investigations needed as well as any additional infrastructure and maintenance requirements are not directly addressed in the model. However, the ability to estimate these into the costing is provided under optional adjustments.

Number of variable inputs

The model inputs are modifiable and the validity of its outputs is dependent on appropriate use by the user. There are a significant number of variables which may be changed in the model which would yield significantly different results in different scenarios. This was necessary to leave modifiable due to the evolving nature of the evidence as more observed or published data may be produced.

Recommendations and future work

These findings can be useful in future commissioning decisions of Chatbot at an ICS level.

Further studies are recommended to confirm the accuracy of the parameters and ratio estimates of the current pathway. Additionally, studies to determine the relative effectiveness of the Chatbot pathway compared with outputs from the current standard where the NHS staff at the provider site are manually making the calls would be needed to conduct cost effectiveness evaluation.

We would recommend the development of a logic model to strengthen to the validity of the results. Future work, should it be commissioned, can expand the analysis by incorporating cost savings which may result from (1) reduced A&E attendances, IP admissions and GP contacts occurring while Pts await to be contacted regarding their waiting list status and (2) increase in surgical theatre utilisation rates by freeing up a proportion of consultants' time presently spent on validating Pts.

To improve the acceptability of this model, additional exploration of similarity would need to be added to meet NICE criteria for acceptance.

“For the acceptance of a cost comparison case, evidence in support of similarity between the intervention and comparator technologies, in terms of overall health outcomes, must be presented.”²

² Cost comparison addendum, NICE
<https://www.nice.org.uk/Media/Default/About/what-we-do/NICE-guidance/NICE-technology-appraisals/methods-guide-addendum-cost-comparison.pdf>

References

Model input sources

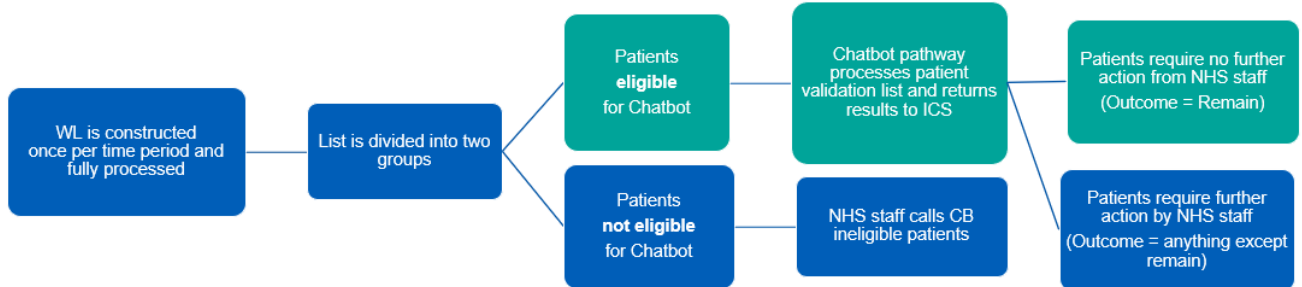
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Methodology

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Appendix I: New pathway overview

Figure 5 Example pathway of system using Chatbot

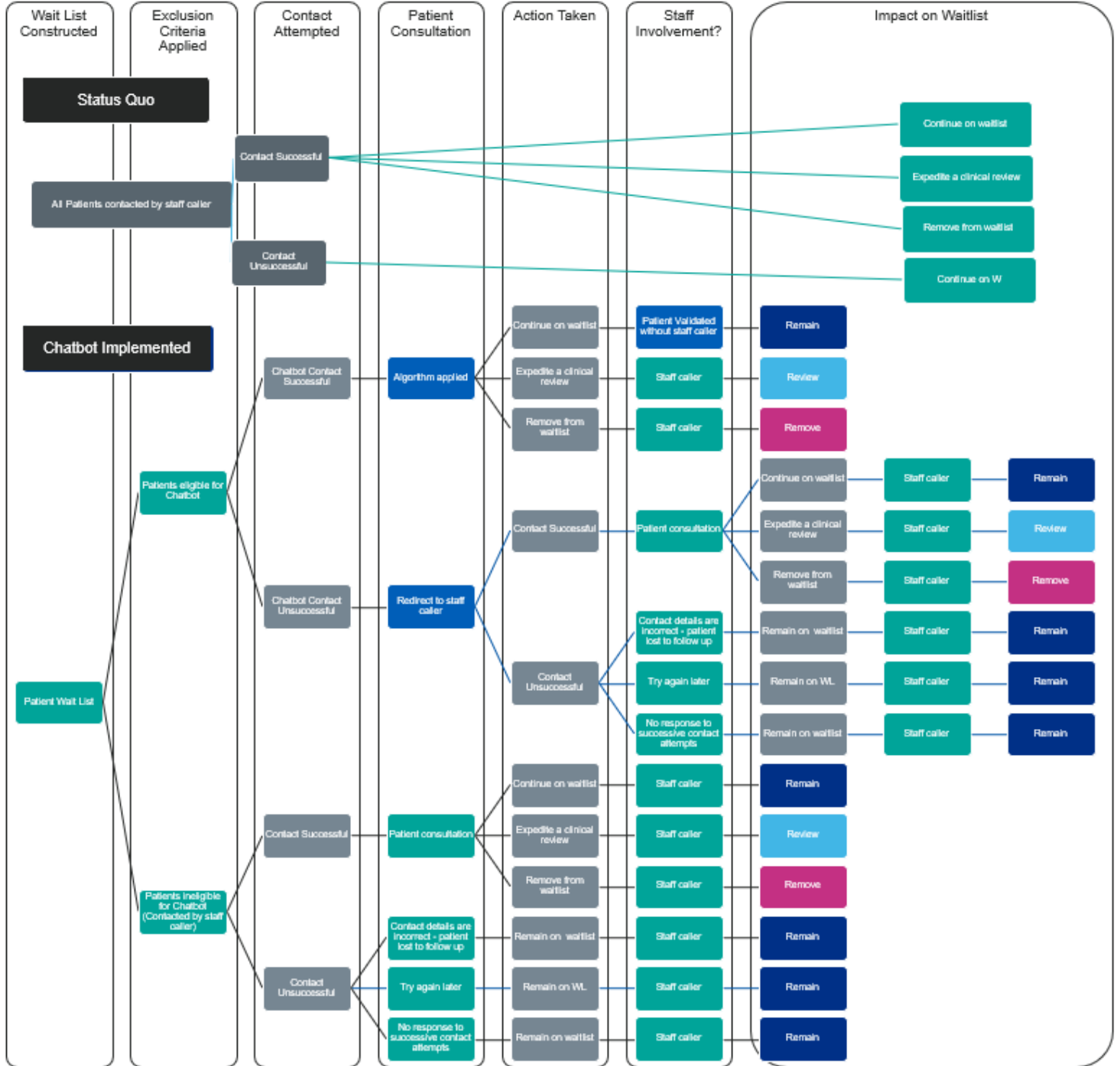


Total cost of Chatbot / NHS staff combination pathway to ICS:

- Cost of block contract with CB to process X number of validations
- NHS staff time cost to process those not eligible for CB
- NHS staff time cost to process those referred back to NHS staff by CB

Appendix II: Pathway analysis

Figure 6 Decision tree showing flow of Pts and WL outcomes; note that “staff caller” here is a general term meaning doctor, nurse, or admin staff that is manually making calls.



Remain	Staff caller
Review	Neutral - no meaning
Remove	CB Interactions

Appendix III: Model Use Notes

Based on conversations with the client, the highlighted boxes in the following screenshot of the 'Populations and Parameters' tab from the model are the cells most likely to be useful in exploring how changes in input variables may impact the overall.

Health Economics Unit Chatbot Resource Impact Evalu
HEU 124: LSC ICS Waiting List Validation Programme Eva

Directions: Enter any alternative estimates in the blue boxes below.

- This page sets out the key parameters and assumptions used in the model.
- Cells highlighted in blue can be amended by the user by entering an alternate value in the cell.
- The alternate values must be a non-zero value. If you want to effectively enter a 0 or 0%, then please enter 0.00001 in the alternate box.
- To return to the default value, select the cell and delete the alternate estimate.

General Service Assumptions	Inpatients		Outpatients	
	Default Estimate	Alternate Estimate	Default Estimate	Alternate Estimate
Size of total combined IP:OP waitlist (weekly)	481		481	
Proportion of total WL by IP or OP	20%		80%	
Size of service specific waitlist (weekly)	96		385	
Validation time - doctor (min)	9		9	
Validation time - nurse / admin (min)	9		9	
Hourly Rate - doctor*	£126		£126	
Hourly Rate - nurse / admin*	£42		£42	
% of validation calls made by a doctor	60%		60%	
% of validation calls made by a nurse / admin	40%		40%	
% of WL Validations Remain	85%		85%	
% of WL Validation Review	10%		0%	
% of WL Validations Remove	5%		15%	
% of calls successful	71%		76%	
Time spent on unsuccessful calls (min/call)	6		6	
% of calls unsuccessful	29%		24%	
General Service - Optional Additional Costs:				
<i>Current Use: Additional costs not accounted for</i>				
	Inpatients		Outpatients	
-				
-				
-				
Total annual additional costs		£0		£0

Cover Overview Methods Pathway Decision Tree Population and Parameters Results

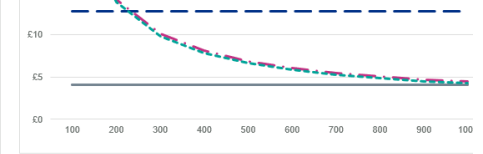
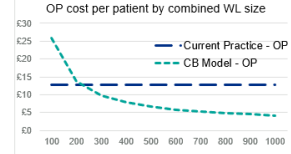
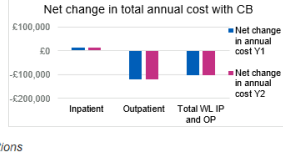
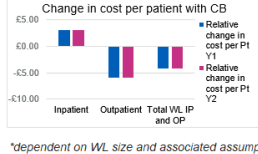
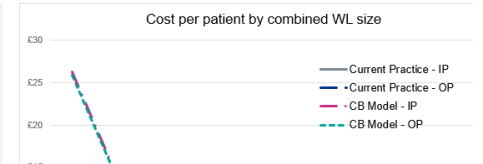
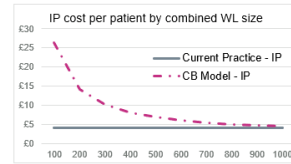
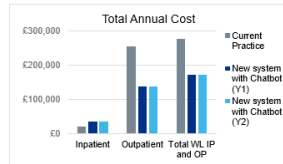
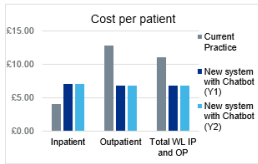
For example, if you want to test the impact of the assumption that 60% of the calls are made by doctors and 40% by nurse or admin staff, changing the ratios is possible by entering the desired alternative ration into the corresponding blue boxes. Similarly, if you know the actual salaries of the staff making the calls (instead of the reference costs used by default in the model) you can enter this under the Hourly Rate.

An example of this, along with the impact on the results tab is shown below. In this example, a user has determined that the staff mix is actually 100% admin at their site and that they cost the provider £30 per hour instead of £42 per hour. (Note, this is not their salary but rather the PSSRU guidance on the total cost including relevant overhead etc. of paying for that person's time). In this alternate use case, the new Chatbot pathway is £2.99 more expensive per patient than the existing pathway but is cheaper per patient by £5.93 for outpatients.

Directions: Enter any alternative estimates in the blue boxes below.
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% of validation calls made by a nurse / admin	40%	100%	40%	
% of WL Validations Remain	85%		85%	
% of WL Validation Review	10%		0%	
% of WL Validations Remove	5%		15%	
% of calls successful	71%		76%	
Time spent on unsuccessful calls (min/call)	6		6	
% of calls unsuccessful	29%		24%	
General Service - Optional Additional Costs:				
Current Use: Additional costs not accounted for				
	Inpatients		Outpatients	
Total annual additional costs		£0		£0

Cost per patient*	Inpatient	Outpatient	Total WL IP and OP	Total annual cost of system*	Inpatient	Outpatient	Total WL IP and OP	Population Estimates
	Current Practice	£4.07	£12.75		£11.02	Current Practice	£20,366	
New system with Chatbot (Y1)	£7.07	£6.82	£6.87	New system with Chatbot (Y1)	£35,347	£136,516	£171,863	Size of IP Waitlist 96
New system with Chatbot (Y2)	£7.07	£6.82	£6.87	New system with Chatbot (Y2)	£35,347	£136,516	£171,863	Size of OP Waitlist 385
Relative change in cost per Pt Y1	£2.99	-\$5.93	-\$4.15	Net change in annual cost Y1	£14,980	-\$118,667	-\$103,687	
Relative change in cost per Pt Y2	£2.99	-\$5.93	-\$4.15	Net change in annual cost Y2	£14,980	-\$118,667	-\$103,687	



*dependent on WL size and associated assumptions