# Case Study: Improving patient care through remote patient monitoring.

**In only a matter of months, virtual wards have evolved beyond an aspirational concept to become a valuable tool for delivering healthcare during the Covid-19 pandemic.**

At the start of the pandemic, Northampton General Hospital (NGH) partnered with Doccla to trial a responsive home monitoring service for patients recovering from Covid-19 and those with high-risk conditions. Since then, NGH and Doccla launched a second service for patients with Chronic Obstructive Pulmonary Disease (COPD) and have scaled up the Covid-19 service in response to the second wave of the pandemic.

The services aim to increase NHS capacity and improve patient care by creating virtual wards that make it possible for NGH clinicians to monitor patients in their own homes.

## Implementation

The services were designed for rapid implementation, with minimal effort required for NHS staff. To do this, Doccla handles:

- the procurement of the latest remote monitoring devices and software;
- dispatch and return of the monitoring equipment (including a pre-configured mobile phone that communicates with the devices);
- patient on-boarding;
- the provision of ongoing technical support (for patients and clinicians) via the Doccla helpdesk; and
- system availability.

Meanwhile, the NGH clinicians are responsible for:

- assessing the suitability of patients;
- agreeing a remote monitoring plan with the patient; and
- monitoring the patients condition during daily virtual “ward rounds” and responding to changes in the patient’s condition.

## The Technology

Doccla provides ready-to-use RPM hardware (including CE marked wearable monitoring devices) and software (including a mobile App and the clinical monitoring dashboard) that harness ‘Information of Things’ technology. Examples of devices and the vital signs that they collect is presented in the table below.

| Device | Measurement Type | Vital Signs |
|---|---|---|
| Pulse Oximeter | Intermittent | Heart rate<br>SPO2 |
| Blood Pressure Monitor | Intermittent | Blood Pressure<br>Heart Rate |
| Thermometer | Intermittent | Temperature |
| Armband | Continuous | Heart rate<br>Respiratory rate<br>Blood pulse wave<br>Heart Rate Variability<br>SPO2<br>Skin temperature<br>Activity - Steps |

The devices are capable of intermittent and continuous monitoring. Intermittent monitoring requires patients to take their own readings and enter them via the app on their Doccla issued mobile phone. Continuous monitoring is performed by devices that communicate with the app in real-time.

Since the launch of the initial Covid-19 service, the technology has changed to address emerging challenges. For example, a video calling function was introduced to help clinicians better assess patients. In addition to providing context from which to judge the vital signs data, the video function has also proved to be a valuable tool for reassuring patients and their families/carers.

To ensure that patients' use the monitoring devices correctly, they are 'on-boarded' by Doccla's skilled customer service team. On-boarding involves calling the patient to guide them through the initial home set-up and help them to enter their first readings into the mobile App. The on-boarding process critical to achieving compliance and Doccla have been able to successfully on-board patients with a broad range of abilities, including one patient who was unable to read or write.

## Experience So Far

Between 18 April 2020 and 06 January 2021, 167 patients were admitted to one of the home monitoring services, equating to over 1700 days of monitoring. During this time, the youngest patient admitted to the service was 17 and the oldest was 96 (average 60 years old).

On average, patients admitted to the Covid-19 service were monitored for 10 days and patients admitted to the COPD service were monitored for 15 days.

### Patient compliance

Patient compliance is the cornerstone any successful remote patient monitoring (RPM) service and is something that many providers struggle to achieve. Overall compliance was 95.8%, calculated as the proportion of monitoring days that patients sent the required data from their devices. The compliance for patients discharged between 18/04/2020 and 06/01/2021, by service type is presented in figure 1.

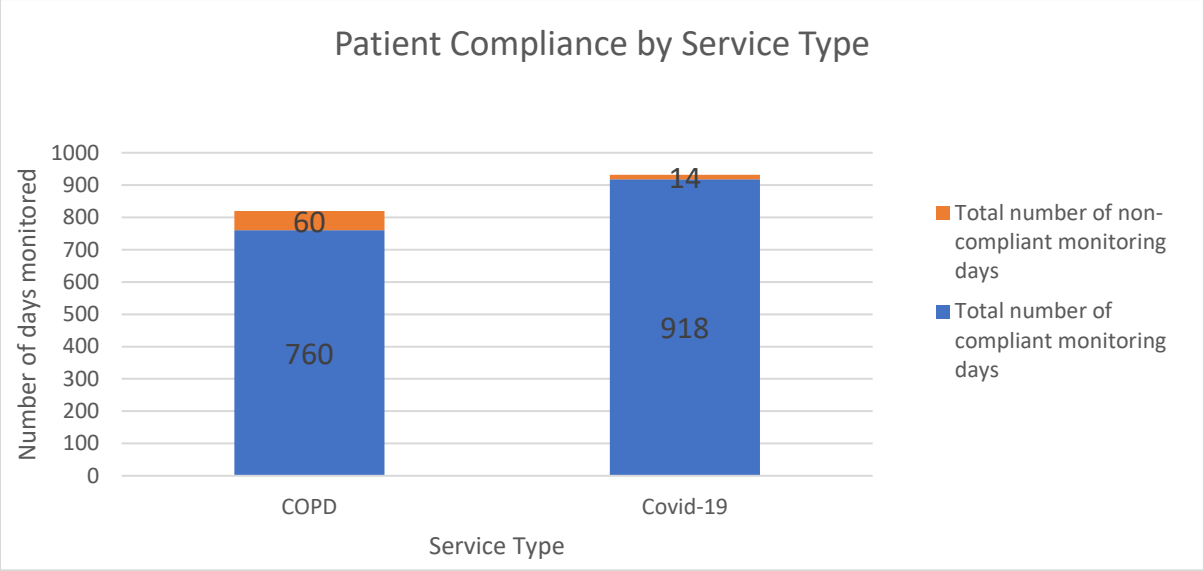


*Figure 1*

Anecdotal evidence from the NGH clinicians working on the project highlights that younger patients tend to find the service easier to use than older patients. However, despite some older patients reporting feeling anxious about using the technology, the vast majority of were able to comply with the service and provided positive feedback about their experience. On one occasion, NGH clinicians reported that one patient, who had initially been reluctant to use home monitoring, felt they benefited so much from the service that they refused to be discharged at the end of the monitoring period.

## Patient Feedback

Following discharge from the services, patients are asked to provide feedback on their monitoring experience. Of the 49 responses received so far, 83% of patients reported that they were 'very satisfied' with the home monitoring services (figure 2). The majority of patients (97%) rated Doccla's customer services as either 'very good' or 'good' (figure 3).

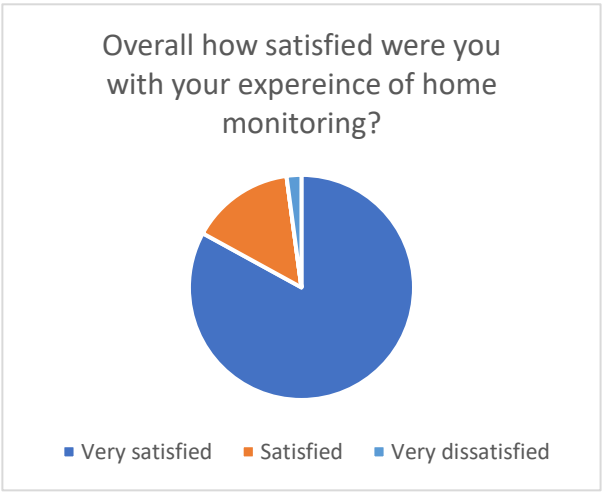


*Figure 2*

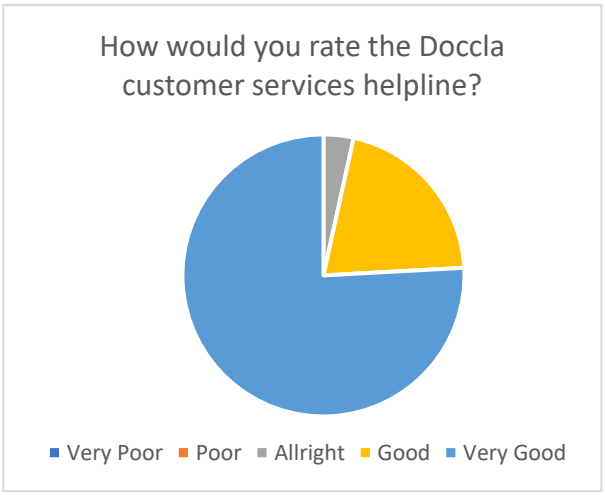


*Figure 3*

Free text responses illustrate the reassurance that remote monitoring has provided patients. One patient wrote:

> *"No. Could not have managed at home without this kit. Thank you."*

Another patient wrote:

> *"Very good idea. Peace of mind."*

## What's worked well?

### Increased capacity at a system level

Reflecting on the impact of the services at a recent roundtable, Frances Mulligan-Evans (Lead Nurse on the home monitoring project) reported that the services have been able to increase hospital capacity by facilitating earlier discharge from hospital and prevent unnecessary hospital admissions.

### Identifying deterioration and enabling early intervention

In addition to increasing NHS capacity, the data captured by the RPM devices has directly helped to inform decisions about patients' treatment. Using the vital signs data from the clinician dashboard, alongside virtual consultations with patients, NGH clinicians have been able to identify clinical deterioration in 21 patients, subsequently resulting in an escalation of their care.

Since its launch, the Covid-19 service has readmitted 19 patients to hospital (7 during the first wave and 12 during the second wave), giving an overall readmission rate of 14.5%. The COPD service readmitted only 2 patients, giving a readmission rate of 3.5%.

In addition to readmitting patients to hospital, NGH monitoring clinicians also intervened by starting a number of patients on antibiotics (via their GP practice), after it their vital signs showed some minor deterioration, or no improvement, during the monitoring period.

### Communication and Partnership Approach

Fundamental to the success of the services has been effective communication between the clinicians at NGH. In addition to helping support staff embrace the new service, communication helped to foster a patient safety focus. Clinicians use an online chat platform to discuss issues and the rapid feedback has helped to simulate the fast-paced decision making typical in a face-to-face clinical environment.

Communication has also been a key ingredient in the partnership approach that has been established between NGH and Doccla. Importantly, working in partnership has enabled the RPM services to adapt to meet the needs of the evolving service and resolve problems quickly. This partnership approach was recently recognised by the HSJ partnership awards nomination.

## Lessons learned?

It quickly became clear that achieving clinician 'buy-in' was critical to the successful implementation of the home monitoring service.  Frances Mulligan-Evans explained that

many staff were initially sceptical of the project, which created an implementation barrier. To address this, the NGH team held regular meetings, where staff could discuss their concerns and share the positive feedback that they'd received from patients. This open communication helped to generate motivation for the project.

Another challenge has been managing competing priorities during the pandemic. One advantage of the service has been that staff who have been displaced from their usual roles and those who are shielding at home have been able to help run the service from home. However, many staff running the home monitoring service have had to balance their responsibilities with their other roles. Dedicated resource for home monitoring will be crucial to ensure that momentum is not lost after the pandemic.

Finally, it is clear from trial and error that 'one size does not fit all' when it comes to monitoring devices. Experience of working with different devices has highlighted that not all devices work equally well on different patients and characteristics (such as skin tone, muscle mass and body weight) can impact the accuracy of the readings. This reinforces the importance of using a patient safety-centred approach and being able to adapt to the needs of the patient, as well as the patient group.