Evaluation of Remote Monitoring of COVID-19 in South-East London

March 2023

Health Innovation Network South London

1. Contents

2. Acknowledgements

This evaluation was conducted by the Health Innovation Network (the Academic Health Science Network for south London) on behalf of our Healthier South East London (the Integrated Care System for south east London). It would not have been possible without the scale of input from staff working for One Health Lewisham (OHL) and Doctaly Assist, as well as the patients who agreed to take part in interviews.

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3. Executive Summary

Background

This evaluation was commissioned by South East London (SEL) Integrated Care System (ICS) and delivered by the Health Innovation Network, the Academic and Health Science network for south London.

The evaluation focused on the implementation and delivery of the Doctaly Assist platform and the use of remote monitoring for managing COVID-19 cases from the perspective of both patients and healthcare staff in Lewisham in south east London. It used a mixed-methods approach including in-depth interviews with staff and patients, and an analysis of data collected by Doctaly Assist.

Although the service has been stopped since, due to the number of acute COVID-19 cases falling, the evaluation provides valuable insights into how a remote monitoring technology was implemented at pace and scale in extremely challenging circumstances.

The Doctaly Assist platform, created by the health tech company Doctaly, uses WhatsApp to monitor and manage patients with COVID-19 in the community by facilitating the collection of patient information through the completion of completing daily assessments.

Clinicians can assess patient information, and if required interact with patients remotely. Patients without access to smart phones and/or WhatsApp can be supported through remote telephone assessments.

Findings

Who were the Doctaly Assist patients monitored for COVID-19 in Lewisham?

Overview of Doctaly Assist data for COVID -19 patients between January 2021 to September 2022

30,490 Lewisham patients were **invited** to use Doctaly Assist

8,4051 patients (27.6% of those invited) completed the registration process

62.3% of all patients registering **were female**

The average age of those registering was **42.3**

8.1% of registered patients were categorised as clinically 'Extremely Vulnerable'

More than **69%** of registered patients were categorised as medical emergency, high risk or medium risk

87.4 % of patients recovered or self-discharged

The median length of service use was **10 days** for those who recovered, and **11 days** for those who self-discharged

What was the patient experience of the COVID-19 version of Doctaly Assist?

Patients felt generally comfortable monitoring their COVID symptoms through the Doctaly Assist platform:

- Some found the service acted as a welcome safety net, and agreed it was easy to use due to their familiarity with the WhatsApp platform (although some struggled with using diagnostic equipment).
- Patients also liked having their assessment data stored on WhatsApp as this was a useful reference point for them.

However, some patients noted assessments could be time consuming and feel fragmented. Some participants were also unclear on whether they had any interaction with a live clinician, or whether their data was being actively reviewed outside automatic triage.

What was the staff experience of the COVID-19 version of Doctaly Assist?

Despite challenging circumstances, there was a shared feeling among the staff interviewed that Doctaly Assist had achieved positive outcomes both for clinical staff and patients with COVID-19 in south east London.

Clinical staff reported positive experiences of:

- **Using the Doctaly platform**, which they described as 'straightforward' and learnt to use with minimum training. A noted downside was the lack of integration between EMIS and the Doctaly Assist platform (integration has occurred since).
- **Working remotely**, and how it could provide an overall better work life balance. In addition, staff welcomed being able to carry on working throughout the lockdowns. Clinical staff agreed that a mix of face-to-face and remote work was a viable and sustainable way to work on a long-term basis.
- **Monitoring patients with COVID-19 remotely,** and how they found it rewarding (whilst their experiences with patients with long-term conditions were more mixed). Reasons for this included being able to alleviate the concerns of anxious patients, deliver safe medical care, help relieve pressure on other NHS services, and carry out a high number of assessments within a shift. However, they noted some challenges to delivering care remotely to patients with COVID-19 including having to rely on sometimes inaccurate pulse oximeter readings taken and submitted by patients.

The role of communicating to patients effectively and empathetically was considered by some as a key requirement to maximise patient engagement.

Conclusions and recommendations

In addition to the benefits for patients and clinicians highlighted above, the evaluation findings highlight some benefits of the Doctaly Assist service for both staff and patients with COVID-19. More than a quarter of invited patients completed the registration process, and out of those, more than 69% were categorised as medical emergency, high risk, or medium risk, suggesting the service achieved what it originally was set up to do: to provide medical help and advice to patients with a likelihood to develop serious illness from COVID-19[1].

While the service was stopped due to the falling number of COVID-19 cases, the evaluation insights provide helpful learning points for those considering implementing remote monitoring services:

- **Improving patient experience and understanding of the service through consistent and targeted communication at every stage of the patient journey**. This includes raising awareness of the service via a mix of channels to reach a wider audience, and clinicians, and communicating efficiently and empathetically with patients to maximise engagement.
- **Having clear distribution processes in place and track the distribution and return of devices**. This is especially critical when devices can be picked up from various locations.

[1] Although it is worth noting that COVID-19 result reporting was not necessarily done by the whole population who had the illness, so those invited to use the platform were only of this cohort

- **Considering interoperability between remote monitoring solutions and patient administration systems when procuring solutions** is key to delivering efficiencies and reducing the burden on staff switching and/or transferring information between systems.
- **Prioritising data collection and monitoring.** Feedback mechanisms should be designed to encourage ongoing engagement from both patient and staff. In addition, there should be mechanisms in place to collect feedback from non-users.
- **Establishing an understanding of requirements regarding information governance (IG) for remote monitoring suppliers** at the earliest possible opportunity, as well as timelines for their completion.

4. Background

Remote monitoring technology was used to manage the care of patients with COVID-19 to help reduce the burden placed on healthcare systems during the pandemic (and beyond) and protect the wellbeing of both staff and patients.

This evaluation was commissioned by South East London (SEL) Integrated Care System (ICS) and delivered by the Health Innovation Network, the Academic and Health Science network for south London. **The evaluation focused on the implementation and delivery of the Doctaly Assist platform and the use of remote monitoring for managing COVID-19 cases from the perspective of both patients and healthcare staff in Lewisham in south east London.**

It is important to note that while the Doctaly Assist platform is no longer used to monitor patients with COVID-19 in Lewisham, the evaluation provides valuable insights into how a remote monitoring technology was implemented at pace and scale in extremely challenging circumstances, and helpful learning points for those considering implementing remote monitoring services.

4.1 Overview of Doctaly Assist for patients with COVID-19 in Lewisham

As part of an effort to care for and monitor patients with COVID-19 during the pandemic, One Health Lewisham (OHL), a GP federation of 33 General Practices in Lewisham[2], was commissioned by SEL Clinical Commissioning Group to provide remote monitoring to its patients through the Doctaly Assist platform. Monitoring of patients occurred between April 2020 and September 2022. The service has been stopped since, due to the number of acute COVID-19 cases falling.

How does Doctaly Assist work

The Doctaly Assist platform, created by the health tech company Doctaly, uses WhatsApp (a widely used free cross-platform messaging service)[3] to monitor and manage patients with COVID-19 in the community by facilitating the collection of patient information through the completion of completing daily assessments. Clinicians can assess patient information, and if required interact with patients remotely. Patients without access to smart phones and/or WhatsApp can be supported through remote telephone assessments.

The questionnaire used as part of the patient assessments was developed by clinicians in south east London using relevant questions taken from existing questionnaires that were being validated for an ongoing COVID-19 monitoring study, Remote COVID-19 Assessment in Primary Care (RECAP) [4]. As part of this study sponsored by Imperial College London (Espinosa-Gonzalez A. et al, 2022)[5], Doctaly provided data for the records for 4,045 south east London patients: for model development in the first instance, and later on for model validation. Using primary data on patients' signs and symptoms collected in the community at the point of consultation and linking them to secondary data on hospital outcomes, it found that the RECAP-oxygen (RECAP-O2) model (where a patient is monitored and SpO2 is available) allowed estimating the likelihood of a particular patient with a COVID-19 diagnosis being admitted to hospital with COVID-19 within 28 days of symptom onset.

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[2] One Health Lewisham (OHL) serves a population of approximately 350,000 people.

[3] According to OFCOM, 88% of UK online smartphone-using adults visited WhatsApp in September 2021: https://www.ofcom.org.uk/__data/assets/pdf_file/0023/238361/online-nation-2022-report.pdf

[4] https://imperialbrc.nihr.ac.uk/research/covid-19/covid-19-ongoing-studies/recap/

[5] Espinosa-Gonzalez A, Prociuk D, Fiorentino F, Ramtale C, Mi E, Mi E, Glampson B, Neves AL, Okusi C, Husain L, Macartney J, Brown M, Browne B, Warren C, Chowla R, Heaversedge J, Greenhalgh T, de Lusignan S, Mayer E, Delaney BC. Remote COVID-19 Assessment in Primary Care (RECAP) risk prediction tool: derivation and real-world validation studies. Lancet Digit Health. 2022 Sep;4(9):e646-e656. doi: 10.1016/S2589-7500(22)00123-6. Epub 2022 Jul 28. PMID: 35909058; PMCID: PMC9333950.

Data collection was automated by a "chatbot", with the questions and answer "flow" changing according to the patient responses. The results provided by the patient were reviewed by clinicians who were trained to read and interpret the data and ask additional questions if required or even suggest action (e.g. advising patients to visit their GP or attend hospital).

While initially developed to monitor patients with COVID-19, the service then expanded and was offered across a number of GP practices in Lewisham and south east London for other conditions, such as monitoring patients with long-term conditions (LTCs). The application of remote monitoring of long-term conditions in south east London was the focus of another evaluation[6] by the Health Innovation Network.

Patient eligibility criteria

The Doctaly platform onboarded One Health Lewisham patients with the following criteria:

- Suspected or confirmed COVID-19 patient case (however, the service was aimed at patients in the acute phase of the illness, and not people with long COVID).
- Not declined to data sharing and to being contacted via SMS messaging.
- 18+ years.

Pulse oximeter[7] access

As part of the onboarding process, patients were asked whether they had access to a pulse oximeter (in order to measure blood oxygen saturation levels when completing assessments). If they did not, patients could choose to either purchase a personal pulse oximeter via an online vendor or access a free one from One Health Lewisham (with the expectation that devices would be returned by patients after use).

As part of managing the service, One Health Lewisham was responsible for staffing it, and did so with a mix of salaried and locum GPs. More details on the e-hub staff can be found in the appendices (9.2).

Clinician onboarding

Clinician onboarding onto the Doctaly Assist platform consisted of the following components:

- Review of One Health Lewisham's Standard Operating Procedure (SOP) document and Doctaly "how to" user guide.
- A training session of around one hour provided by the Doctaly team to help them navigate the platform.
- Being added to a WhatsApp group with other One Health Lewisham clinicians working on the platform and v administrators. The group was used by administrators to communicate with clinicians on shift, and for clinicians to ask any questions they might have.

One Health Lewisham operating model for patients with COVID-19

There were a number of steps involved in the care process for One Health Lewisham patients with COVID-19, from being invited to use Doctaly Assist to completing an assessment (as summarised in Appendix 9.1).

Step 1: Patients were directed to the service from multiple sources, with the vast majority of referrals coming from COVID-19 Positive Electronic Patient Record (EPR) searches by One Health Lewisham[8]. Those patients were automatically enrolled into the service and sent a message requesting their consent to proceed. At this stage, patients had the option to opt out of the service. Those without access to smart phones or WhatsApp could submit information as part of their assessments over the phone.

[6] Evaluation of Remote Monitoring of Long Term Conditions in South East London - Health Innovation Network
[7] A pulse oximeter is a small medical device that is put on the tip of the finger, to check someone's oxygen levels.
[8] If a patient had a positive swab coded in EMIS (e.g. Hospital or GP record), these patients were picked up automatically by OHL's proactive searches.

Step 2: At the point of onboarding, the details of consenting patients[9] were transferred from EMIS into the Doctaly Assist platform.

Step 3: Based upon the frequency suggested by One Health Lewisham clinicians, patients received prompts on WhatsApp to complete their assessment. Throughout the flow, a series of triage questions were also used to assign patients to the most appropriate 'risk' group (i.e. High, Medium, or Low risk depending on their responses reflected on the assessment summary provided by the chatbot)[10] [11].

Step 4: One Health Lewisham clinicians reviewed patient information via the platform and actioned any necessary changes[12].

Step 5: After being monitored for up to 14 days (or as soon as the patient tested negative), patients were discharge from the service. Upon discharge, Doctaly dispatched a monitoring summary emailed to patients' registered GPs. Patients also had the option to self-discharge after each message prompt or conversation with One Health Lewisham staff.

More information about One Health Lewisham, including its patient demographics can be found in Appendix 9.1.

[9] Those details included: full name, date of birth, ethnicity, gender, telephone contact details, NHS number, height, GP practice, and information on comorbidities.

[10] Upon patient incompletion of WhatsApp assessment, 3 follow-up messages are sent from Doctaly before placing patient on exceptions list report. Doctaly prompt messaging at 24 hours, 1 week, and 2 weeks).

[11] Patients categorised as 'medical emergency' were directed to call 999 immediately; information was also flagged on the Doctaly platform. High-risk patients identified were escalated to the clinicians on rota.

[12] As part of doing this, clinicians could ask patients for additional information through WhatsApp. They also had access to a browser-based video consultation capability, should they wish to interact with patients that way. Clinicians could access patients' medical history by tracing patients in GP Extended Access (GPEA) EMIS. Patients requiring a face-to-face appointment could be booked into a 'Hot Hub' appointment, home visit, or escalated to urgent/emergency care.

5. Evaluation purpose and design

The proposed evaluation focuses on the COVID-19 specific version of the Doctaly Assist platform to NHS patients, implemented as part of the UK Coronavirus response and managed by One Health Lewisham (OHL) GP Federation.

5.1 Evaluation questions

The evaluation has aimed to answer the following questions:

- Who were the patients invited and used Doctaly Assist to monitor their COVID-19 symptoms?
- How did these patients engage with the service?
- What was the patient experience of the service? Did they find using the technology acceptable?
- What was the staff experience of the service?

In doing so, the evaluation has sought to:

- Determine the uptake of the remote monitoring platform by Patients with COVID-19
- Describe its patients' characteristics.
- Explore the practical and clinical acceptability of the platform looking at patient satisfaction and experience.
- Describe conditions for implementation and delivery of the remote monitoring platform and identify barriers and enablers.
- Explore staff experience, including acceptability of the platform, and experience of treating patients with COVID-19 remotely.

This evaluation did not look at how/ whether the service impacted on healthcare utilisation.

5.2 Evaluation design

This evaluation has used a mixed-methods approach where both quantitative and qualitative data has been collected and analysed to address the evaluation objectives. It included:

- An analysis of data collected by Doctaly Assist.
- Qualitative fieldwork with One Health Lewisham's clinical and administrative staff, and locum GPs who had worked with the service.
- Qualitative fieldwork with patients who used the Doctaly Assist platform to monitor their COVID-19 symptoms.

Quantitative data collection

A range of quantitative data relating to the profile and activity of One Health Lewisham patients with COVID-19 invited to register to the platform was provided by Doctaly Assist, in order to undertake this evaluation.

Data was received for the period of January 2021 to September 2022. This was patient-level, non-identifiable data for all patients invited to use the Doctaly Assist service, which included:

- Month of invitation to use Doctaly Assist
- Demographics (sex, age, and ethnicity)
- Vulnerability and risk status (where captured)
- Source of referral
- Method of contact (WhatsApp or phone)

- Registration status to Doctaly (Registered, Opted-out, Failed to Respond)
- Dates of registration or deregistration
- Patient outcome

Qualitative data collection

Qualitative interviews were carried out with seven staff – one operational staff member involved in the implementation of the service, and six GPs involved in delivering clinical care to patients with COVID-19 through the Doctaly Assist platform. Four of the six GPs we talked to had also experience of monitoring patients with long term conditions (i.e. hypertension, asthma, and chronic obstructive pulmonary disease) through the platform; therefore, they were able to compare their experiences doing so against their experiences of monitoring patients with COVID-19. This is discussed in section 6.3.

A total of six patient interviews were carried out. The patient fieldwork was carried out over November and December 2022. All patients interviewed had used the Doctaly Assist platform between August and September 2022. Interviews lasted around 30 minutes and covered patient experiences of being invited to use, and of being monitored via Doctaly Assist.

When considering the patient insights, it is important to highlight the context in which the participants used Doctaly Assist and when the fieldwork was carried out, which was at a time when concerns around COVID-19 (and its impact on healthcare services) were not as high as earlier in the pandemic. This may have influenced patients' views of the service.

6. Findings

This section discusses the findings derived from the analysis of the quantitative and qualitative data collected.

6.1 Who were the Doctaly Assist patients monitored for COVID-19 in Lewisham?

Doctaly Assist service data from January 2021 to September 2022 was extracted for patients invited to register to the Doctaly Assist platform to monitor their COVID-19 symptoms at home. During this period, a total of 30,490 Lewisham patients were invited to use the service.

Referral and invitation to the service

The vast majority of patients (96.8% of all patients invited and 91.9% of those registered) were referred into the service through a COVID-19 positive Electronic Patient Record (EPR) search by the One Health Lewisham team (Table 1). One Health Lewisham then sent this daily extract, containing the details of patients who had tested positive to COVID-19 within the last 14 days (rolling), to Doctaly through secure email.

Table 1: Sources of referral

	Registered		Opted Out		Failed to respond	
Source of Referral	Number	%	Number	%	Number	%
COVID-19 Positive EPR Search	7723	91.9%	2948	99.3%	18848	98.6%
Other	682	8.1%	20	0.7%	269	1.4%
TOTAL	**8405**	**100%**	**2968**	**100%**	**19117**	**100%**

The majority of patients who registered did so through WhatsApp (98.9%) (Table 2).

Table 2: Method of contact with patient

	Registered		Opted Out		Failed to respond	
Method	Number	%	Number	%	Number	%
Phone	90	1.1%	-	0.0%	655	3.4%
WhatsApp	8315	98.9%	2967	100.0%	18462	96.6%
TOTAL	**8405**	**100%**	**2968**	**100%**	**19117**	**100%**

Uptake of patients invited to register to Doctaly Assist

Out of the 30,490 who were invited, 8,405 patients (27.6% of those invited) completed the registration process. The remaining patients either failed to respond (62.7%) or they opted out at the end of the registration process (9.7%) (Table 3).

Table 3: Uptake of Doctaly for those invited

	Invited to use Doctaly for COVID -19	
	Number	%
Registered	8405	27.6%
Failed to respond	19117	62.7%
Opted-out	2968	9.7%
TOTAL INVITED	**30490**	**100.0%**

Demographics of Doctaly Assist patients with COVID-19

Error! Reference source not found. shows the sex, age range and ethnicity breakdown of all invited patients[13]:

- There was a proportionately higher uptake of Doctaly Assist by female patients. This is further demonstrated by the fact that 30.5% of females invited to use Doctaly Assist registered for the service, compared to 23.7% of invited males[14].
- Uptake was proportionately lower in the 18-34 year old age group as well as the 85+ age group. The average age of those registering was 42.3 compared to an average age of 40.2 of all those invited. The 45-54 year old age group were the most likely to register from being invited at 33.7%.
- Ethnicity data was very limited for all patient groups with 92.4% of all invited patients having no ethnicity recorded. Of the small numbers available, 6.7% of those who registered were recorded as being in the white ethnicity group[15].
- Of those who registered for the service, 830 (8.1%) were categorised as 'Extremely Vulnerable'[16].

[13] As not all people would have logged their positive COVID test results on the NHS COVID app, or the NHS website registered or alerted their GP practice, it cannot be assumed that this data reflects the entire Lewisham population with a COVID-19 infection.
[14] The Health Innovation Networks' evaluation of remote monitoring of long term conditions also found that the uptake of Doctaly Assist was higher for female patients.
[15] The white ethnicity group includes 'white other'.
[16] As part of the patient set-up process, One Health Lewisham clinicians had to complete an online referral from to onboard patients onto the Doctaly Assist platform. This form included a flag, based on certain comorbidities[16] denoting whether a patient was 'Extremely vulnerable' or not. The underlying health issues that would lead to a patient being flagged as 'extremely vulnerable' included: post-transplant; active chemo/radiotherapy cancer patients/immunotherapy; haematological cancers (at any stage of treatment); severe chest conditions (CF, asthmatics/COPD); rare diseases and inborn errors of metabolism that increase risk of infections including homozygous sickle cell disease; on immunosuppressant therapy sufficient to increase risk of infection; pregnant with heart disease

Table 4: Demographics of invited patients by registration type

	Registered		Opted Out		Failed to respond		All invited patients
	Number	%	Number	%	Number	%	%
Sex							
Female	5236	62.3%	1687	56.8%	10217	53.4%	56.2%
Male	3169	37.7%	1281	43.2%	8900	46.6%	43.8%
Age band							
18-24	389	4.6%	225	8.6%	2143	11.2%	9.1%
25-34	2286	27.2%	1148	38.7%	6196	32.4%	31.6%
35-44	2512	29.9%	823	27.7%	4685	24.5%	26.3%
45-54	1755	20.9%	425	14.3%	3022	15.8%	17.1%
55-64	999	11.9%	226	7.6%	2027	10.6%	10.7%
65-74	317	3.8%	68	2.3%	663	3.5%	3.4%
75-84	113	1.3%	16	0.5%	268	1.4%	1.3%
85+	34	0.4%	-	0.2%	107	0.6%	0.5%
Unknown	0	0.0%	-	0.0%	-	0.0%	0.0%
Average age							
	42.3	-	37.9	-	39.6	-	40.2
Ethnicity							
Asian or Asian British	92	1.1%	-	0.2%	125	0.7%	0.7%
Black or Black British	224	2.7%	31	1.0%	425	2.2%	2.2%
Mixed	54	0.6%	-	0.2%	60	0.3%	0.4%
Other	38	0.5%	-	0.1%	33	0.2%	0.3%
White (incl. white other)	566	6.7%	72	2.4%	582	3.0%	4.0%
Not stated/Unknown	7431	88.4%	2847	95.9%	17892	93.6%	92.4%
Vulnerability status							
Extremely vulnerable	830	8.1%	-	-	-	-	-
TOTAL	**8405**		**2968**		**19117**		

Table 5 shows the patients' highest risk category[17] they fell into throughout their time using the Doctaly Assist service:

- There were 174 patients (2.1%) who fell into the 'medical emergency' category.
- There were 2,131 (25.4%) who were classified as 'high risk'.
- The majority of those registered (3,496) were placed in the 'medium risk' category (41.6%).

The above suggests the service was successful at engaging patients with underlying medical problems or vulnerabilities more likely to develop serious illness from COVID-19 (with only 19.3% of patients categorised as low risk).

The average age of patients increases for each risk category: 48 years old for medical emergency, 43 years old for high risk, and 42 years old for medium risk (

[17] See Appendix 9.3 for more information about risk categories

Table **5**).

Table 5: Registered patients' highest risk category

	Registered		Average Age
Risk Category	Number	%	
999	174	2.1%	48
High	2131	25.4%	43
Medium	3496	41.6%	42
Low	1626	19.3%	39
Unknown	978	11.6%	40
TOTAL	**8405**	**100.0%**	

Patient outcomes

Table 6 shows the patient outcomes collected by Doctaly for those who registered to the service. However, outcomes were only collected for 43.5% of registered patients, with the remainder bulk discharged (56.6%) from the service (56.6%) after a certain period of non-response[18].

Out of the patients for whom an outcome was recorded:

- The majority of patients (87.4 %) recovered or self-discharged.
- A further 430 (5.1% of all patients) had ongoing symptoms and were discharged to other services.
- Of the 29 (0.3% of all patients) admitted to hospital, 21 were categorised in the 999 or 'high' risk category (see above).

Data on registration and discharge dates onto the service was collected and can be seen in Table 6. There were some inconsistencies such as missing or inaccurate registration dates as well as potential delayed discharge from the service. However, the median length of service use for the patients where data was available was:

- 10 days for those who recovered as recorded by the service clinicians.
- 11 days for those who self-discharged.
- 10 days for those who had ongoing symptoms and were referred to other services.
- 5 days for those who were admitted to hospital.

Table 6: Patient outcome

	Registered		
Outcome	Number	%	Median duration on platform (in days)
Batch removed/declined service/unresponsive	4748	56.5%	n/a
Recovered (Discharge to GP)	2725	32.4%	10
Self-Discharge	473	5.6%	11
Ongoing symptoms (discharge to other service)	430	5.1%	10
Admitted to hospital	29	0.3%	5

6.2 What was the patient experience of the COVID-19 version of Doctaly Assist?

This section describes patients' experiences of using Doctaly Assist to monitor their COVID-19 symptoms. It is based on qualitative interviews carried out as part of this evaluation with six patients.

The patient fieldwork for this evaluation was carried out over November and December 2022. All patients interviewed had used the Doctaly Assist platform between August and September 2022, when concerns around

[18] Non-responders were discharged after failing to respond to: four messages sent by a clinician or OHL administrative staff, and one phone call by a clinician

COVID-19 among the general population were not as high as earlier in the pandemic. This lower concern was due to the number of COVID cases falling, the vaccine programme being rolled out, as well as greater understanding and awareness of how to manage COVID- 19 symptoms.

Feedback collected by One Health Lewisham in 2021 (see below) (and staff insights gathered as part of this evaluation earlier in 2022) suggest that patients had found the platform more helpful at that time when concerns around COVID-19 were higher.

Invitation and onboarding process

Participants were asked to describe the process of being invited to use Doctaly Assist to monitor their COVID-19 symptoms. All the participants interviewed were identified and referred by One Health Lewisham onto the service after logging their positive COVID test results on the NHS COVID app, or the NHS website. One patient's wife who was symptomatic and also logged her positive result on NHS COVID app, was not contacted by Doctaly Assist, despite being registered to the same GP practice, which the participant found confusing.

Patients generally felt the invitation to use Doctaly Assist sent over WhatsApp was unsolicited, and 'came out of the blue', which led to initial frustration or perplexity for some. Because they did not receive any communication from a pre-existing, trusted source within the health service, a few participants noted feeling sceptical regarding the legitimacy of the service.

> *"And then about a day or two later [after recording positive result online], Doctaly got in touch and said they were monitoring me with it, and I was a bit surprised about that because I didn't think they even did that. I was a bit annoyed about it to be honest. Nobody warned me that that was going to happen, like it had gone on without my permission sort of thing. It felt it was almost like an intrusion, because no one had explained."*

In addition, there could be some confusion around the rationale for the service upon receiving the invite, with some patients believing it was aimed at monitoring compliance with COVID restrictions rather than monitoring his own health or a population health data collection initiative more than a personal health service. Other patients felt they did not fit the eligibility criteria for the service, in terms of age and health status, and therefore felt they had been invited to use it by mistake.

> *"I hadn't understood what it meant, and it was talking about an older age profile, about particular concerns about symptoms or underlying health conditions, etc, which didn't actually apply to me (…) I took advantage of the oversight, but I'm not sure that I should been in there in the first place."*
>
> *"It felt like a policing thing (…) I said I've got COVID, and it was: 'Blimey, we'd better get in touch with her make sure she's not all charging around giving everyone COVID'."*
>
> *"Initially, when COVID came out, I was part of the ZOE study[19]. And I was found that very, very, very good (…) I just thought this was a continuation, they can use the information to help support research."*

[19] The Zoe Health Study, formerly the COVID Symptom Study, is a health research project of British company Zoe Limited which uses a mobile app. The initial purpose of the app was to track COVID-19 symptoms and other salient data in a large number of people, to enable epidemiological results to be calculated.

Those misconceptions and initial lack of clarity around the purpose of the service suggests how information about a new service, such as Doctaly Assist, should come from a trusted source (e.g. a patient GP practice or another 'official' NHS service) to maximise patient engagement, as highlighted in the Health Innovation Networks' Evaluation of Remote Monitoring of Long Term Conditions in South East London[20] .

> *"I was a little bit pissed off. Because I thought, why isn't my GP calling me because I have a very good GP and extremely fond of him. But then I realized it was a supportive service. So I went along with it. Though I did think for a second, 'Oh, is this one of those scamming messages'. Because you have to be very, very wary."*

Despite their initial surprise of receiving an invite to use the service, participants agreed that the information given as part of the onboarding process was appropriate and tended to be clear about what was expected of them through the assessments. In addition, there were no concerns or reservations about using WhatsApp for the purpose of remote monitoring. All participants had used WhatsApp previously and had confidence in the platform's security[21].

Reasons for registering to Doctaly Assist

In addition to agreeing to monitor their symptoms remotely, participants identified other motivations for opting-in:

- They wanted to contribute to broader health research by providing their data.
- They felt obliged to opt-in as part of COVID 'policing', and a few noted their motivation being linked to personal health tracking.
- They wanted to have an additional source to prove their COVID status to work and a useful for proof of self-isolating, if needed.

> *"I got a text saying 'Would you like to use the service?' And I thought, oh, what a good idea. Yeah, I'll do this. And also I thought be quite good for work as well if I needed some proof or something".*

Experiences of care received through the Doctaly Assist platform

Overall, participants reported mixed experiences of care through Doctaly Assist to monitor their COVID-19 symptoms. However, it is important to view this in the context of the patients we talked to:

- Not having concerns about their health and relatively mild COVID-19 symptoms
- The fieldwork being conducted after the pandemic, and successive lockdowns.

Box 1 provides a summary of feedback collected by One Health in December 2021 during the rapid rise in Omicron variant cases in London, as a comparison to data collected from patients for this evaluation in November and December 2022.

[20] Contrary to patients with COVID-19, Doctaly patients LTCs were sent a SMS message by their GP practice prior to being sent an invite to register to the service.

[21] Yet it is important to note that concerns over the legitimacy of the platform and reservations about sharing personal health data over WhatsApp were potential access barriers for a number of people invited to use the service.

Box 1: Patient feedback on remote monitoring of COVID-19 by One Health Lewisham

Feedback collected by OHL in the midst of the pandemic tended to be more positive with patients highlighting a number of benefits to using the service including how:

- It acted as what was felt to be a **helpful safety net**, which felt to be especially important for patients with health conditions.
  "I have an underlying heart condition so when I was first told I had contracted COVID, I was quite worried! Knowing a GP was aware I had it and was monitoring me from home daily really put all my concerns to ease and made me feel safe. "

- It helped **alleviate feelings of isolation**, and anxiety.
  "If I didn't have the service, I feel I would have panicked and felt alone. Recovery would have taken longer. My anxiety would have hit the roof. Having the GP monitoring service reassured me that I'm not alone and I can get medical advice & help. Mentally it made me stronger."

- It could help **relieve pressure on other NHS** services such as GP practices and emergency services.
  "At a time of national crisis, it's easy to not seek medical help or advice because you don't want to put extra pressure on services and then dismiss your symptoms."

- It gave **tailored medical advice**.
  "Being connected to professionals every step of the way gave me the confidence to ride through any symptoms in the knowledge that what I was experiencing was normal; as it wasn't generic advice that you would find from a google search, it was based on my specific …symptoms."

Views on assessments

Patients interviewed for this evaluation felt comfortable monitoring their COVID symptoms through the Doctaly Assist platform. They noted that:

- The assessment questions were clear and the assessment process relatively straightforward.
- The frequency of assessments was acceptable.
- Having their assessment data stored on WhatsApp was a useful reference point.

> *"I'm hoping that [my assessment answers were] being reviewed on a on a regular basis and that if there were any anomalies that they would have highlighted me to that. But also at the same time for me, it was a good reference tool (…) I could always refer back thinking, 'Oh, was I ill that day or was it COVID related to do with something else?"*

However, some participants noted that assessments could:

- Be time consuming; one participant discussed how completing a full assessment could take him up to 30 minutes.
- Feel fragmented due to the asynchronous communication between patients and clinicians and the service working only on weekdays.

In addition, patients had a mixed understanding of if and how their data was being assessed by a clinician. Most understood the majority of the interaction to be automated, with a few noting it was clearer when they were interacting with a live clinician.

"I felt kind of looked after, you know, it's quite a nice turn to the human element."

Yet, a few participants were unclear on whether they had any interaction with a live clinician, or whether their data was being actively reviewed outside automatic triage. Some felt their data was primarily being used for population-level research; suggesting the importance of clinicians being able to communicate effectively and empathetically with patients (and making sure not to over rely canned messages[22], as highlighted in the HIN's evaluation of remote monitoring for LTCs).

A few patients noted they found the communication to be 'one-way' and would have liked an opportunity for more open-ended dialogue with clinicians, as well as a more personal process for discharge (see below).

Use of clinical equipment

While most participants found completing the assessments straightforward, some patients reported issues linked to:

- **Using a pulse oximeter to take and submit readings**: one patient felt the instructions provided were confusing and unhelpful, particularly regarding respiratory rate. As a result, the patient tried to take his respiratory rate manually, with readings rejected by the assessment as 'too high'. He then resorted to 'making up' the numbers; thereby, was submitting inaccurate clinical data. Participants with long-term conditions (and accustomed to monitor their own health) tended to be more comfortable submitting their readings.

- **Not receiving a pulse oximeter in time to complete the assessments**: although most of the participants already had their pulse oximeter (or access through a relative), two did not and were offered one. One patient only received it after being discharged and was not able to use it while on the platform. They were also unclear about how to return the device, which suggests clearer guidance on device management for patients could have been helpful for some.

Areas for improvement identified by participants

The patients interviewed identified a number of areas for improvement for the platform, which included having:

- The option to engage with a clinician proactively and directly. This was also identified as a key priority by patients as part of the Health Innovation Networks' evaluation of remote monitoring for long term conditions. As part of this, one participant mentioned they would have liked being able to sign off / express thanks to clinicians following an assessment, as their interactions with them had felt uncomplete.

- Greater clarity around the discharge process and how to self-discharge. For instance, one patient self-discharged after three days due to frustration with the platform, and lack of severity of symptoms.

- The option to provide feedback, including scoring each interaction with a clinician.

6.3 What was staff experience of Doctaly Assist to monitor patients with COVID-19?

Qualitative interviews were carried out with seven staff:

- One operational staff member involved in the implementation of the service. Their interview focused on the implementation and delivery of the service, including barriers, enablers, and lessons.
- Six GPs involved in delivering clinical care of patients with COVID-19 through the Doctaly Assist platform.

[22] Canned responses are predetermined responses to common questions. Doctaly Assist uses canned responses to send template responses providing common instructions or advice to patients.

Their interviews focused on their views of the platform, their experience of treating patients with COVID-19 through it, on how this had impacted their day-to-day role, and their perspectives on patient care.

Views on implementation and delivery

The Doctaly Assist platform was introduced rapidly and at scale in the midst of the pandemic, therefore the service unsurprisingly experienced a number of challenges with its implementation. Most were directly attributable to the issues commonly experienced when implementing a new service, as well as the challenging context in which the service was launched. Identified challenges included:

- The high demand from patients with COVID-19: the service was launched during the Omicron wave in December 2021, coinciding with a peak of COVID-19 cases in London. This meant demand for the service was initially underestimated.

> *"I think we underestimated how many hours that we needed. And so actually it was a case of them [GPs who helped implementing the service] ending up working over Christmas and you know, you're trying to because everyone was really sick, and it was a lot."*

- The lack of administrative resources originally deployed, which resulted in issues around delivering and collecting oximeters from patients.

- Resourcing and recruitment challenges, because recruiting salaried staff proved challenging (partly due to chronic staff shortages across the NHS), One Health Lewisham had to rely on locums more than anticipated/ hoped for. In addition to this, resourcing the service and predicting workloads was difficult as it was not possible to predict the number of patients from one day to another.

> *"I think it was very difficult to know how many staff they needed. We had minimal clinicians, but so many reviews. So I remember that was a bit difficult because we were all trying to learn the system and you know, we're obviously a bit slower in terms of the reviews that we do. So that was a little bit that took a little bit of adjustment period."*

However, despite challenging circumstances, there was a shared feeling among the staff interviewed that the COVID-19 version of the platform achieved very positive outcomes (both for clinical staff and patients alike).

> *"I think I think for COVID, it's been very satisfying. I think a lot of patients really appreciate it. I feel very comfortable reviewing patients as well. I do think it is safe. I think I'm good at picking out which [patients] are higher risk, which ones need calling on top of just the normal review (…) So I think from that point I have found it very satisfying actually to be involved (…) So yeah, I think it's been really good experience."*

Overall, the rationale for the COVID-19 service to release pressure on emergency services and being able to treat patients self-isolating at home proved to be compelling and effective at getting clinical buy-in. In addition, staff identified some key enablers (also discussed in the Health Innovation Networks' evaluation of remote monitoring of long-term conditions[23]):

[23] Evaluation of Remote Monitoring of Long Term Conditions in South East London - Health Innovation Network

- The establishment of a good and productive relationship between the One Health Lewisham and Doctaly teams: this was one of the key factors considered when the decision was made to expand the use of the platform to treat certain LTCs.

- Staff and patient acceptability of remote monitoring: it was felt this was partly because the platform was easy and straightforward to use but also because the pandemic helped with overall acceptance of remote technologies, even among older patients.

> *"There's been acceptance for patients, especially the elderly generation (…) And I've seen this play out the 20s and 30s patients, they're very happy to, you know, they don't want to come to hospital (…) They're very happy with the remote interaction. It was with the elderly or the middle aged that I thought there was going to be the real barrier (…) but I think that COVID has accelerated [acceptance of remote care]."*

- The advantages of managing the service through a hub-led model: identified benefits of the hub model ran by One Health Lewisham included having a centrally run team comprised of staff (both clinical and administrative) with an in-depth understanding of the service and having some consistency in how the service was delivered.

Clinical staff experience of working with Doctaly Assist to treat patients with COVID-19

This section mainly focuses on insights gathered from six GPs who used the Doctaly platform to monitor patients with COVID-19; including salaried One Health Lewisham's staff, and locum GPs. At the time of the fieldwork, four of the six GPs interviewed had also used the platform to treat patients with long term conditions. This means that participants were able to compare their experiences of using the platform to monitor patients with COVID-19, to treat patients with long term conditions. This is discussed below.

Views of the platform

Overall, clinical staff reported positive experiences of using the Doctaly platform, which they described as 'straightforward' and 'intuitive'. Practically, this meant they could carry remote assessments out with minimum training. This was a key consideration for locum GPs completing shifts only sporadically, as they did not have to be constantly retrained on how to use the platform:

> *"I had like 1 hour demo at the beginning and then did a session later and it was fine. It was a bit, you know, or is this right after a certain hour, say when you've got a few sorts of patients you keep going and it's fine and actually back then I did leave and did some locum as and when and every time I start again I found it quite easy. So I think the actual system, it is very easy to use."*

In addition to the platform's ease of use, staff also praised:

- The way it displays information about patients. They welcomed how they could easily access information about their demographics and view previous interactions between a patient and other One Health Lewisham clinicians.

> *"You can scroll up, see the patients, previous responses. You can see their demographics. You can put it to another colleague putting in their inbox. They could put into your inbox. You can see*

who's viewed it. (…) So I think it's really good."

- Its canned message functionality, which meant clinicians could not only save time but also communicate more effectively with patients by signposting them quickly to relevant advice and/or services. It was also noted how canned messages had gotten better overtime, and how Doctaly seemed to have incorporated some of the feedback received.

- Its administrative support team, with participants describing receiving prompt technical support when needed. This sentiment was echoed by One Health Lewisham programme staff who noted how the team always prioritised taking the time to train clinicians when required.

A noted downside was the lack of integration between EMIS and the Doctaly Assist platform. Some staff noted how they would have liked to see EMIS coded information about the patients through the platform, which was not possible[24]. This meant they had relied on information about co-morbidities and medication inputted by patients, which could sometimes be inaccurate (although any potential risk to patient safety and outcomes was mitigated by clinicians also reviewing patient information in EMIS)

Benefits of remote working

As highlighted in the Health Innovation Networks' evaluation of remote monitoring of long-term conditions[25], clinical staff identified a number of benefits linked to providing an overall better work life balance, specifically:

- Being able to work from home, or anywhere, and allowing staff the flexibly to choose where to work from.

- Being able to manage one's own time and workload. This had several positive implications, especially for those with caring responsibilities.

- Not being as physically and mentally taxing as face-to-face appointments. This was perceived as particularly important due to the burnout experienced by some post-pandemic.

"It is really helpful to have that variety, I feel less tired, less burnt out… I think Doctaly is much less mentally exhausting than working at the practice (…) because you can pace yourself at rhythm that feels comfortable for you. You're not under pressure to respond immediately, you can think about things, you can get up, get a drink when you need to go to the loo when you want to."

In addition, staff welcomed being able to carry on working throughout the lockdowns, albeit differently.

"With COVID, everyone else got a chance to work from home (…) And so yeah, you know, having that opportunity to do some remote work and still making a difference is really handy. "

However, participants cautioned against the risk of:

- Spending too long online without any break, doing a four-hour shift, and having to learn to have boundaries.
- Working only remotely: clinical staff agreed that working exclusively online could lead to deskilling, and that a mix of face to face and remote work was a more viable and sustainable way to work on a long-term basis.

[24] This was not possible at the time of the fieldwork, however since then, a new version of the platform fully integrated with EMIS was developed and went live in Autumn 2022.

[25] Evaluation of Remote Monitoring of Long Term Conditions in South East London - Health Innovation Network

Experiences of monitoring patients with COVID-19 remotely

Whilst staff perspectives on remotely treating patients with long-term conditions were overall mixed[26], the clinicians interviewed reported very positive experiences of monitoring patients with COVID-19. They found working shifts on Doctaly Assist had been a rewarding experience, and discussed how they felt the service was safe and valued by patients.

> *"I think for COVID, it's been brilliant (…) I've had so much positive feedback... I think so many people appreciate it. Plus they're not able to see their own GPS as well. So a lot of people feel reassured, especially the sick ones and to have a point of contact. So definitely, I think COVID is very different. Whereas with the LTCs… I think for some reason the patients get a bit confused. We have found that [some patients] think that we're actually their GPs."*

They identified several reasons for this including being able to:

- Alleviate the concerns of anxious patients isolating at home.
- Deliver what they felt was accurate and safe medical care remotely.
- Help relieve pressures on GP practices and emergency services, especially during the COVID-19 waves.
- Work efficiently, and more specifically assess patients quickly but safely and carry out a high number of assessments within a shift (participants contrasted this to their experiences of carrying LTCs reviews which could be spread across several days).

> *"I've done a full day's work of COVID. I can be like today for example or I think I've done 9 to 5, and you know I can say safely I sort of resolved about 100 to 150 cases."*

> *"You know, COVID is a viral illness. It's like a, you know, it's an acute illness. So I think with COPD with asthma, hypertension there, there is a lot more to think about generally. So you know the reviews naturally would take longer because you need to take, you need to look in their medical records, you need to see what they're on (…) So naturally there's a bit more ground work that needs to be done."*

Linked to the above, staff noted how patients tended to engage well and respond relatively quickly to their messages, which they attributed to the acuity of their illness.

> *"Basically with COVID, they've actually got an acute illness. So they engage with you a bit better [than for LTCs] because you know they've got COVID-19 and they're acutely unwell. [With LTCs], it's kind of like sometimes they won't engage because it's just a message on the phone and it's not urgent to them. "*

However, the role of communicating to patients effectively and empathetically was considered by some as a key requirement to maximise patient engagement and ensure assessments were carried out efficiently. It was noted that patients could sometimes be unclear on whether they exchanged messages with a chatbot or a clinician. For instance, one clinician explained how he paid particular attention on how to phrase his interactions with patients, to gain the best rapport by personalising his messages.

[26] Reference to LTCs report

"I'll always have like an introduction … because they're mostly talking to the bot. Otherwise, they're kind of blunt (..) because if they've gone through a million automated bots over the past few months, it's nice just having a unique kind of a personalised line (…). Whatever, you know, something to gain rapport."

However, challenges to delivering care remotely to patients with COVID-19 were also identified that related to:

- The lack of pathway integration between multiple conditions, including COVID-19, could cause confusion among patients.
- Having to treat patients with COVID-19 and patients with long term conditions within one shift. One participant noted how having to assess a mixed caseload of both COVID and LTCs patients within a single shift might not be as efficient as focusing on a single condition (although it is important to note this changed since the fieldwork was carried out, with clinicians focusing on COVID or LTCs during a shift).
- Having to rely on pulse oximeter readings taken and submitted by patients, which could be inaccurate. This highlights the importance of empowering and educating patients to use a pulse oximeter correctly.

"Even if patients are given a SATs probe [pulse oximeter], the readings were not necessarily accurate. I think a lot of people just put it on for a few seconds, and they just put that number…so there's a lot of trying to educate people on how to use the SATs probe."

7. Limitations

There are a number of limiting factors that impacted on this evaluation:

- There were some gaps in the data collected by Doctaly and shared with the evaluation team:
    - Data on vulnerability was predominately only available for patients who registered, therefore understanding uptake of the service by those who may be more likely to use secondary care services (due to higher vulnerability levels) was not possible to ascertain.
    - No data was available on the number of readings submitted by patients, nor the patient journey/trajectories and subsequent impact on healthcare utilisation.
    - Ethnicity data was very limited with no information (or not stated) for 92.4% of all invited patients.

- A breadth of staff working for One Health Lewisham was interviewed. However, this was not intended as an exhaustive process. The views of some individuals who played substantial roles in the programme may not be reflected in the evaluation.

- The patient fieldwork for this evaluation was carried out over November and December 2022. All patients interviewed had used the Doctaly Assist platform between August and September 2022, when concerns around COVID-19 among the general population were not as high as before. It is therefore important to note that the patient feedback might have likely differed (i.e. be more positive), should the fieldwork had been carried out in the midst of the pandemic.

- The perspectives on certain cohorts of patients are missing from the evaluation:
    - patients who refused or did not register to Doctaly Assist (they made up more than three quarters of invited patients), and
    - patients who registered with Doctaly Assist but did not engage post-registration, or dropped out.

  No data was collected on these cohorts of patients. Their reasons for not registering or not engaging should be explored further in order to identify and understand any potential behavioural or access barriers to using the platform, and remote monitoring care more generally.

- Linked to the above, understanding engagement and length of time using the platform was difficult due to significant numbers of registered patients being bulk removed from the service after a period of non-responsiveness. Reasons for the disengagement are unknown.

- The purpose of this evaluation was not to undertake an economic analysis. However, this would have been needed to understand the full financial costs and benefits of having implemented and delivered Doctaly Assist (and/or comparable solutions) to remotely monitor patients with COVID-19.

8. Conclusions and recommendations

This evaluation provides insights into how a remote monitoring technology was implemented at pace and scale in the midst of the COVID-19 pandemic. Despite challenging circumstances, there was a shared feeling among the One Health Lewisham staff interviewed that Doctaly Assist had achieved positive outcomes both for clinical staff and patients with COVID-19 in south east London.

The evaluation findings highlight some benefits of the Doctaly Assist service for both staff and patients with COVID-19:

- More than a quarter of invited patients completed the registration process, and out of those, more than 69% were categorised as medical emergency, high risk or medium risk, suggesting the service achieved what it originally was set up to do: to provide medical help and advice to patients with a likelihood to develop serious illness from COVID-19 (although it is worth noting that COVID-19 result reporting was not necessarily done by the whole population who had the illness, so those invited to use the platform were only of this cohort).
- Some patients found the service acted as a welcome safety net, and agreed it was easy to use due to their familiarity with the WhatsApp platform (although some struggled with using diagnostic equipment).
- Clinicians found the platform user-friendly, enjoyed the benefits of hybrid working, and overall, felt they successfully managed a large volume of patients using the platform.

Importantly, the successful perception of the COVID-19 version of Doctaly Assist in treating COVID patients in south east London was instrumental in scaling up of the service to treat long-term conditions, getting the buy-in from staff across Lewisham, and boosting take-up among One Health Lewisham's GP practices.

Recommendations

The service was stopped due to the falling number of COVID-19 cases, as well as greater patient confidence in managing their COVID symptoms. However, the evaluation insights provide helpful learning points for those considering implementing remote monitoring services.

Improving staff and patient experience: Participants' experience and understanding of the service highlight the importance of communication at every stage of the patient journey, which is echoed by the findings of the Health Innovation Networks' evaluation of remote monitoring of long-term conditions[27]. This includes raising awareness of the service via a mix of channels to reach a wider audience. This was especially important for patients with COVID-19, as they were directly invited to join the service by Doctaly rather than their GP practice (as was the case for long-term conditions). Another important consideration is for clinicians carrying remote assessments to communicate efficiently and empathetically with patients to maximise engagement, and so patients are clear when they engage with a clinician (and when they do not).

Improving processes: When the use of clinical equipment is required for a remote monitoring service, there needs to be clear distribution processes. It is also important to ensure the number of devices aligns with the allocation of staff resources to be able to manage effective delivery. It is also important to track the distribution and return of devices. This is especially critical when devices can be picked up from various locations.

Technological considerations: Interoperability between remote monitoring solutions and patient administration systems should be a key consideration when procuring solutions. Integration between provider systems (such as

[27] Evaluation of Remote Monitoring of Long Term Conditions in South East London - Health Innovation Network

EMIS) and specialist applications is key to delivering efficiencies and reduce the burden on staff switching and/or transferring information between systems.

Data collection and monitoring: Feedback mechanisms should be designed to encourage ongoing engagement from both patient and staff. In addition, there should be mechanisms in place to collect feedback from non-users, including:

- Patients who do not register to the service upon receiving the invite, by systematically asking those opting out of the service their reasons for doing so.
- Patients who register to the service but do not complete an assessment.

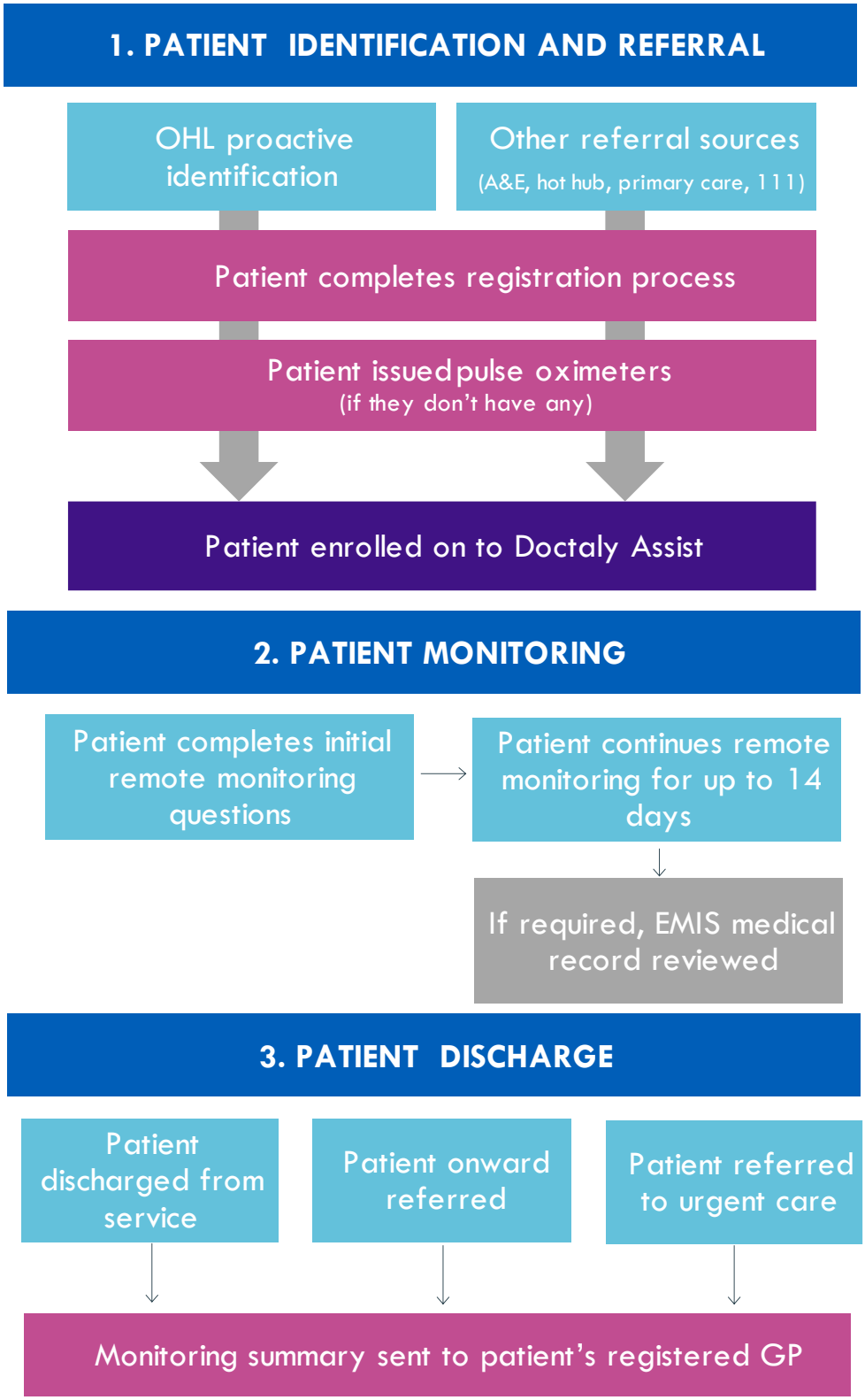
Information Governance: an understanding of requirements regarding information governance (IG) should be established and clearly communicated to remote monitoring suppliers at the earliest possible opportunity, as well as timelines for their completion. For instance, the creation of an SEL (or national) template repository, which teams could adapt to fit the needs of their specific remote monitoring projects, could help address this.

In addition to the recommendations outlined above, further recommendations relevant to the remote monitoring of acute conditions, such as COVID-19, can be found in the summary report on evaluating the London remote monitoring scale up programme for managing long-term conditions, which collates learning from evaluations of pathways across five Integrated Care Systems in London[28].

[28] Health Innovation Network (2023) Evaluating the London remote monitoring scale up programme for managing Long-Term Conditions, available on: https://healthinnovationnetwork.com/wp-content/uploads/2023/06/Pan-London-Evaluation-report_Final.pdf

9. Appendix

9.1 One Health Lewisham pathway for Patients with COVID-19



9.2 Overview of One Health Lewisham

One Health Lewisham (OHL) is a GP Federation established in 2016 that has grown out of four neighbourhood GP federations in the North, Centre, South East and South West of the South London Borough of Lewisham. It comprises membership of 33 GP practices, serving a population of approximately 350,000 people.

Patient demographics

The largest age group of One Health Lewisham patients is 30-39 years old and 51% of patients are female. There are higher levels of deprivation in Lewisham compared to the England average with an overall deprivation score of 26.7 (England has a score of 21.7)[29]. Self-reported unemployment is also much higher than the England average (10.2% in Lewisham compared to 5.5% in England)[30]. A lower percentage of patients report that they have a long-standing health condition in Lewisham (44.3%) compared to the proportion in England (51.1%), although it is higher than the London percentage (42.6%)[31].

GP Practice survey data

Error! Reference source not found. shows select data from the 2021 GP practice survey [32] [33]. Scores for One Health Lewisham practices are slightly lower than the England averages, particularly in regard to telephone access (only 61.5% are satisfied under One Health Lewisham compared to 67.6% in England overall).

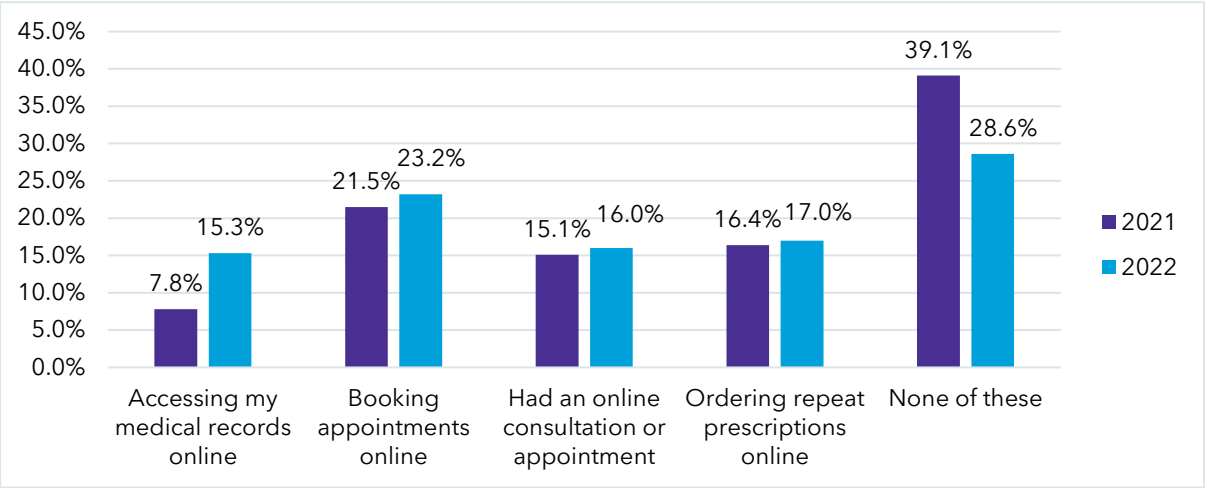
Table 7 : 2021 GP patient survey data

2021	Lewisham – OHL practices	England
% who have a positive experience of their GP practice	80.4	83.0
% satisfied with phone access	61.5	67.6
% satisfied with practice appointment times	59.8	62.7
% reporting good overall experience of making an appointment	66.8	70.6

Comparison data from the 2021 and 2022 GP patient surveys[34] shows an increase in use of online services within Lewisham, with 39.1% of respondents not using any online services in 2021 reducing to 28.6% in 2022.

[29] https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019
[30] 2021 GP Patient Survey: https://www.gp-patient.co.uk/
[31] Idem
[32] Idem
[33] View Lewisham data in Fingertips here: OHID General Practice Data practice profile data set https://fingertips.phe.org.uk/profile/general-practice/data#page/0/gid/2000005/pat/165/par/E38000098/ati/7/are/G85698/yrr/1/cid/4/tbm/1/page-options/tre-ao-1_car-do-0
[34] 2022 GP Patient Survey : https://www.gp-patient.co.uk/

Figure 1: Comparison of online services access by patients in the past 12 months for Lewisham practices (OHL) in 2021 and 2022 (source: GP Patient Survey, 2021 and 2022).



E-hub staff

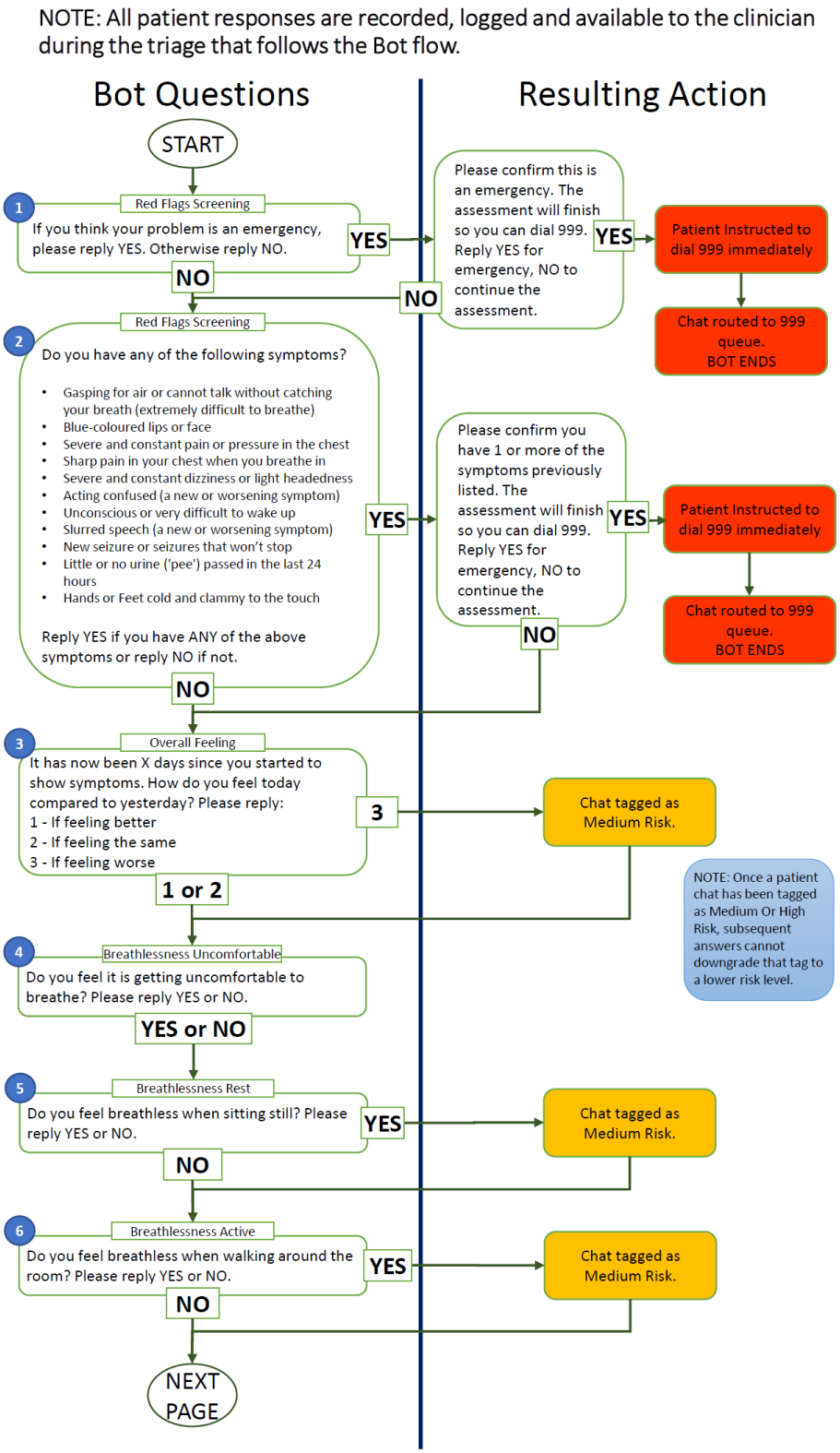
As part of managing the Doctaly Assist service, One Health Lewisham was responsible for staffing it, and did so with a mix of salaried and locum GPs. An administrator (supporting patients with both COVID-19 or long-term conditions) was on shift every day and provided support to clinical staff and patients when needed, which included:

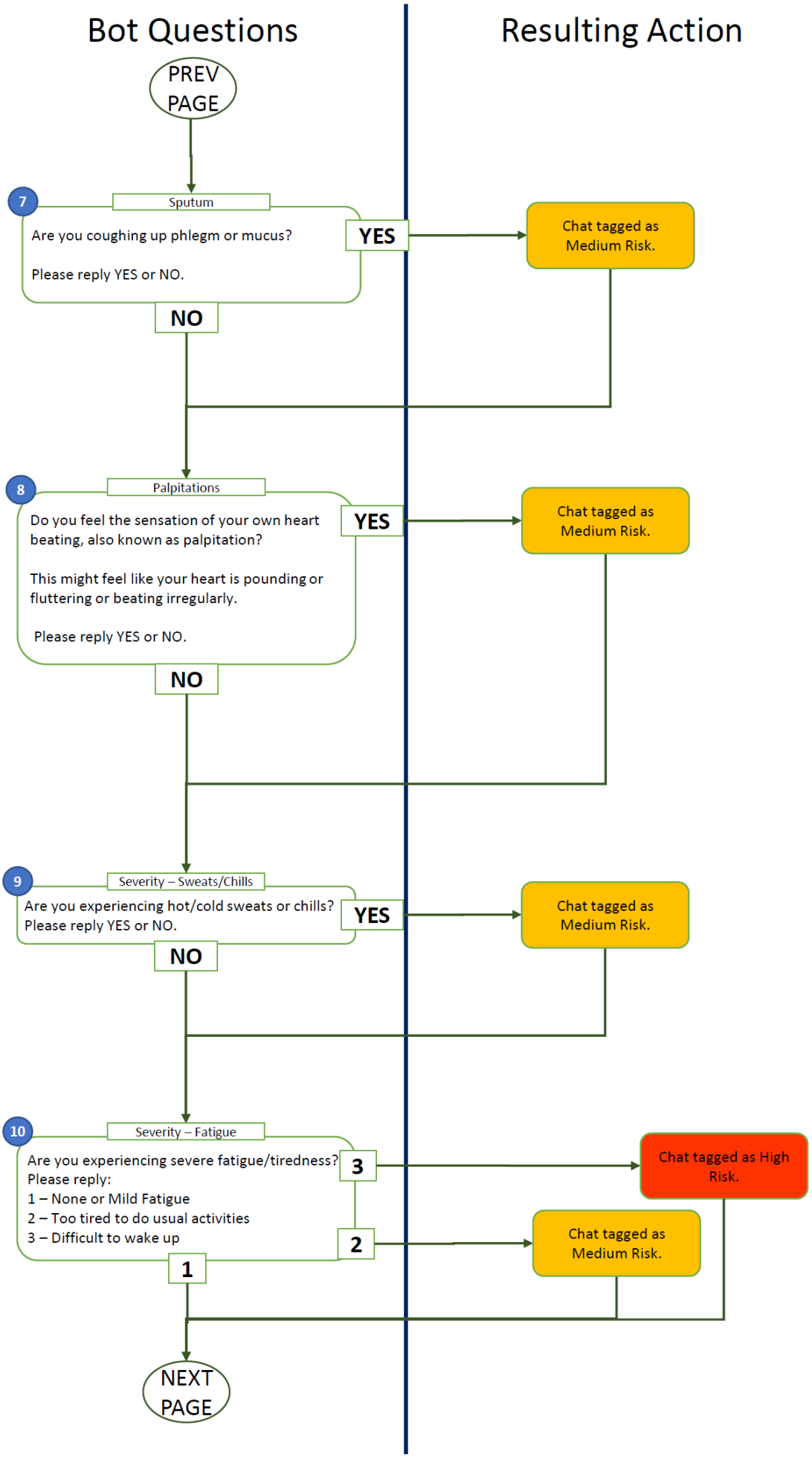
- Monitoring incoming patients in the Doctaly inbox and assigning them to clinicians according to their risk category.
- Booking patients into a COVID hot hub service[35], if required.
- Inputting information from Doctaly into patients' electronic records (i.e. initially the platform did not integrate with EMIS).
- Completing assessments with patients without a smart phone over a phone call.
- Arranging the delivery of pulse oximeters for patients without close friends or relatives available to collect them.

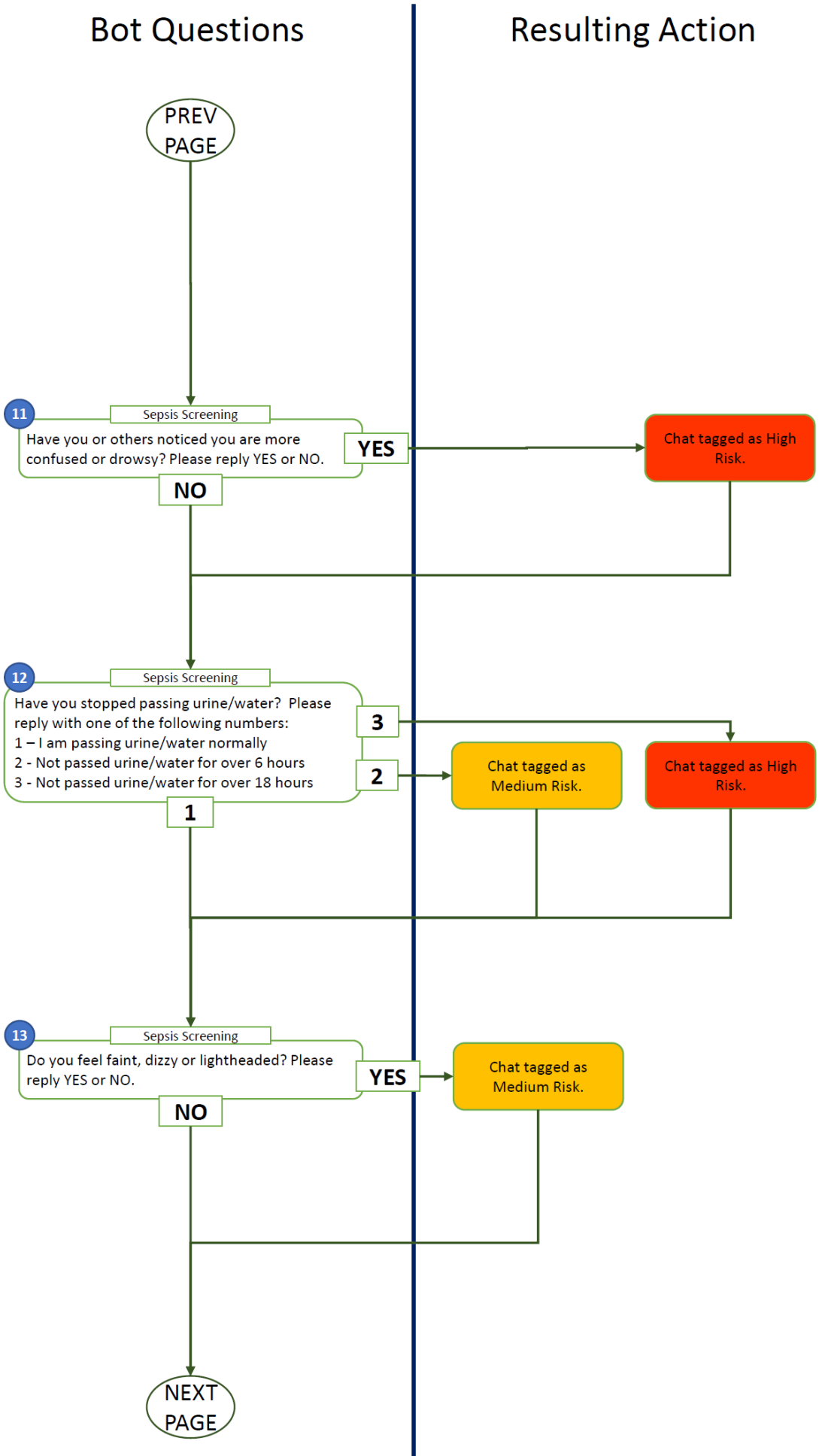
Clinicians and administrators worked Monday to Friday. Patients could be asked to complete assessments out of hours and were still required to use their discretion with calling emergency care, or 111, if they deemed their condition to be urgent. The next working day, One Health Lewisham clinicians would follow up with patients directed to call emergency care to ensure that they have adhered to the instruction.

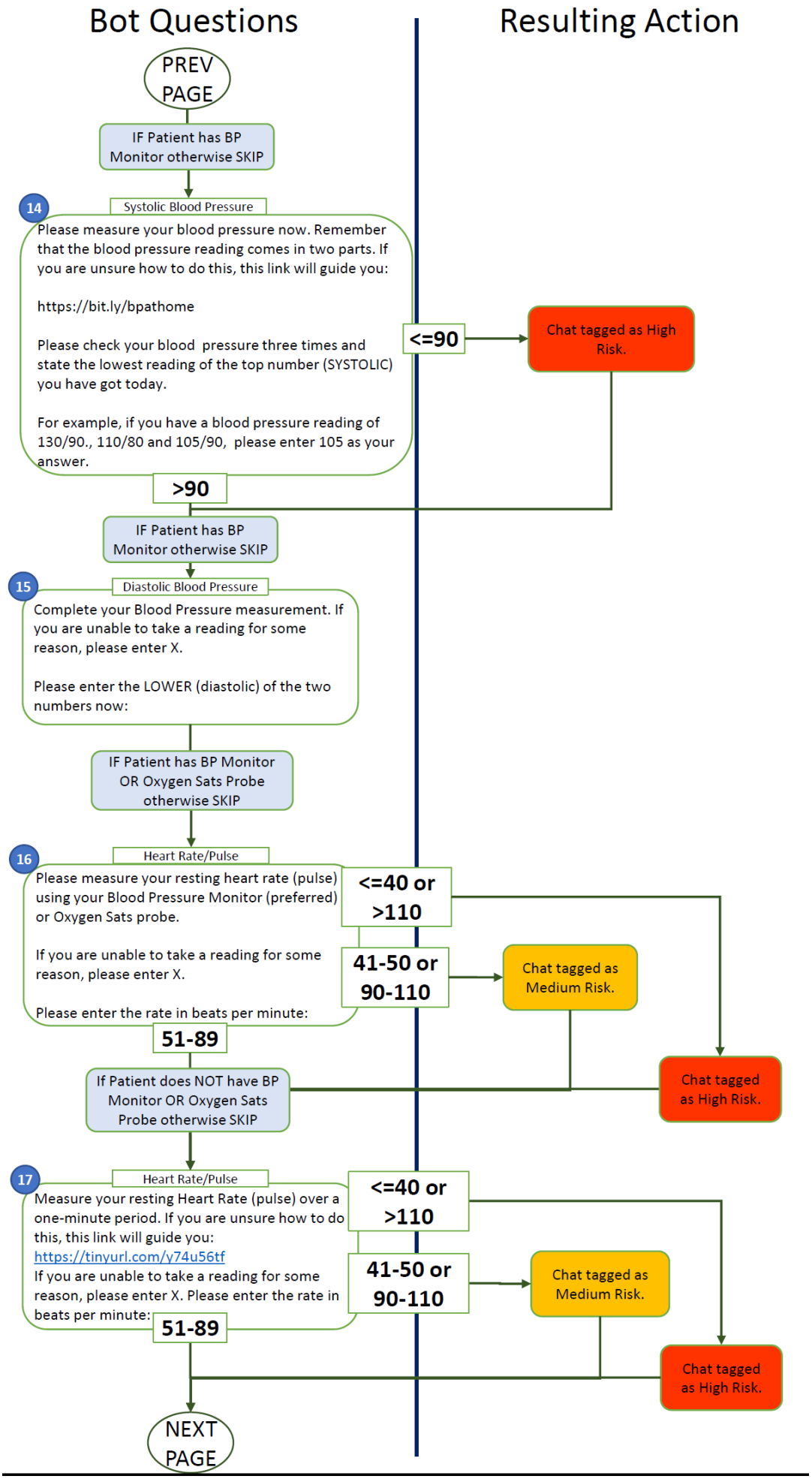
[35] As part of Lewisham's COVID-19 Emergency Response, two community treatment centres or 'hot' hubs opened in April 2020. They provided care for patients who were very unwell and were suspected of having Covid-19 and required medical attention.

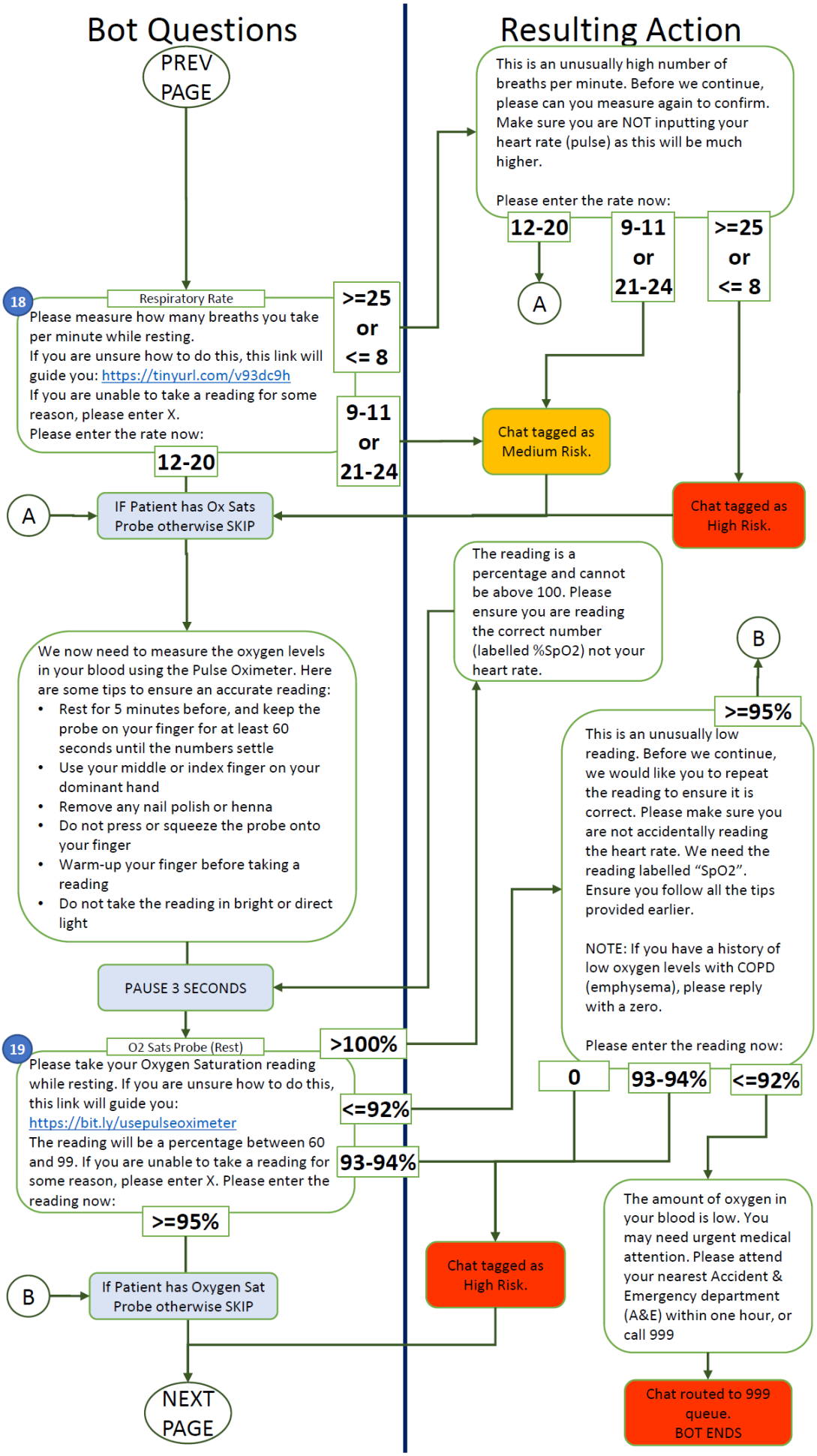
9.3 Doctaly COVID-19 risk flow

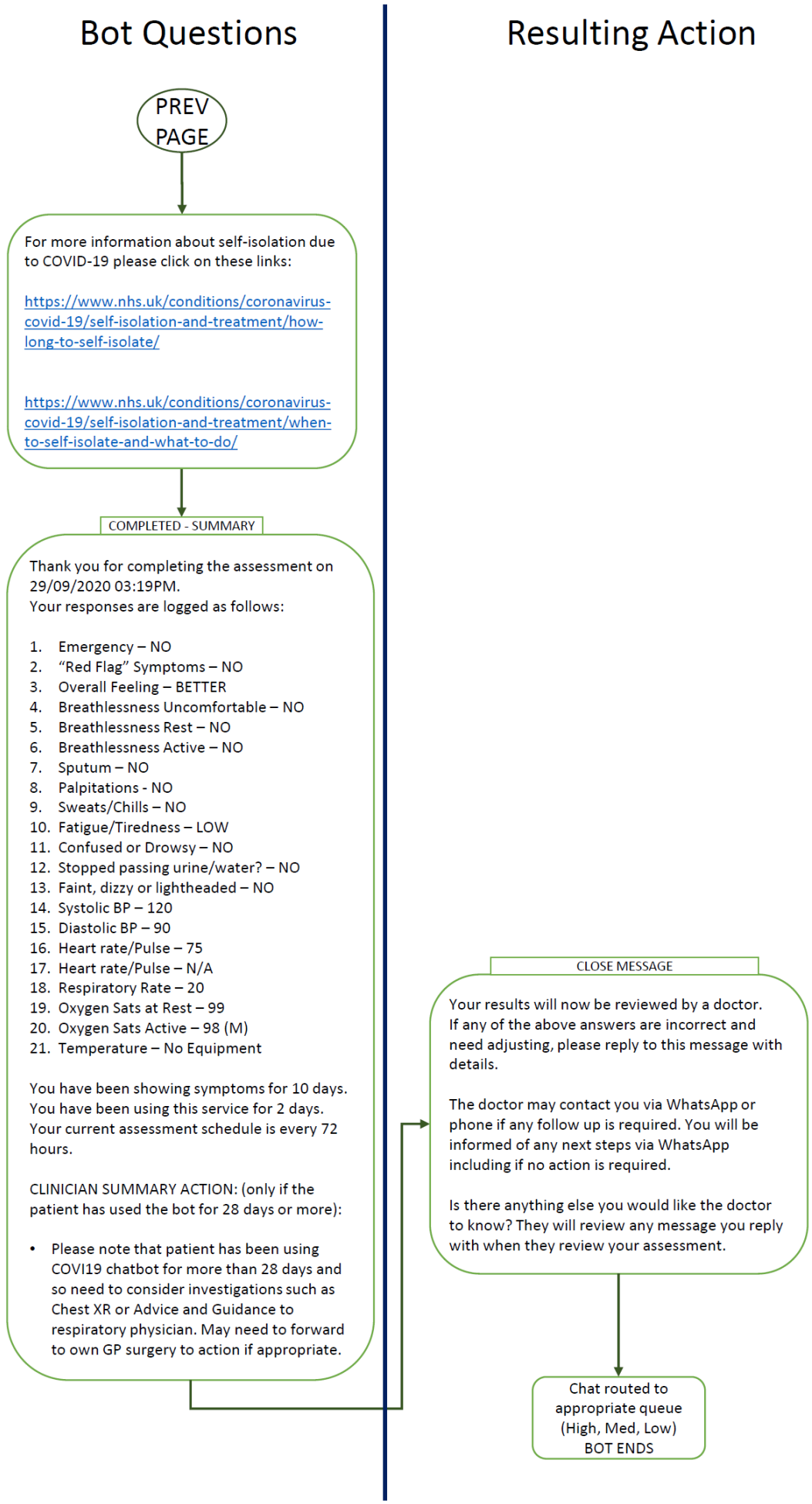


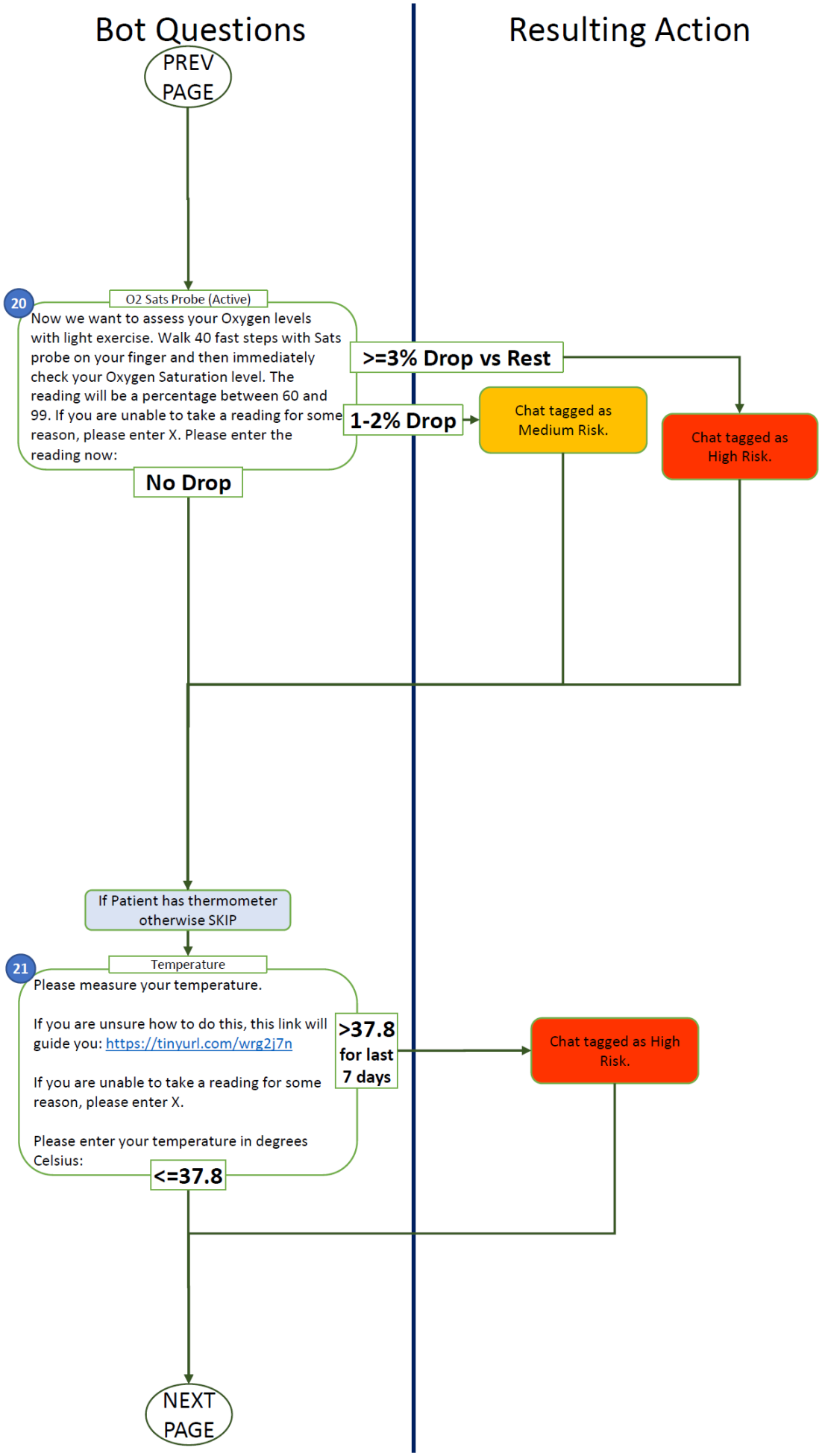

Bot Questions
Resulting Action
PREV PAGE
7
Sputum
Are you coughing up phlegm or mucus?
Please reply YES or NO.
YES
NO
Chat tagged as Medium Risk.
8
Palpitations
Do you feel the sensation of your own heart beating, also known as palpitation?
This might feel like your heart is pounding or fluttering or beating irregularly.
Please reply YES or NO.
YES
NO
Chat tagged as Medium Risk.
9
Severity – Sweats/Chills
Are you experiencing hot/cold sweats or chills?
Please reply YES or NO.
YES
NO
Chat tagged as Medium Risk.
10
Severity – Fatigue
Are you experiencing severe fatigue/tiredness?
Please reply:
1 – None or Mild Fatigue
2 – Too tired to do usual activities
3 – Difficult to wake up
3
2
1
Chat tagged as High Risk.
Chat tagged as Medium Risk.
NEXT PAGE


Bot Questions
Resulting Action
PREV PAGE
11
Sepsis Screening
Have you or others noticed you are more confused or drowsy? Please reply YES or NO.
YES
NO
Chat tagged as High Risk.
12
Sepsis Screening
Have you stopped passing urine/water? Please reply with one of the following numbers:
1 – I am passing urine/water normally
2 - Not passed urine/water for over 6 hours
3 - Not passed urine/water for over 18 hours
3
2
1
Chat tagged as Medium Risk.
Chat tagged as High Risk.
13
Sepsis Screening
Do you feel faint, dizzy or lightheaded? Please reply YES or NO.
YES
NO
Chat tagged as Medium Risk.
NEXT PAGE


Bot Questions
Resulting Action
PREV PAGE
IF Patient has BP Monitor otherwise SKIP
14
Systolic Blood Pressure
Please measure your blood pressure now. Remember that the blood pressure reading comes in two parts. If you are unsure how to do this, this link will guide you:
https://bit.ly/bpathome
Please check your blood pressure three times and state the lowest reading of the top number (SYSTOLIC) you have got today.
For example, if you have a blood pressure reading of 130/90., 110/80 and 105/90, please enter 105 as your answer.
<=90
Chat tagged as High Risk.
>90
IF Patient has BP Monitor otherwise SKIP
15
Diastolic Blood Pressure
Complete your Blood Pressure measurement. If you are unable to take a reading for some reason, please enter X.
Please enter the LOWER (diastolic) of the two numbers now:
IF Patient has BP Monitor OR Oxygen Sats Probe otherwise SKIP
16
Heart Rate/Pulse
Please measure your resting heart rate (pulse) using your Blood Pressure Monitor (preferred) or Oxygen Sats probe.
If you are unable to take a reading for some reason, please enter X.
Please enter the rate in beats per minute:
<=40 or >110
41-50 or 90-110
Chat tagged as Medium Risk.
51-89
Chat tagged as High Risk.
If Patient does NOT have BP Monitor OR Oxygen Sats Probe otherwise SKIP
17
Heart Rate/Pulse
Measure your resting Heart Rate (pulse) over a one-minute period. If you are unsure how to do this, this link will guide you:
https://tinyurl.com/y74u56tf
If you are unable to take a reading for some reason, please enter X. Please enter the rate in beats per minute:
<=40 or >110
41-50 or 90-110
Chat tagged as Medium Risk.
51-89
Chat tagged as High Risk.
NEXT PAGE


Bot Questions
Resulting Action
PREV PAGE
18
Respiratory Rate
Please measure how many breaths you take per minute while resting.
If you are unsure how to do this, this link will guide you: https://tinyurl.com/v93dc9h
If you are unable to take a reading for some reason, please enter X.
Please enter the rate now:
12-20
>=25 or <= 8
9-11 or 21-24
This is an unusually high number of breaths per minute. Before we continue, please can you measure again to confirm. Make sure you are NOT inputting your heart rate (pulse) as this will be much higher.
Please enter the rate now:
12-20
9-11 or 21-24
>=25 or <= 8
A
Chat tagged as Medium Risk.
Chat tagged as High Risk.
A
IF Patient has Ox Sats Probe otherwise SKIP
We now need to measure the oxygen levels in your blood using the Pulse Oximeter. Here are some tips to ensure an accurate reading:
Rest for 5 minutes before, and keep the probe on your finger for at least 60 seconds until the numbers settle
Use your middle or index finger on your dominant hand
Remove any nail polish or henna
Do not press or squeeze the probe onto your finger
Warm-up your finger before taking a reading
Do not take the reading in bright or direct light
PAUSE 3 SECONDS
19
O2 Sats Probe (Rest)
Please take your Oxygen Saturation reading while resting. If you are unsure how to do this, this link will guide you:
https://bit.ly/usepulseoximeter
The reading will be a percentage between 60 and 99. If you are unable to take a reading for some reason, please enter X. Please enter the reading now:
>=95%
>100%
<=92%
93-94%
The reading is a percentage and cannot be above 100. Please ensure you are reading the correct number (labelled %SpO2) not your heart rate.
B
>=95%
This is an unusually low reading. Before we continue, we would like you to repeat the reading to ensure it is correct. Please make sure you are not accidentally reading the heart rate. We need the reading labelled "SpO2". Ensure you follow all the tips provided earlier.
NOTE: If you have a history of low oxygen levels with COPD (emphysema), please reply with a zero.
Please enter the reading now:
0
93-94%
<=92%
Chat tagged as High Risk.
The amount of oxygen in your blood is low. You may need urgent medical attention. Please attend your nearest Accident & Emergency department (A&E) within one hour, or call 999
Chat routed to 999 queue.
BOT ENDS
B
If Patient has Oxygen Sat Probe otherwise SKIP
NEXT PAGE


Bot Questions
Resulting Action
PREV PAGE
For more information about self-isolation due to COVID-19 please click on these links:
https://www.nhs.uk/conditions/coronavirus-covid-19/self-isolation-and-treatment/how-long-to-self-isolate/
https://www.nhs.uk/conditions/coronavirus-covid-19/self-isolation-and-treatment/when-to-self-isolate-and-what-to-do/
COMPLETED - SUMMARY
Thank you for completing the assessment on 29/09/2020 03:19PM.
Your responses are logged as follows:
1. Emergency – NO
2. "Red Flag" Symptoms – NO
3. Overall Feeling – BETTER
4. Breathlessness Uncomfortable – NO
5. Breathlessness Rest – NO
6. Breathlessness Active – NO
7. Sputum – NO
8. Palpitations - NO
9. Sweats/Chills – NO
10. Fatigue/Tiredness – LOW
11. Confused or Drowsy – NO
12. Stopped passing urine/water? – NO
13. Faint, dizzy or lightheaded – NO
14. Systolic BP – 120
15. Diastolic BP – 90
16. Heart rate/Pulse – 75
17. Heart rate/Pulse – N/A
18. Respiratory Rate – 20
19. Oxygen Sats at Rest – 99
20. Oxygen Sats Active – 98 (M)
21. Temperature – No Equipment
You have been showing symptoms for 10 days.
You have been using this service for 2 days.
Your current assessment schedule is every 72 hours.
CLINICIAN SUMMARY ACTION: (only if the patient has used the bot for 28 days or more):
• Please note that patient has been using COVI19 chatbot for more than 28 days and so need to consider investigations such as Chest XR or Advice and Guidance to respiratory physician. May need to forward to own GP surgery to action if appropriate.
CLOSE MESSAGE
Your results will now be reviewed by a doctor.
If any of the above answers are incorrect and need adjusting, please reply to this message with details.
The doctor may contact you via WhatsApp or phone if any follow up is required. You will be informed of any next steps via WhatsApp including if no action is required.
Is there anything else you would like the doctor to know? They will review any message you reply with when they review your assessment.
Chat routed to appropriate queue (High, Med, Low)
BOT ENDS


Bot Questions
Resulting Action
PREV PAGE
20
O2 Sats Probe (Active)
Now we want to assess your Oxygen levels with light exercise. Walk 40 fast steps with Sats probe on your finger and then immediately check your Oxygen Saturation level. The reading will be a percentage between 60 and 99. If you are unable to take a reading for some reason, please enter X. Please enter the reading now:
>=3% Drop vs Rest
1-2% Drop
Chat tagged as Medium Risk.
Chat tagged as High Risk.
No Drop
If Patient has thermometer otherwise SKIP
21
Temperature
Please measure your temperature.
If you are unsure how to do this, this link will guide you: https://tinyurl.com/wrg2j7n
If you are unable to take a reading for some reason, please enter X.
Please enter your temperature in degrees Celsius:
>37.8 for last 7 days
Chat tagged as High Risk.
<=37.8
NEXT PAGE