

Evaluation of Virtual Ward Models in South West London

November 2022

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1. Executive summary

Overview

The aim of this evaluation is to assess the role of virtual wards in reducing hospital (re)admission, and supporting early discharge of high acuity patients in South West London. More specifically, it aims to answer the following questions:

1. What are the core components of the virtual ward models?
2. What factors have supported the successful implementation of the virtual wards?
3. Who are the patients being admitted to virtual wards?
4. What is patient engagement with and adherence to the remote monitoring technology?
5. What is patient experience of the virtual ward models?
6. How do staff engage with and work on virtual wards?
7. What is staff experience of the virtual ward models?
8. What patient outcomes are associated with the ward models?

This evaluation provides in-depth case studies of the virtual wards in Sutton and Kingston/Richmond. In addition, it supplements a previous evaluation of the Croydon virtual ward¹ with additional data.

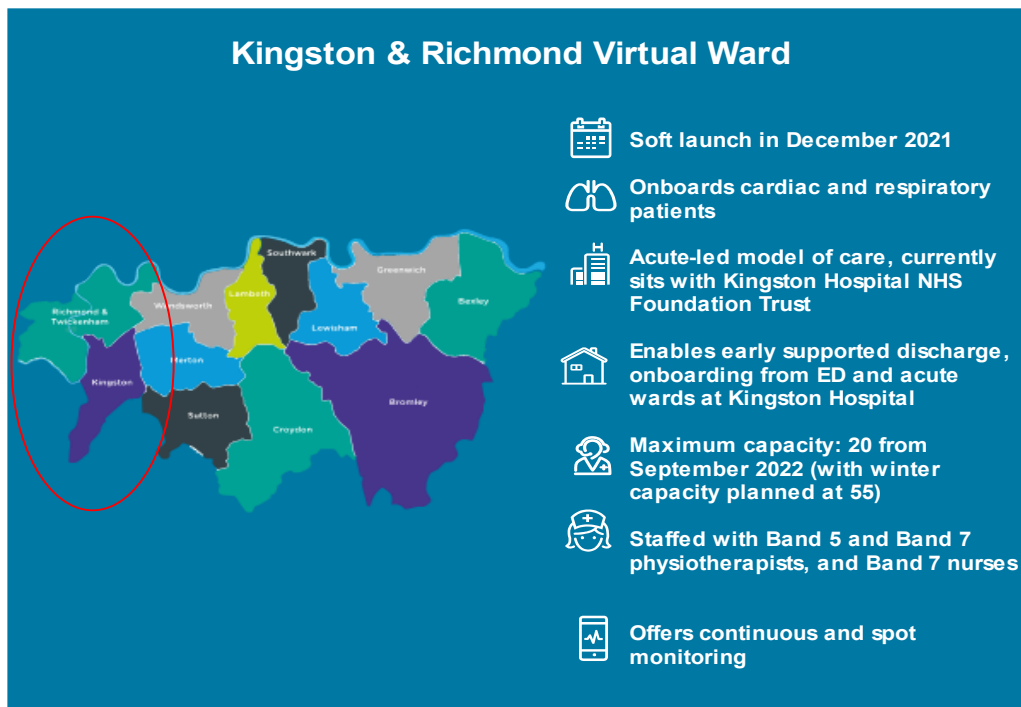
In order to answer the evaluation questions, a mixed-method approach was deployed, including:

- An analysis of pre-existing quantitative data provided by each of the local systems in scope for this evaluation.
- An analysis of data collected by Vcare for Sutton, and Kingston and Richmond.
- Qualitative fieldwork with virtual ward staff, and with clinical staff in acute settings.
- Qualitative fieldwork with patients admitted and treated on the virtual wards.

¹ Health Innovation Network (2021), Rapid Evaluation of Croydon Virtual Ward, London. Available on: <https://healthinnovationnetwork.com/wp-content/uploads/2022/01/Croydon-VW-Evaluation-Report-to-NHSX-v10.pdf>

Key findings

Kingston and Richmond



Overview of virtual ward activity

- Between January and July 2022, there were 42 admissions to the virtual ward. In this time, there was only 1 readmission.
- 83% of patient referrals were via an acute hospital inpatient department, and 17% were via an emergency department or same day emergency care.
- Length of stay ranged from 1-29 days, with a median average length of stay (ALOS) on the virtual ward of 13 days.
- The average length of stays on the virtual ward for patients with COVID-19, chronic obstructive pulmonary disease (COPD), and heart failure were higher compared to average length of stays at Kingston Hospital NHS Foundation Trust.

What factors have supported the successful implementation of the virtual wards?

- Staff felt that overall the Kingston and Richmond virtual ward was successful at what it was to set up to achieve one participant noting: *"you're not only seeing the benefits of the patient being at home, but you see the benefits of beds opening up in the hospital."*
- They identified a number of factors that had supported the successful implementation of the virtual ward, including being an acute secondary care led model, having pre-existing relationships within the community, having a mix of skills within the virtual ward team, and putting an emphasis on data collection.
- They also described a number of challenges, including lack of similar existing models to refer to (due to the novel nature of the service), lack of awareness of the virtual ward by clinicians in primary care and acute care settings, challenges in getting some consultants' buy in, and lack of administrative support.
- From an operational perspective, some questions were raised over the sustainability of the model, with it remaining to be seen whether the service could be an effective model to reduce length of stay.
- Other issues highlighted as slowing down the implementation of the virtual ward included recruitment challenges (as a new team had to be created from scratch) and the fact the number of patients being

onboarded on the ward had been lower than originally anticipated.

- Finally, the lack of consistency in defining the virtual ward was viewed as problematic, which had implications on funding allocation choices.

Who are the patients being admitted to virtual wards?

- The majority of patient admissions (81%) were for an exacerbation of an existing respiratory or cardiovascular long-term condition. A further 19% of admissions were for an acute incident, these included covid-19 (14%) as well as other incidents (5%) such as falls and pneumonia.
- 81% of patient admissions were for an exacerbation of an existing respiratory or cardiovascular long-term condition. A further 12% of patient admissions were for exacerbations of cardiovascular conditions which include heart failure and pulmonary hypertension. A further 19% of admissions were for an acute incident, these included COVID-19 (14%) as well as other incidents (5%) such as falls and pneumonia.
- Patients admitted to the virtual ward were more likely to be white, between 65-84, and female.
- The average number of comorbidities per patient was 5.1.

What is patient engagement with and adherence to the remote monitoring technology?

- Over a quarter of patients wore their device for 60% or more of their time on the ward, giving them complete adherence to the technology.
- In the qualitative interviews, staff reported that overall patients engaged with the technology well, as long as they were given clear instructions on how to use it.
- Continuous monitoring was preferred by patients over spot monitoring, as it required minimum technical expertise from patients. However, technical issues were commonly reported, meaning some patients had to switch to spot monitoring.

What is patient experience of the virtual ward models?

- Staff reported receiving mainly positive feedback from patients, including of using remote monitoring equipment.
- They felt the virtual ward was most beneficial to patients with chronic long-term conditions who tend to be proactive in their treatment and care, elderly patients who need some extra support going home after hospital discharge, those suffering anxiety and those experiencing cognitive decline.

How do staff engage with and work on virtual wards? (i.e. staff activity)

- Number of telephone contacts per virtual ward admission ranged from 1-17, with an average of 0.39 telephone contacts per patient per day.
- Number of home visits per virtual ward admission ranged from 1-4, with an average of 0.18 home visits per patient per day.
- Clinicians tasked with monitoring patients reported taking an average of 5 minutes to check one person's readings (which they did throughout the day).

What is staff experience of the virtual ward models?

- Clinical staff on the virtual ward team described positive experiences of working for the service.
- Positive experiences were directly attributable to the team, its make-up and good relationships between colleagues, including working in a multidisciplinary team and being able to learn new skills/upskill as a result, the flexibility and adaptability of the team in assigning roles and responsibilities, and the perceived lack of hierarchy within the team.
- Staff felt a sense of satisfaction and pride from working for an innovative service which they believed was highly beneficial to patients.

- Clinical virtual ward staff highlighted previously feeling anxious occasionally when 'leaving patients' unmonitored over long periods of time e.g. at evenings and weekends. These concerns had been largely alleviated since the service started operating seven days a week.


What patient outcomes are associated with the virtual ward models?








- All patients but two (40 patients) were discharged to their usual place of residence. Ten per cent (10%) of patients were referred to pulmonary rehabilitation following discharge. Only one patient was admitted to hospital.
- Data on hospital admissions 30 days after discharge from the virtual ward showed that 7 patient admissions (17%) had been admitted to hospital in the 30 days after being discharged from the virtual ward.
- Information on deaths in the 30 days following discharge was also obtained showing that 3 patient admissions (7%) had died in the 30 days following discharge from the virtual ward.
- Staff noted a number of positive outcomes to being admitted onto the ward, such as encouraging patients to self-manage over time, supporting functional recovery by get them to move around the house and engage in normal activities of daily living, giving staff the opportunity to optimise patients' medication, and reduce the risk of hospital-acquired infections.

What is the financial impact on acute beds?

Due to the discrepancies between length of stay on the virtual ward and length of stay in hospital, it has not been possible to assume that for every day spent on the virtual ward an acute bed day has been saved. Due to the small number (7) of patients that were stepped up to the virtual ward and therefore avoided an acute hospital admission, the recommendation is to gain more data on acute length of stays for patients that are transferred from a hospital setting to a virtual ward and to enable the collation of data of a larger cohort of patients before undertaking economic modelling of acute bed usage.

Sutton Virtual Ward



-  Launched in February 2021
-  Supports patients with frailty who need more support, and patients with LTCs
-  Primary care led, with Sutton Health and Care delivering the service
-  Onboarding from ED, acute frailty unit, medical wards and primary care
-  Has 40 to 50 patients admitted at a time, but its total maximum capacity is 100
-  Staffed with MDT clinicians including band 8 and 6 nurses
-  Offers spot monitoring-also treats non-tech enabled patients.

Overview of virtual ward activity

- The 458 referrals that were accepted onto the ward related to 402 individual patients, with 89% of patients having one admission to the virtual ward during this period and 11% having more than one admission.
- Over half (53%) of referrals to the virtual ward came from an acute hospital inpatient department, with 41% of referrals coming from GP practices and 5% coming via a community health service. There were a small number (6, 1%) that were referred via other routes including the ambulance service, via a self-referral route or via the telephone access service.
- The average (median) length of stay on the virtual ward was 10 days.

What factors have supported the successful implementation of the virtual wards?

- From a patient perspective, it was viewed to be highly beneficial as it was well positioned to provide holistic care, including being able to offer packages of care when discharging patients.
- From a staff perspective, it could sometimes be challenging working with multiple partners, and getting different stakeholders' buy-in, especially GPs.
- Staff also felt that whilst remote monitoring equipment was a useful tool to support the delivery of the Sutton virtual ward, it should not be at the centre of it, so the service also included non-tech enabled patients who had more complex needs.
- In terms of workforce, staff valued having senior and experienced nurses working for the virtual ward, a leadership team with a clinical background, and an in-reach nurse identifying/ sourcing patients on acute wards.
- Staff noted the importance of establishing trust and communicating to wider healthcare staff about the benefits of the virtual ward through a clear engagement plan to support better partnership working.

Who are the patients being admitted to virtual wards?

- Data on the primary complaint/ reason for admission to the virtual ward was only recorded for 80 (17%) patient admissions.
- Of these 31% were admitted due to respiratory conditions or symptoms, 18% due to an infection, 15% due to trauma and musculoskeletal conditions, and 10% due to an altered mental state or neurological symptoms. A further 26% were admitted with general symptoms, such as pain or dizziness or with an exacerbation of a non-respiratory condition.
- The majority (74%) of patient admissions were aged over 75.
- A higher proportion of patient admissions were female (57%) than were male (43%).
- Of those patient admissions where ethnicity was recorded 91% were white.

What is patient engagement with and adherence to the remote monitoring technology?

- The Sutton virtual ward uses spot monitoring by having patients take health observations using the provided kit at regular intervals. Patients are advised to take a minimum of one set of observations a day and a maximum of three.
- Data from VCare shows that there were 79 virtual ward patients in Sutton that were onboarded to the VCare remote monitoring platform. All virtual ward patients are offered the remote monitoring kits, meaning that approximately 83% declined use of the kits. Reasons for declining have not been recorded.
- Of the 79 patients who used the kits all took some form of observation during their time on the platform. Of the 68 patients that were on the platform for a day or more the average number of observations taken per patient per day was 5.3 across all tests.
- On average patients were undertaking most tests (temperature, respiratory rate, blood pressure, oxygen saturation and heart rate) at least once a day.

What is patient experience of the virtual ward models?

- Patients were positive about the service and saw the benefits of being cared for at home rather than on a hospital ward.
- On the whole patients felt they were discharged from hospital at the right time and broadly understood the concepts behind the virtual ward, although further explanations on how the ward works in practice would have been welcome.
- Positive experiences of the technology were also linked to: carers providing support, swift technical support from the virtual ward team, and a perceived good level of 'contact' and communication with the virtual ward nurses.
- Among those with more mixed experiences, it was felt that more follow-up action and contact from the virtual ward team was required, and there needed to be more clarity around the discharge process (for instance by discharging patients through a face-to-face visit, rather than over the phone).

How do staff engage with and work on virtual wards? (i.e., staff activity)

- There was information recorded for 265 patient admissions on the number of times patients were in contact with staff from the virtual ward either via a telephone call or a home visit.
- There were 514 phone calls made, which equates to 1.9 phone calls per patient. The number of telephone calls received per admission varied from 0 up to 20 calls, with a standard deviation of 2.87.
- There were 1,243 home visits to virtual ward patients, giving an average of 4.7 home visits per patient admission. The number of home visits per patient admission ranged from 1 up to 43 home visits, with a standard deviation of 5.34.

What is staff experience of the virtual ward models?

Interviews with staff mainly focused on implementation barriers and enablers. Unfortunately, we were not able to interview virtual ward nurses about their experiences of working for Sutton virtual ward.

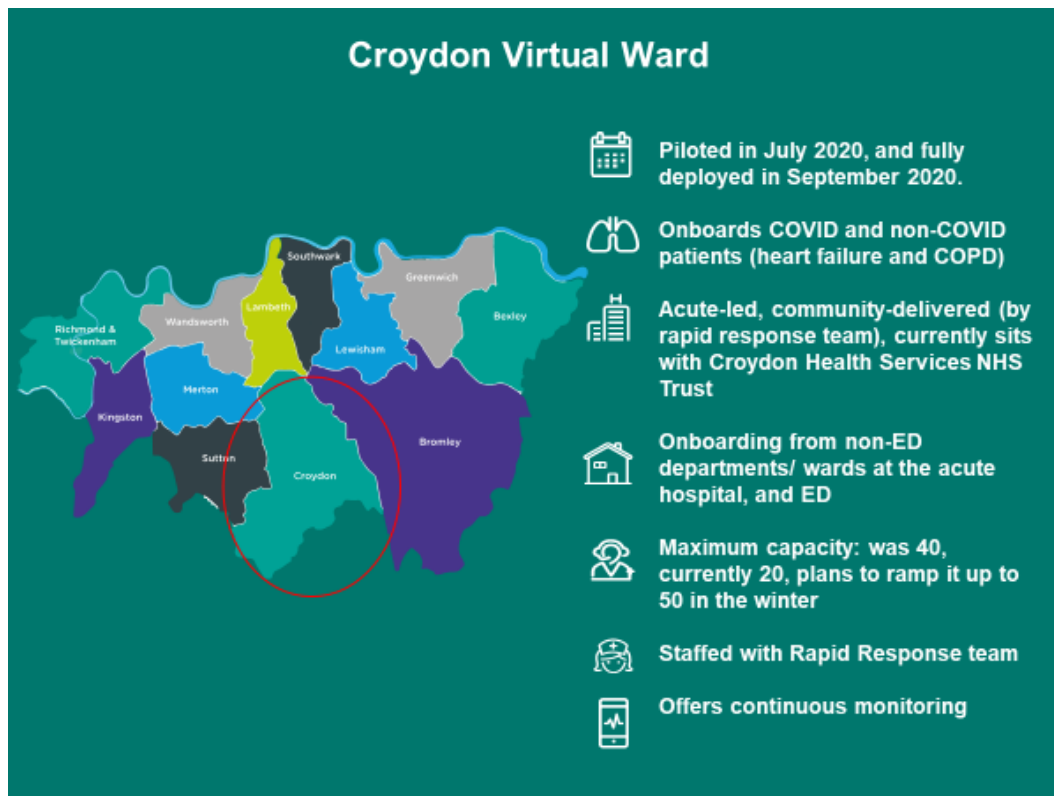
What patient outcomes are associated with the virtual ward models?

- The majority of patient admissions were discharged back to their usual place of residence (74%), with just over a quarter (26%) being admitted to an acute hospital.

What is the financial impact on acute beds?

Due to a lack of data on the primary complaint of Sutton virtual ward patients it has not been possible to use information on length of stay to model the financial impact of the virtual ward on acute bed days for this virtual ward.

Croydon



Overview of virtual ward activity

- Between October 2021 and July 2022, there were 272 admissions to the Croydon virtual ward, which is approximately 27 admissions per month.
- The highest proportion of referrals (39%) came via non-ED departments and/or wards at the acute hospital, with a further 20% of referrals coming from ED. Smaller proportions of referrals came via GPs (15%), the Rapid Response team where the ward is hosted (14%) and community nursing staff (5%).
- Average (median) length of stay on the ward was 7 days. Length of stays ranged between 0 and 48 days, with a standard deviation of 6.5.
- When comparing the average length of stay on a virtual ward to an acute hospital stay, patients with COPD had longer stays on a virtual ward by 1.9 days., with COVID-19 patients having longer stays by less than a day (0.6 days) and heart failure patients staying on average half a day longer (0.5) than they would have done in hospital.

What factors have supported the successful implementation of the virtual wards?

- In our 2021 report, staff identified a number of factors they saw as essential to making a virtual ward model effective, namely the ward being run by community (not acute) services, pathways in place to ensure emergency treatment is accessed when needed, upskilling staff so they know how the technology can be used to optimise care for individual patients (and therefore can determine when continuous monitoring might be more suitable than spot monitoring, and vice versa), and having a cross-system multidisciplinary team.
- Staff discussed how sitting within an urgent community response team had a number of advantages, including being able to Piggyback on pre-established relationships with GPs and the hospital, and having access both to hospital and community Electronic Patient Record (EPR) systems.
- Implementation learnings identified by staff included acknowledging the culture change required in

implementing a virtual ward, having an effective engagement plan in place (including face-to-face engagement), resourcing the virtual ward with an adequate number of staff (especially in the early phase of implementation), basing a member of the rapid response staff within the acute hospital, diversifying patient pathways and developing a comprehensive training offer for virtual ward staff.

Who are the patients being admitted to virtual wards?

- A large proportion of virtual ward admissions were for acute episodes (60%): these included 50% of patients that were admitted due to COVID-19, 6% due to an infection and 4% due to pneumonia or a lower respiratory tract infection. A further 30% of admissions were for an exacerbation of a long-term condition. Smaller proportions (4%) were admitted for further investigations and monitoring.
- Whilst the majority (61%) of admissions were aged 65 or older there were still a significant number of admissions of working age (39%).
- There was a higher proportion of females (59%) admitted to the virtual ward than males (41%).
- The majority of patients were white (62%), 15% were from an Asian ethnic background, 15% were of black ethnicity and a further 8% were either from a mixed or multiple ethnic background, or from an 'other' ethnic group.

What is patient engagement with and adherence to the remote monitoring technology?

- The 2021 evaluation highlighted high levels of acceptability and adherence with the technology. Feedback survey scores were largely very positive, with 87% agreeing virtual ward technology was simple to use.
- The analysis undertaken as part of this evaluation found that there were a small number of patients (5, 2%) that declined the use of the technology and self-discharged themselves from the virtual ward. The vast majority (98%) of patient admissions were able to engage with the technology.

What is patient experience of the virtual ward models?

- Patient insights were collected as part of the 2021 evaluation, with interviewed patients and carers reporting overall positive experiences of their experiences on the virtual ward.
- While patient insights were not gathered as part of this evaluation, staff interviewed also reported receiving positive feedback from patients about their experiences of being treated on the virtual ward.

How do staff engage with and work on virtual wards? (i.e., staff activity)

Quantitative data on staff engagements with virtual ward patients was not collected for this evaluation. A previous analysis of modes of interactions between staff and patients can be found in the initial Croydon virtual ward evaluation.² However, 9% of patient admissions received at least one home visit from a community nurse during their time on the ward.

What is staff experience of the virtual ward models?

- Heitz (2022)³ identified a number of staff benefits of working on the virtual ward, including: increase of community and hospital collaborative working, skill acquisition (such as remote assessment and trend monitoring), reduction of in-person visits, and the opportunity for remote working.

² Health Innovation Network (2021), Rapid Evaluation of Croydon Virtual Ward, London. Available on:

<https://healthinnovationnetwork.com/wp-content/uploads/2022/01/Croydon-VW-Evaluation-Report-to-NHSX-v10.pdf>

³ Heitz, Liz (2022) Optimisation, evaluation and service development of a community-based, technology-enabled, acute virtual ward: an evaluation study. Unpublished Master's dissertation, Faculty of the Institute of Global Health Innovation, Imperial College London.

- Insights gathered through the staff interviews highlighted how these benefits could have positive implications in relation to workforce retention.
- Staff emphasised how working on a virtual ward required a specific set of skills and identified development of a comprehensive training offer as a key priority for the service, including training on the device and technology, in digital skills, in learning how to read non-verbal cues, how to monitor deterioration, and on data collection and quality improvement, which was perceived especially important due to the novelty of the service.

What patient outcomes are associated with the virtual ward models?

- The discharge outcomes from the Croydon virtual ward showed that 81% of patient admissions remained at home until they were discharged from the ward. This included 72% that remained at home with only remote access to healthcare, and a further 9% who also remained at home but received a home visit during their time on the virtual ward.
- Twelve per cent (12%) of patients were discharged from the virtual ward into a hospital inpatient setting.
- The remaining patient admissions were discharged early from the virtual ward either due to the realisation that telehealth services were not appropriate (13, 5%), or patients declining the technology and self-discharging from the virtual ward (5, 2%).

What is the financial impact on acute beds?

It is likely that there was a cost saving in terms of acute beds of between £477,000 – £715,500 with a cost saving per patient that was stepped up to the virtual ward from a community setting of approximately £3,000 - £4,500. This modelling is based on all virtual ward admissions that were stepped up (but not on those who were stepped down).

The total acute bed savings as a result of the virtual wards will be higher than this as patients that were referred via an acute inpatient setting (stepped down) are likely to also save bed days as a result of a reduced length of stay in hospital, however more data and economic analysis would be required to understand what the financial impact of patients that have been stepped down is.

Conclusion

This evaluation has shown that the three South West London Virtual Ward models, although set-up differently, were all successful at treating patients safely and comfortably at home. Data collected highlights some clear benefits of virtual wards from a patient and staff perspective.

Although discharge outcomes varied between the different virtual ward models, patients across the three services were on the whole able to be cared for at home, through a combination of remote monitoring, telephone calls and home visits.

Patients and their carers felt they were being kept out of hospital whilst receiving the same standard of care as they would in a hospital environment and saw the benefits of being cared for at home. They were generally compliant and satisfied with remote monitoring solutions (for both continuous and spot monitoring models). Acceptability of remote technology solutions was highest when clinical teams were given dedicated time to support patients in how to use the technology optimally. This was especially important for patients with limited digital skills and was key to increase their confidence in using the technology autonomously.

Interviews with clinical virtual ward staff also highlighted positive experiences of working on the ward. Those were linked to working among multidisciplinary teams and developing new skills, as well as being proud of working for an innovative service, and receiving positive patient feedback. Developing a comprehensive training offer for virtual ward staff was identified as a key priority going forward.

There was also some indicative modelling of the financial savings associated with acute bed days saved for one of the virtual wards, with estimated savings of between £3,000 - £4,500 per patient. Although it is important to note this does not take into account the costs associated with running the virtual wards.

Data collected and analysed across the three models highlighted a number of key enablers for virtual wards to prevent admissions into acute hospital beds, or supporting early discharge out of hospital, including:

- **Offering continuous monitoring to all patients**, as it was generally preferred by patients over spot monitoring and required minimum technical confidence and experience from patients.
- **Referring a small but targeted cohort of patients**, with a focus on respiratory and cardiovascular conditions and symptoms, which can be monitored using the range of monitoring devices and tests offered by the remote monitoring kits.
- **Having established clinical and referral pathways**, ideally from a range of sources including ED, inpatient wards and community services.
- **Having in-reach virtual ward staff based in acute settings**, so they can help with identifying suitable patients and referring them onto the ward when clinically appropriate.
- **Strengthening relationships with acute trust staff**: although it is not essential for the virtual ward to be hosted by an acute trust to treat patients successfully, the development of strong relationships between virtual ward and acute staff is a key factor to reducing admissions and onboarding patients onto the virtual wards quickly and smoothly.
- **Building multi-disciplinary teams**, with a mix of skills among virtual ward staff, to increase job satisfaction, and enhance staff ability to provide holistic care to patients.
- **Having clear clinical governance arrangements in place**, in order to protect both patients and staff, and avoid any confusion around who is responsible for a patient's care while they are on the virtual ward.

At the time of writing, a 24/7 central remote monitoring hub, which will serve the whole South West London population, hosted by the Croydon virtual ward is due to launch at the end of November 2022. This will have a significant impact on how the Croydon, Kingston and Richmond, and Sutton Virtual Wards operate in the future. This is likely to release capacity within the local virtual teams and enable monitoring to be done at scale and 24 hours of the day, with the hope that more patients will be referred to the virtual wards in future.

Recommendations

The following recommendations are derived from the insights gathered across the three virtual wards: Kingston and Richmond, Sutton and Croydon. They focus on maximising the effectiveness and the impact of services going forward; as they expand, diversify their referral pathways, and start working with the central monitoring hub.

1. Further evidence is needed to understand the full impact of the virtual ward services

A full evaluation of the central remote monitoring hub should be carried out, once the service is completely up and running. It will be important to understand how the hub offer impacts on local virtual wards, how demand is managed (especially over a 24/7 period), and how it affects acute trust bed usage across each local system, and across the whole of South West London. The hub will also impact staffing levels and responsibilities in each local system. As such, gathering insights and sharing learnings, as the local virtual wards learn to work with the service, should play a key priority when implementing the hub (and beyond). As there are plans for the hub, and all local virtual wards, to offer both continuous and spot monitoring, the evaluation should also aim to understand if and when continuous monitoring is more effective than spot monitoring at treating patients with specific conditions (and vice versa).

As part of this, a comprehensive economic evaluation would also be needed to understand the cost-effectiveness of the South West London virtual ward offer.

Data monitoring needs to be prioritised, with some standardised data fields in place across the local virtual wards and the central hub. As a minimum, we recommend the following should be recorded and monitored at regular intervals:

- Primary reason for admission to the virtual ward,
- Discharge destination,
- Virtual ward resource/ interactions e.g. home visits, telephone calls, staff monitoring
- Acuity score of patients
- Whether patients declined admission to virtual ward and reason for decline
- Demographics of virtual ward patients (as a minimum, age, gender and ethnicity)
- Whether patients were tech enabled/ onboarded for remote monitoring kits
- Patient satisfaction (net promotor) scores

Embedding structured forms in each system's Electronic Patient Records (EPR) is recommended to help with routine collection of data for future monitoring of the services. This should be supplemented by Patient Reported Outcome Measures (PROMs) and Patient Reported Experience Measures (PREMs), gathered through systematic and structured patient and carer feedback. In addition, responsibility for improving recording, analysing and reporting performance monitoring data should be clearly allocated to one or more members of each virtual ward team and to trust business intelligence teams, and consideration must be made of the resource required to perform these tasks.

A full equalities impact assessment should be undertaken. As part of this, a number of areas should be explored including whether some cohorts of patients are more likely to:

- decline being treated on a virtual ward (and their reasons for doing so).
- not be referred to a virtual ward (and why).
- not be offered remote monitoring solutions.
- struggle using the technology (both continuous and spot monitoring solutions).

As part of this, it will also be important to consider how rising energy bills could impact on low-income patients and their ability to charge up the monitoring equipment if offered to them.

2. Recommendations on how to improve staff experience

While staff reported overall positive experiences of working on virtual wards, some areas of improvement were identified. The following recommendations are therefore proposed:

A comprehensive training offer for the virtual ward staff should be developed, to ensure virtual ward clinicians are equipped with the right digital and clinical skills to treat patients effectively. This should include training on the devices and technology, in relevant digital skills (such as using the clinical dashboards), on how to read non-verbal cues, and how to monitor deterioration, as well as training on data collection and quality improvement.

Because virtual wards are relatively new services, job descriptions should include practical details around the roles on offer. The term 'virtual' can be interpreted in many ways, and job applicants should be clear about what working for a virtual ward entails (i.e. the extent to which staff can work from home for instance).

3. Recommendations on how to improve patient experience, and increasing the inclusivity of the virtual ward

An adequate amount of time needs to be allocated to virtual ward clinicians to support patients to use remote monitoring solutions optimally. As highlighted by the evaluation, acceptability of remote technology solutions was highest when clinical teams were given dedicated time to support patients in how to use the technology. This is especially important for patients with limited digital skills, and this can help ensure the virtual ward offer is as inclusive as it can be. Doing so can also have potentially longer-term implications in encouraging self-management, as patients become empowered to take more control over their own health.

The discharge process should include a home visit, so patients are clear they have been discharged from the virtual ward. Discharge processes over the phone were not viewed as satisfactory by patients, who required a sense of closure. In addition, discharge visits should include collection of the remote monitoring equipment so patients do not have to keep it for long periods of time, and try to arrange to have it collected themselves.

4. Ensuring the successful implementation of the central remote monitoring hub

Although the central hub was not the focus of this evaluation, there are a number of learnings emerging from the evidence gathered which should be taken into consideration as the hub is being set up.

There should be clearly defined standard operating procedures (SOPs) and governance arrangements in place when the hub is launched. This is critical to get clinicians' buy-in (from primary and acute care settings), as the hub will encourage cross-service working.

An effective and ongoing engagement strategy needs to be put in place, raising awareness of the service should be a key priority going forward. The plan should focus on emphasising the ability and skills of the virtual wards to manage their patients and highlight how the service could help reduce pressure on acute and emergency services; through face-to-face engagement and shared learning events.

2. Background

A virtual ward is a safe and efficient alternative to NHS bedded care that is enabled by technology. Virtual wards support patients who would otherwise be in hospital to receive the acute care, monitoring and treatment they need in their own home. This includes either preventing avoidable admissions into hospital, or supporting early discharge out of hospital.

Although the recent expansion of virtual wards was a direct response to the pandemic, there is currently a national policy push in England towards virtual wards being developed for health conditions other than COVID-19. The ambition is for the NHS to have 40–50 'virtual ward beds' per 100,000 population by December 2023.⁴

The South West London Integrated Care System has developed four virtual wards covering six boroughs: Croydon virtual ward, Sutton virtual ward, Kingston and Richmond virtual ward, and Merton and Wandsworth virtual ward. Each ward is currently locally resourced and admits a mix of COVID-19 and non-COVID-19 patients (including patients with COPD and heart failure). The development trajectory of each virtual ward has been influenced by local factors and each model has been set up differently (a detailed description of how three of these virtual wards have been set up and operate is included in sections 4.1, 5.1 and 6.1).

This evaluation was jointly commissioned by the NHS @Home team and the London Digital team at NHS England, to understand how the virtual ward offer in South West London was developed and implemented, its impact on patients and staff, and which lessons can be drawn from this.

⁴ https://www.england.nhs.uk/wp-content/uploads/2022/04/B1382_supporting-information-for-integrated-care-system-leads_enablers-for-success_virtual-wards-including-hos.pdf

3. Evaluation purpose and design

This evaluation provides in-depth case studies of the virtual wards in Sutton and Kingston and Richmond. In addition, it supplements an existing rapid evaluation of the Croydon virtual ward⁵, with additional details regarding the model and staff experience.

The reasons for focusing on these specific wards were:

- The Merton & Wandsworth virtual ward was still at an early stage of implementation during the scoping phase for this evaluation, and it did not function at full capacity.
- Both the Sutton and Kingston and Richmond virtual wards have been successfully running for an extended period of time, which means enough patients have gone through their wards to enable us to carry out meaningful analysis.
- It enabled us look at three distinctive models of virtual wards to draw out learning: acute-led (i.e. Kingston and Richmond), a primary care- led model (i.e. Sutton), and community services-led (i.e. Croydon).

The focus is on high acuity **patients that would otherwise be in an acute hospital bed** but that have instead been admitted to a virtual ward for monitoring at home.

Evaluation purpose

The aim of this evaluation is to assess the role of virtual wards on reducing hospital (re)admission, and supporting early discharge of high acuity patients in South West London.

More specifically, it aims to answer the following questions:

- What factors have supported the successful implementation of the virtual wards?
- Who are the patients being admitted to virtual wards?
- What is patient engagement with and adherence to the remote monitoring technology?
- What is patient experience of the virtual ward models?
- How do staff engage with and work on virtual wards? (i.e. staff activity)
- What is staff experience of the virtual ward models?
- What patient outcomes are associated with the virtual ward models?
- What is the financial impact on acute beds?

Design and methodology

The approach conducted a series of formative and impact mixed methods service evaluations. The evaluation team carried out in-depth interviews with both Sutton and Kingston and Richmond staff (i.e. both clinical and programme staff), and virtual ward patients.

While the evaluation focuses on Sutton and Kingston/Richmond, it also includes a number of depth interviews with Croydon staff and patients, to supplement the evaluation of Croydon virtual ward which focused primarily on quantitative data analysis of service and outcomes data. An overview of the methodology deployed across the three virtual wards can be found in the table 3.1 below.

⁵ Health Innovation Network (2021) Rapid Evaluation of Croydon Virtual Ward, Health Innovation Network: London. Available on: <https://healthinnovationnetwork.com/wp-content/uploads/2022/01/Croydon-VW-Evaluation-Report-to-NHSX-v10.pdf>

Table 3.1 Overview of methodology

Virtual Ward	Qualitative data collection		Quantitative data collection
	Staff interviews	Patient interviews	
Sutton	✓ (5 staff interviewed)	✓ (10 interviews carried out: six with patients, three joint carers/ patients, and one carer only)	✓ (analysis of activity and outcome data between November 2021-August 2022)
Kingston and Richmond	✓ (6 staff interviewed)	✓ (one joint interview with carer/patient)	✓ (analysis of activity and outcome between January and July 2022)
Croydon	✓ (3 staff interviewed)	X (3 patient interviews were carried out in our 2021 evaluation)	✓ (analysis of some key activity and outcome data fields between October 2021-July 2022), more detailed analysis can be found in the 2021 evaluation)

Further details about methodologies deployed for each of the virtual wards can be found at the start of the individual report chapters relating to each of the virtual wards.

How to read this report

This report is split into three main chapters, each one of them focusing on one the virtual ward services within the scope of this evaluation. Each chapter contains a detailed description of how the local virtual ward has been set up and how it delivers care to its patients, followed by key insights gathered as part of the evaluation to answer each of the evaluation questions.

It is important to note that this report provides in-depth case studies for each of the virtual ward models in scope for this evaluation. Because the methods deployed to evaluate the models vary (due to the iterative nature of evaluating busy and new services), and because each service operates differently, insights – especially around patient outcomes – should not be compared between the three models. However, key themes emerging across the three evaluations are discussed in the report’s conclusion and recommendations (in chapters 7 and 9).

4. Kingston and Richmond Virtual Ward

4.1 What are the core components of the Kingston and Richmond virtual ward?

The Kingston and Richmond virtual ward, which was soft launched in the midst of the pandemic in December 2021, is primarily aimed at patients with respiratory or cardiac issues. As of July 2022, the ward had onboarded a total of 42 patients (and 66 patients as of 16 September 2022). It can currently admit a maximum of 20 patients at one time, with plans to increase capacity over winter 2022/23 to 55. The virtual ward sits within Kingston Hospital NHS Foundation Trust but also works across Kingston and Hounslow & Richmond Community Healthcare NHS trust, social care and primary care. It previously employed the VCare platform⁶ but has recently transitioned to Current Health technology⁷ to continuously monitor the health of patients that are acutely unwell and identify any health deterioration. Data for this evaluation was obtained when patients and staff used the VCare technology.

It is important to note that, at the time of writing, Kingston and Richmond virtual ward is rapidly expanding, and a virtual ward providing care for patients with frailty is being set up. Going forward, the virtual ward will also work collaboratively with South West London's central monitoring hub, which is expected to support the service with the monitoring of patients (including out of hours monitoring), distributing and collecting remote monitoring kits, and routine calls.

Kingston & Richmond Virtual Ward

- Soft launch in December 2021
- Onboards cardiac and respiratory patients
- Acute-led model of care, currently sits with Kingston Hospital NHS Foundation Trust
- Enables early supported discharge, onboarding from ED and acute wards at Kingston Hospital
- Maximum capacity: 20 from September 2022 (with winter capacity planned at 55)
- Staffed with Band 5 and Band 7 physiotherapists, and Band 7 nurses
- Offers continuous and spot monitoring

The infographic includes a map of London boroughs: Richmond & Twickenham, Kingston, Sutton, Lambeth, Southwark, Greenwich, Berley, Lewisham, Bromley, and Croydon. The Kingston and Richmond areas are circled in red.

⁶ <https://www.vcaresystems.co.uk/solutions/rpm-solution-remote-patient-monitoring>

⁷ <https://www.currenthealth.com/resources/case-studies/demand-for-virtual-ward-services>

Workforce model

The Kingston and Richmond virtual ward's development, implementation and delivery has been led by a consultant physiotherapist, with the help of a project manager who worked alongside her one day per week. Since then, in addition to its lead, the team has expanded and now comprises four band 5 physiotherapists, two band 7 physiotherapists, and two band 7 specialist nurses – with the stated aim of trying to reflect as much as possible the structure of a physical ward's multidisciplinary team (MDT).

Although there is a degree of flexibility between the different roles and responsibilities within the team (as discussed in section 4.2.8), there are some clear distinctions between the band 5 and band 7 roles:

- band 5 staff work across all specialities and tend to be main points of contact for patients: they monitor their observations (through the Current Health dashboard and previously through the VCare dashboard), call patients and do home visits.
- band 7 physiotherapists work within one speciality, with three currently covering respiratory patients, and one heart failure. They have multifaceted roles which include clinical delivery and being the first level of escalation if there are any concerns around a patient. They are also responsible for the national reporting of data and are actively involved in shaping the service.
- band 7 nurses have similar responsibilities to band 7 physiotherapists

Although the service experienced recruitment challenges in the early stages of its implementation (mainly linked to staff shortages in acute settings), positive word of mouth has helped generate interest, especially among internal candidates. The current recruitment drive has focused on team diversification and recruiting from new specialities (however, it has not managed to employ an occupational therapist yet due to chronic staff shortages across the NHS).

The wider team includes one Allied Health Professional (AHP) consultant, one consultant nurse and one consultant overseeing the ward- who are available to provide support. Each day, the consultant overseeing the ward rotates and is the person ultimately clinically responsible for virtual ward patients for that day.

Eligibility criteria and referral processes

To be admitted to the virtual ward, patients must meet the following general criteria:

- Be over 18 years old;
- Must have a telephone and be able to use independently or a 24hr carer/relative who is able to fill these requirements;
- Registered with a Kingston or Richmond GP;
- Must not have significant cognitive impairment, unless they have a 24hr carer or relative who is able to communicate with the team;
- Consultations in English must be possible, either directly or through a relative who can translate;
- On a stable or improving clinical trajectory.

To determine eligibility, other soft criteria are considered, including social history, and level of digital confidence; although as discussed below, the team places a strong emphasis in educating patients to use the remote monitoring kit.

Referrals can be directly made to the virtual ward team via phone (with the team reviewing the patient and advising whether they would be eligible). However, most patients are pro-actively identified by the virtual ward team. At the time of writing, patients are mainly screened on four Kingston Hospital Foundation wards: respiratory, cardiac, the Emergency Department and the Acute Assessment Unit. At the time of writing, the Cerner Computerised Record System referral form has just gone live, enabling referrals to be submitted by any clinician from anywhere in the hospital, which is expected to enhance accessibility and optimise capacity of the virtual ward. The referral form

includes referral criteria to improve quality of referrals and understanding of its role.

Patients are identified and referred as follows:

1. Each morning, one member of the team is allocated one of the four most frequently onboarded wards, and given a handover sheet to review- containing the medical information of its patients (i.e. presenting conditions, summary care records and medical plan). From this, they start identifying which patients might be eligible to be admitted onto the virtual ward.
2. They would then attend the RAG meeting of their allocated ward, where they get the opportunity to gather more information about patients.
3. If a patient is identified as eligible, ensuing discussions occur with the patient's consultant to determine whether and when a patient can be onboarded onto the virtual ward.
4. The patient is then approached by their consultant and a member of the virtual ward team. They are explained how the service works and asked whether this is something they would like to consider. If so, they are shown how to use the virtual ward monitoring equipment, which they then take home with them.

Onboarding process

Once patients are identified as suitable to be transferred to the virtual ward and monitored within their own homes, a structured onboarding process is initiated by the virtual ward team. All patients have a Day 1 visit to ensure that they are safe at home and answer any queries that they might have. They are shown how to use their remote monitoring kit again. The kit includes a smart tablet, a WIFI dongle, an arm band (which is set to automatically record patient observations every 15 minutes), as well as pieces of equipment the patient can use to do spot monitoring if they experience issues with the arm band, including a blood pressure monitor, a thermometer, and an oxygen saturation and heart rate monitor. Depending on a patient's need, a nebuliser spirometer and weighing scales can also be provided.

Each patient is also provided with an information leaflet. This leaflet contains information on each bit of equipment within the remote monitoring kit and how to use them. They are also given their 'Target Ranges' to ensure they are aware of their vital signs and when to escalate to the virtual ward staff. Finally, staff re-iterate the virtual ward's monitoring hours (see below), contact details and safety netting.

Monitoring process

Each day, two members of the team are tasked with monitoring patients' observations on the Current Health (previously VCare) dashboard. As part of this, they manually input data from the Current Health (previously VCare) system onto the Electronic Patient Record (although this will be automated in the near future).

Patients are actively monitored between 8am and 6pm from Monday to Sunday (before August, the ward operated from 8am to 4:30pm from Monday to Friday). Outside of working hours, patients are safety netted (i.e. provided with information on actions to take if their condition deteriorates) to ensure they are aware of what to do during a deterioration out of working hours (i.e. call 999 or 111).

In addition to monitoring, virtual ward staff stay in contact with patients during their stay on the virtual ward through phone calls, and if required home visits. There are three types of calls – routine, escalation, and health coaching – with one type of call sometimes turning into another. Health coaching is varied – ranging from tobacco dependence to hydration and dietary advice.

In addition to routine Day 1 and discharge home visits, escalation visits can occur in response to a patient's clinical deterioration – whether it is requested by the patient themselves or deemed necessary by the virtual ward team.

Ward Round and Multi-disciplinary Team Meetings

As with a physical ward, all patients are discussed daily by the virtual ward team and a twice weekly specialist MDT takes place for patient care plans to be agreed.

Discharge process

Unless they self-discharge, a patient is normally discharged when they have achieved their target goals or have recovered from their illness/symptoms. A discharge home visit is completed, serving the dual aim of collecting the remote monitoring kit, and ensuring the patient is clinically stable and safety netted. A discharge letter is completed and sent to the patient's GP. As part of the discharge process, the virtual ward team can refer patients onwards to any community service (i.e. GP/Community Respiratory Team/Pulmonary). At the time of writing, a Cerner CRS powerform has also been created and will soon be embedded into the Cerner Health Information Exchange (HIE) platform, to increase transparency of virtual ward care episodes across secondary, primary and community care teams.

4.2 Evaluation findings

4.2.1 Kingston and Richmond virtual ward methodology to data collection

Quantitative data collection

A range of data relating to the profile of patients admitted to the Kingston and Richmond virtual ward, the amount of clinical contact each patient admission received, and their discharge outcomes were collected by the service for the period between January 2022 when the virtual ward was first implemented until July 2022. For the purpose of this evaluation a clinical staff member working on the virtual ward looked through the case notes of each patient that had been discharged from the virtual ward by the end of July 2022 and extracted the relevant information manually.

The service is in the process of embedding some forms that will collect coded quantitative data into their patient electronic record system to make the collation of data more seamless and consistent going forward.

Qualitative data collection

Qualitative interviews were carried out with six staff – some involved in the implementation of the service, and others in delivering clinical care to patients admitted on the virtual ward.

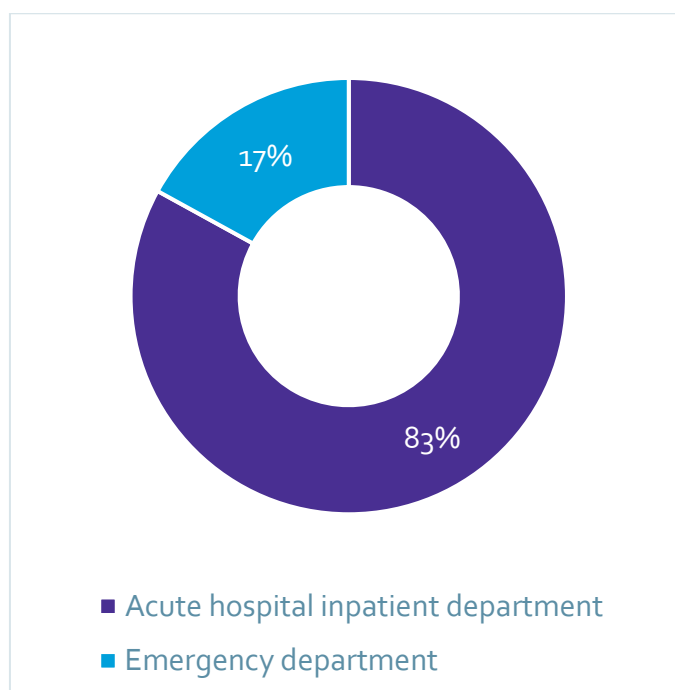
Interviews explored implementation challenges and successes, experiences of working for or with Kingston and Richmond virtual ward, and perspectives on patient care, outcomes, and experiences of being on the ward. To seek further feedback on patient experiences of the virtual ward, one joint interview was completed with a patient and her carer, and the insights gathered were used to build up a case study (see p.50).

4.2.2 Overview of virtual ward activity

Between January and July 2022, there were 42 admissions to the virtual ward. On average, there were 6.8 admissions each month. In this time, there was only 1 readmission.

Regarding referral source, 35 (83%) of patient referrals were via an acute hospital inpatient department. Seven (17%) patient referrals were via an emergency department or same day emergency care, as highlighted in Figure 4.1.

Figure 4.1: Breakdown of referral source to the virtual ward



Length of stay ranged from 1-29 days, with a median average length of stay (ALOS) on the virtual ward of 13 days and a standard deviation of 6.5. In order to compare ALOS on the virtual ward to ALOS at Kingston hospital which has been calculated as a mean, a mean average has also been calculated which equates to 12.9 days.

Table 4.1 gives a breakdown of the number of patient admissions by length of stay (LOS) in time bands of days. 10% of patient admissions stayed for 5 days or less, with 36% staying for between 6 and 10 days, a further 43% staying for between 11 and 20 days and 12% of patient admissions staying for more than 20 days.

Table 4.1: Length of Stay (in time bands of days) on the virtual ward

LOS (in bands)	No. of patient admissions	% of patient admissions
1-5 days	4	9.5%
6-10 days	15	35.7%
11-20 days	18	42.9%
21+ days	5	11.9%
Total	42	

Some data was obtained on acute hospital length of stays for certain conditions being treated by the virtual wards to act as a comparator. The below analysis compares the ALOS of patients on the virtual ward for certain conditions to the ALOS of patients admitted to the local hospital (Kingston Hospital NHS Foundation Trust) in 2021-22 for the same conditions. The length of stays on the virtual ward were higher across these conditions.

Average length of stay (ALOS) on the virtual ward for patients with COVID-19 was 12.7 days, compared to ALOS of 9.7 days at Kingston Hospital NHS Foundation Trust (2021/2022).

ALOS on the virtual ward for patients with COPD was 14.1 days, compared to an ALOS of 3.9 days at Kingston Hospital NHS Foundation Trust (2021/2022).

There were smaller numbers of patients (4) admitted to the virtual ward with heart failure so this average may not be reliable, however of these the average length of stay was 10.3 days, compared to 6.6 days at Kingston hospital.

Table 4.2: ALOS on virtual ward by condition comparison to acute hospital ALOS

Condition	No. of patient admissions	ALOS on virtual ward	ALOS in hospital 2021-22
Covid-19	6	12.7	9.7
COPD	13	14.1	3.9
Heart Failure	4	10.3	6.6

4.2.3 What factors have supported the successful implementation of the virtual wards?

As part of this evaluation, staff were asked to reflect on whether they could identify any implementation and delivery lessons. It is important to note that overall staff felt that the virtual ward had been successful at what it was to set up to achieve – i.e. being able to keep patients at home, and freeing up hospital beds.

"Improving patient flow is the best [thing about the virtual ward] in my in my opinion, because you're not only seeing the benefits of the patient being at home, but you see the benefits of beds opening up in the hospital."

Staff identified a number of factors which they believed had supported the successful implementation of the Kingston and Richmond virtual ward, including:

- **Being an acute secondary care led model:** the virtual ward sits within Kingston Hospital Trust which staff felt brought a number of advantages, in relation to (1) having direct access to patients and consultants in an acute setting (which helped with identifying and onboarding suitable patients onto the ward), and (2) building trust with consultants and nurses working on physical wards by being able to directly interact with them, and to regularly attend RAG meetings.⁸
- **Having pre-existing relationships within the community:** staff noted they had good pre-existing relationships with the community respiratory teams across Kingston and Richmond through the respiratory steering group (which was established about six years ago). Awareness of the virtual ward was raised through the group's monthly meetings, which provided an opportunity to talk about the service and share learnings.

*"So the single biggest useful tools was the **pre-existing relationship with our community partners**. I think for any project like this to be successful, if you haven't got an established conversation or stakeholder group or something like that, it's gonna slow you down a lot (...) Even when we started to think about [setting up the virtual ward], we were meeting with our community teams."*

In the early stages of the virtual ward being developed, the group was also able to identify that there was no existing resource capacity to staff it, and an entirely new team would need to be recruited. Recruiting the virtual ward team in collaboration with the other steering group members was also instrumental in establishing trust in the service.

- **Having a mix of skills within the virtual ward team:** ensuring that team members had a set of different skills – with physios, and speciality nurses – was viewed as beneficial to both patients (through the provision of holistic care) and staff (see section 4.2.7).

⁸ A RAG (red, amber, green) meeting involves rating patient individual cases according to their current circumstances, and medical condition.

*"It's been great with the physios, with the band fives who were originally recruited for respiratory, they're now looking at doing all the frailties (...) So it's just increasing **the awareness of the more holistic care of these patients** rather just going there for a few patients (...) **So it's really enhancing the care and broadening the spectrum.**"*

- **Putting an emphasis on data collection:** due to the novel nature of the service, this was prioritised by the team. Building an evidence base and business case to upskill the team was viewed as critical.

Staff identified also a number of challenges, mainly relating to the virtual ward being a new service, including:

- **Lack of existing models to refer to** – and not being able to learn from the experiences of similar services being set up.

*"We started from nothing, **doing everything from scratch**. So doing that was kind of the hardest aspect. So possibly having the kind of interaction with other teams that have done similar things. I think that would be quite useful."*

- **Lack of awareness of the service** – especially in the early phases of delivery, there were some reported issues with deteriorating patients on the virtual ward presenting at the emergency department (ED), and hospital staff not being aware of what the service was.

"The people in the ED and on the wards were not fully aware of who we are and what we're doing. It is much as you try to educate and you visit every RAG and you tell them all about who we are still. They've got a whole job to be focused on. We're not priority number one."

- **Getting some consultants' buy in** – establishing trust within the virtual ward could be challenging, especially among more risk-averse consultants. Reassuring them around out of hours care and sharing patient feedback could help alleviate their concerns.
- **Lack of administrative support** – it was felt additional administrative support would have been especially helpful when setting up the service, but also to undertake data collection and manage the kit on an ongoing basis.

From an operational perspective, some questions were raised over the sustainability of the model – although the staff interviewed were also keen to point this was a laudable project. Noting that the service was newly established, they agreed that the extent to which the service could be used as a model to reduce length of stay remained to be seen. They noted that implementation had been slowed down due to:

- **Recruitment challenges:** while there was an initial assumption that staff in the community could pick up some of the virtual ward's workload, it became quickly apparent there was no additional capacity. A new team had to be created from scratch, making the service 'quite resource heavy'. In addition, recruiting staff was initially challenging due to the fixed-term nature of the contracts offered (this has changed since).
- **Number of suitable patients:** the number of patients being onboarded on the ward had been lower than anticipated, which staff linked to a number of factors included risk aversion from consultants, training and the time needed for the service to establish itself. Coordination of OPAT (Outpatient Parenteral Antimicrobial Therapy) services and the virtual ward was identified as a key enabler, although it was noted this would require additional investment.

In addition, it was noted that the lack of consistency in the definition of the virtual ward had negative implications in how funds were allocated (as it was viewed as not appropriate to compare high-acuity patients in hospitals to

patients in the community avoiding hospital admission).

4.2.4 Who are the patients being admitted to virtual wards?

As shown in Table 4.3 below, the majority of patient admissions (81%) were for an exacerbation of an existing respiratory or cardiovascular long-term condition, with 31% of admissions being for an exacerbation of COPD, 21% for asthma and 17% for other respiratory conditions which include post COVID, interstitial lung disease and respiratory failure. A further 12% of patient admissions were for exacerbations of cardiovascular conditions which include heart failure and pulmonary hypertension.

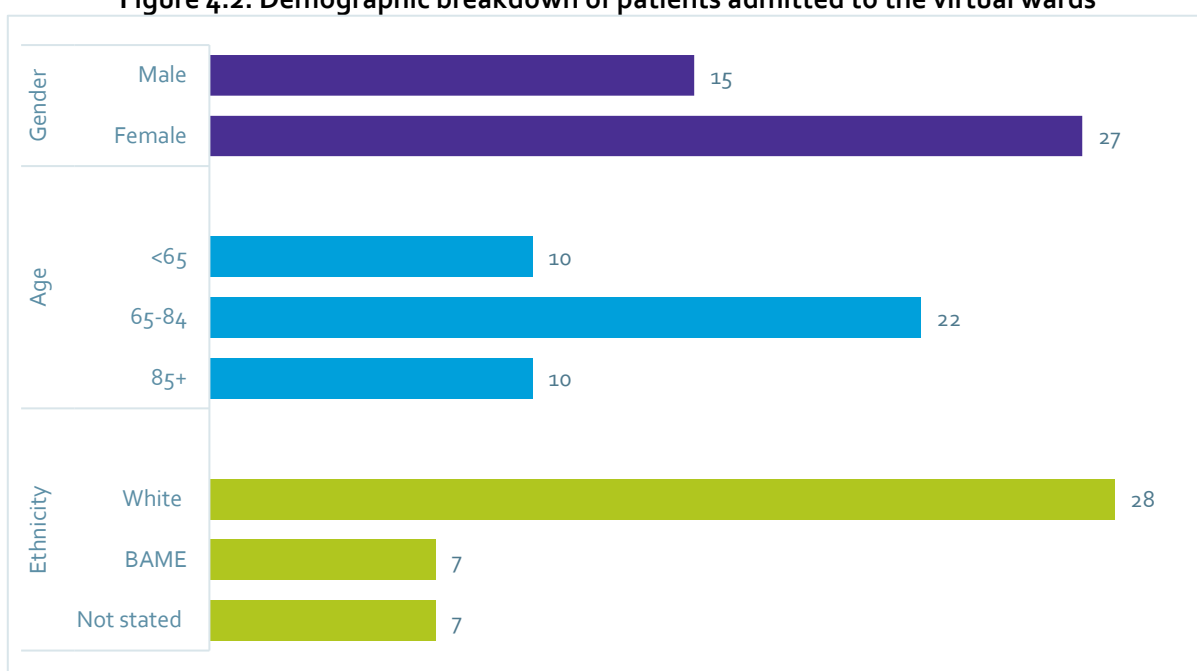
A further 19% of admissions were for an acute incident, these included COVID-19 (14%) as well as other incidents (5%) such as falls and pneumonia.

Table 4.3: Breakdown of patients admitted to virtual wards by condition

Primary complaint	No. of patient admissions	% of patient admissions
Acute incident		
<i>COVID-19</i>	6	14.3%
<i>Other</i>	2	4.8%
Exacerbation of LTC		
<i>COPD</i>	13	31.0%
<i>Asthma</i>	9	21.4%
<i>Respiratory (other)</i>	7	16.7%
<i>Cardiovascular conditions</i>	5	11.9%

Patients admitted to the virtual ward were more likely to be white, between 65-84, and female, as shown in Figure 4.2.

Figure 4.2: Demographic breakdown of patients admitted to the virtual wards



Recorded comorbidities ranged from 0-16, with the average number of comorbidities per patient being 5.1. Four patient admissions (10%) had no comorbidities, 15 patient admissions (36%) had between 1-4 comorbidities, a further 19 patient admissions (45%) had between 5 and 10 comorbidities and 4 patients (10%) had more than ten comorbidities (see Table 4.4 below).

Table 4.4: Breakdown of number of comorbidities in patients admitted to virtual wards

No of comorbidities	No. of patient admissions	% of patient admissions
None	4	9.5%
Between 1 and 4	15	35.7%
Between 5 and 10	19	45.2%
More than 10	4	9.5%

All patients admitted onto the virtual ward were given an acuity score. An acuity score measures the workload that can be expected to care for a patient. In this case, the acuity score is provided for the 'unwell adults being cared for in their usual place of residence through community services' using the Guys and St Thomas' Acuity and Dependency Tool⁹. The care acuity scale is grouped into four tiers as follows:

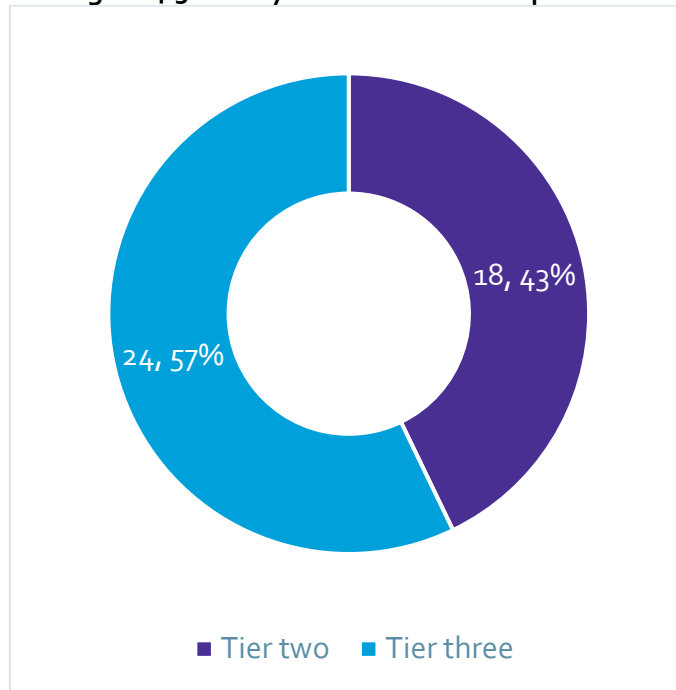
- Tier 1: acute care at home with patient need met through routine visits carried out by a band 5 staff member.
- Tier 2: acute care at home with patient requiring more than a routine visit, clinically stable but at risk of deterioration. This would typically be carried out by senior band 5 and band 6 clinicians.
- Tier 3: acutely unwell at home, clinically unstable with higher risk of deterioration. These visits would typically be carried out by senior band 6, band 7 staff and doctors.

⁹ <https://ihub.scot/media/8016/guys-st-thomas-acuity-and-dependency-tool.pdf>

- Tier 4: acutely unwell requiring external expertise and staffing level. These visits would typically be carried out by band 7 clinicians and doctors.

All virtual ward patients fell into tiers 2 and 3, with 43% of patient admissions being tier two and 57% being tier three, as shown in Figure 4.3 below.

Figure 4.3: Acuity tier of virtual ward patients



4.2.5 What is patient engagement with and adherence to the remote monitoring technology?

Data on the number of patients that declined a referral to the virtual ward and the reasons for declining were not collected. Similarly, it was not clear how many patients requested early discharge from the ward because they were having difficulty with the remote monitoring kits. The routine recording of this data will help in understanding patient adherence in future.

Data from the remote monitoring technology provider VCare was obtained in order to understand the levels of usage of the remote monitoring devices. For the Kingston model devices were being worn on a continuous basis throughout the day and then taken off at night. A proportion of time being worn of 60% or more is indicative of complete adherence.

The average percentage of time patients on the Kingston ward spent wearing their device was 43% of the time.

The breakdown of adherence can be seen in Table 4.5 below. It should be noted that adherence rates are prone to some error as it is hard to know exactly how long each patient was on the ward to calculate the proportion of time spent wearing the device. This can be due to there being a lag for some patients between when they are discharged from the virtual ward versus being discharged from the VCare platform (which can happen later). Additionally, there can be a lag between being onboarded to the VCare platform and actually starting to wear a device. The below analysis still gives some indication of adherence despite these caveats, but actual proportion of time spent wearing a device is likely to be higher than reported through this data.

Of the 50 patient admissions registered to the VCare platform between January and July 2022, just over a quarter (26%) wore their device for 60% or more of their time on the ward, giving them complete adherence to the technology. A further 20% wore their device for 40% - 59% of the time. Two-fifths of patient admissions wore their device for between 20%-39% of the time and a small number (7, 14%) wore their device less than 20% of the time.

Table 4.5: Proportion of time on virtual ward that device was active

	No. of patient admissions	% of patient admissions
More than 60%	13	26%
40%-59%	10	20%
20%-39%	20	40%
Less than 20%	7	14%
	50	

Most patient admissions (47) had information on how to take their health observations, these included a range of different test that can be taken using the devices provided by VCare, which are temperature, respiratory rate, blood pressure, oxygen saturation and heart rate.

Temperature and heart rate readings had the highest volumes of recordings, with temperature readings being taken on average 34 times per patient per day, and heart rate taken 31 times per patient per day. Blood pressure readings were taken much less often with an average of 0.6 times per patient per day on the virtual ward.

Table 4.6: Number and rates of health observations taken using VCare kits

	Total no of observations taken	No of observation outside normal range	Proportion of observations outside normal range	Average no of observations per patient per day	Average no of observations outside normal range per patient per day
Temperature	16723	292	1.7%	33.9	0.6
Respiratory rate	12513	6176	49.4%	25.3	12.5
Blood pressure	285	53	18.6%	0.6	0.1
Oxygen saturation	9686	1531	15.8%	19.1	3.0
Heart rate	15578	6118	39.3%	30.5	12.0

In the qualitative interviews, staff reported how, overall, **patients engaged with the technology well, as long as they were given enough instruction on how to use it.**

Showing patients how to use the remote monitoring kit and how to take their readings could take anything between 15 and 45 minutes. However, staff were in agreement that it was a critical step to patient onboarding, and they believed that all patients and/or their carers, even those with little digital confidence, could be taught how to use it. As part of this, obtaining consent and getting patients to sign a consent form was a central step of the onboarding process.

Staff interviewed only reported a few instances of patients declining admission to the virtual ward because of lack of confidence or concerns over using the remote monitoring equipment. One staff interviewed noted that the widespread idea that older patients are technologically illiterate was misguided.

*"I know they are [old]. And you would think that that would be a bigger issue. But we under appreciate that like [older patients] are more capable and that's usually more of a nervousness to use the technology. But **when you actually teach them how to use it, they suddenly they think "Oh this isn't this isn't as bad as I thought". They're often quite surprised.**"*

Continuous monitoring was preferred by patients over spot monitoring, as it required minimum technical expertise from them. Staff reported how patients found using the arm band generally straightforward, and how they could wear it throughout the day without feeling any discomfort. However, technical issues were commonly reported, meaning some patients had had to switch to spot monitoring.

*"We actually found [continuous monitoring] easier for those patients (...) because a lot of the patients that we have are a bit older. It does take a little bit of time to get used to use the tech and actively input all of their observations 3/4 times a day. **We often found it was being quite difficult for them, whereas in terms of continuous monitoring, they just put the armband on, it would do all of the observations we wanted to do with them anyway.**"*

There were also some instances when virtual ward staff suspected patients were struggling with the remote monitoring kit and asked them to submit their observations on the phone every morning – suggesting the importance of adopting a flexible and user-centred approach when monitoring patients.

4.2.6 What is patient experience of the virtual ward models?

Staff working on the Kingston and Richmond virtual ward reported receiving mainly positive feedback from patients, including of using remote monitoring equipment. They reported how patients overall understood the rationale behind the virtual ward as they were keen to get out of hospital, as highlighted by the patient case study below.

Kingston and Richmond virtual ward- patient case study

Carer X, 80, cares for her 104-year old mother, patient X: they live together in Kingston. Paramedics were called to their home in August, after Patient X slipped off her bed and Carer X was unable to help her mother back up. As paramedics responded, they noticed swelling in Patient X's legs and admitted her to Kingston Hospital where she received intravenous treatment to remove the fluid from her feet, ankles and legs. As the treatment drew to an end, Carer X and her mother were informed about the virtual ward and Patient X was admitted following her 10-day stay in hospital. Despite knowing nothing about the service initially, Carer X recalled: *"I was fascinated and interested and excited by it because all I wanted was to get my mum home. And the virtual ward was a way to get mum home."*

Despite receiving a "clear explanation", both in the hospital and at home, Carer X initially found her new responsibility slightly "perplexing". She explained: *"It was new. And until I got used to it, I did worry about whether I was doing everything right."*

In the first instance, Carer X used the backup equipment; blood pressure monitor, oximeter, thermometer and weighing scales, as the armband wouldn't pick up a reading due to Patient X's slight circulation problem, and she rang the reading through to the team. *"I enjoyed following, checking, discussing with the young nurses. I enjoyed all that,"* Carer X recalled, *"It was reassuring, because every time I did them [the readings], they were good. And I was able to reassure her [mum] that it was a good result. So it made it a very positive experience for both of us."*

Carer X could not fault the care her mum received: *"There were plenty of opportunities for me to raise any subject that I wanted to raise with reference to my mum or the equipment or anything. I had all of the support I needed and wanted. And we had the reassurance that she was being monitored. She was being cared for and she was being looked after."* She also praised the virtual ward team: *"They were such lovely people. All the technology in the world would not have been good enough without the team of human beings, who were reassuring, professional, sympathetic, compassionate, happy and smiley. That team of people made this experience. Not the technology. It was the people."*

Carer X described how receiving care at home meant her mother was able to feel that things were back to normal: *"The food – I could give her what she liked. I got control of her food as she had stopped eating in hospital. I helped with the side effects of her treatments so I'd take her to the loo when she needed it."* Importantly, as Patient X's fulltime carer, Carer X also felt it was easier for her: *"It was so much easier for me as her carer. Look after her, sit and chat with her. We'd have a meal, sit and chat. It was much easier for me."*

When Patient X was discharged from the virtual ward, Carer X had mixed emotions: *"In one sense delighted because she [mum] was better but disappointed I was losing the support. I felt vulnerable because I was responsible for my mum's wellbeing, I was looking after her. And to lose the support in one fell swoop. It was a bit daunting."*

In spite of this, Carer X believes she has been empowered by this experience: *"I have been sort of taught by them and trained. I know I can do it. If Mum is unwell, I would take all those readings. And before I ring anybody, I would be able to take the readings and have it all at my fingertips."*

Carer X summed up her overall thoughts and experience: *"Mum didn't need to stay in hospital. She needed to be monitored. This equipment enabled her to come home. Home is where you get better with your loved ones around you and visiting you. And that's what she needed. It was coming home that turned a corner. And it worked beautifully."*

Staff interviewed also reflected on which types of patient cohorts they felt the virtual ward was most beneficial to (beyond their medical conditions), including:

- Patients with chronic long-term conditions- such as COPD and asthma – who tend to be pro-active in their treatment and care.
- Elderly patients who need a bit of support going home after hospital discharge – so they can be discharged early from hospital.
- Patients suffering from anxiety.
- Patients experiencing cognitive decline –s symptoms tend to worsen in unfamiliar settings such as a hospital.

"Anyone with cognitive difficulties, when you're in a hospital you get really confused. [Patients] are just confused. They don't know where they are. And I think the virtual ward is really beneficial for those patients because then when they get home, the confusion subsides. And now you can see the symptoms of the actual problems and you can manage that."

4.2.7 How do staff engage with and work on virtual wards? (i.e. staff activity)

Telephone contacts

Number of telephone contacts per virtual ward admission ranged from 1-17, with an average of 0.39 telephone contacts per patient per day. Telephone contacts were either routine or due to an alert.

Home visits

Number of home visits per virtual ward admission ranged from 1-4, with an average of 0.18 home visits per patient per day. All home visits were completed by a physiotherapist.

Table 4.7: Contacts with virtual ward staff

Type of contact	No of contacts	No of contacts per admission	No of contacts per admission per day
Telephone (routine)	6	0.1	0.01
Telephone (alarm/alert)	216	5.1	0.4
Telephone (all)	222	5.3	0.39
Home visit	92	2.2	0.18

Monitoring

There is no quantitative data collected about how staff engage with remote monitoring activities. However, when asked about how they worked on the virtual ward, staff discussed the time they saved being able to remotely monitor patients. Clinicians tasked with monitoring patients reported taking an average of 5 minutes to check one person's readings (which they did throughout the day).

4.2.8 What is staff experience of the virtual ward models?

Clinical staff on the virtual ward team described positive experiences of working on the ward. Some reasons for this were directly attributable to the team, its make-up, and good relationships between colleagues. Other reasons for this included the satisfaction and pride staff felt working for an innovative service which they believed was highly beneficial to patients.

The virtual ward team

Thinking about how they worked within their team, staff interviewed noted how satisfaction was driven by:

- **Being able to learn new skills/ upskill thanks to the mix of roles within the team:** when developing the virtual ward, the virtual ward lead was keen to recruit team members with a different set of skills (see section 4.1) so team members could learn from each other, and in doing so enhance their ability to provide holistic care to patients.

"The nurses have been able to support the physios and upskilling them and doing the computer based training and things like cannulation(..) Likewise the physios have been upskilling the nurses in chest X-ray interpretation, doing ABG sampling, that kind of thing".

Staff agreed and felt working among a multi-disciplinary team had been highly beneficial as they were able to develop a new range of skills.

"We're a mixed team where nurses and physios and so I've started learning from nurses their approach to patients and how different that is to what physios taught."

- **The flexibly and adaptably of the team in assigning roles and responsibilities** – with different tasks assigned each morning to different members of the team – was also a major contributor to positive work experiences. Assignment of tasks would in most cases be determined by practicalities (i.e. who has a car to perform the home visits) – although all escalations visits were completed by band 7 staff.
- **Perceived lack of hierarchy within the team:** while this is linked to the point above, this also more widely reflects on the perceived culture within the team.

"Even though you've got your band 7 and band 5 nurses and physios, we don't really work in a hierarchy. If something was going wrong, we'd discuss it as a team and as a team we would be able to give like what we our own input and the bands 7 would listen and our bands 5 input just as much."

Satisfaction of delivering patient care as part of the virtual ward

In addition to working within a supportive team and environment, staff felt positive about working for the service, and how this impacted on their relationships with patients. They discussed:

- **The excitement of working for an innovative service:** because the virtual ward was a new service, staff also felt they had opportunity to shape it, and to directly influence not only its delivery, but the delivery of other similar services being developed.

"It's something that's never been done before. You're at the forefront of it. Whatever you do will pave the way for the virtual wards... You'll be having just a simple chat about something going on the Kingston virtual world and then someone might think is a good idea. You go to a SW London meeting and then all of the virtual wards start taking that idea. We can really change the whole process."

- **The pride of working for a service which they felt was highly beneficial to patients:** staff explained how they found it rewarding to help patients stay safely at home. Positive feedback received by patients reinforced such views.

"So it's nice to see the patients happy at home and seeing the happiness that brings their family as well."

One staff gave the example of a palliative patient with lung cancer who was able to get back home following her referral to the virtual ward.

*"We got her home and made sure that she was at home with oxygen. She was very capable. She was mobilizing, and she wasn't bed bound or anything. It was just that her prognosis was quite low. But it meant we got her out of hospital and **it meant that she could be in her own home for the rest of her life. And then we discharged her safely.**"*

Not only the service meant that patients could be more comfortable at home, and could recover quickly, but staff could also provide reassurance to patients who were anxious after being discharged from hospital.

"So what I've noticed in my personal experiences is that there is a lot of anxiety going home from the hospital for the patient (...) But having that social support of going and seeing them at home, being able to give them a phone call every day making, you know, reassuring them that they are doing well. That's been lovely."

- **Developing a greater personal connection with patients:** contrasting her experience of working on a physical ward to her current role, one member of staff noted how she enjoyed getting to know patients better, through doing home visits.

"When they're in hospital, they're just a patient. [At home] you get to see their pets, their garden, their family, like the paintings, like the drawings or whatever their favourite food, what they buy, what they want to eat, what they usually eat at home. So it's actually a good experience to get to know the patients like that."

However, **staff also highlighted the occasional anxiety caused by 'leaving patients' unmonitored** over long periods of time, with some staff finding it sometimes *"harder to leave work at work"*. It is important such concerns had been largely alleviated since the service started operating seven days a week (meaning patients are just not monitored at night, rather than over the whole weekend).

"I think because we've only just gone seven days, so it was definitely for me come Friday evening, I'd be calling patients and really safety netting them like if something goes wrong, you need to call for help because we're not gonna be here. But then now doing these extended hours (...) now I feel like because we're so frequently in contact with our patients, I'm not as concerned."

Finally, one staff interviewed suggested an area of improvement: noting there could be misconceptions about what working for a virtual ward entails (for instance, she originally believed working for the ward would involve being able to work from home), she felt job descriptions should include more details around the practicalities of the day to day role.

4.2.9 What patient outcomes are associated with the virtual ward models?

The majority (40, 95%) of patients were discharged to their usual place of residence. One patient was discharged to an acute hospital, and one was discharged to a different virtual ward. No patients requested early discharge. Where recorded, 4 (10%) patients were referred to services following discharge, all of which were pulmonary rehabilitation.

Table 4.8: Discharge destination of patients admitted to the virtual wards

Discharge destination	n	%
Usual place of residence	40	95%
Acute hospital	1	2%
A different virtual ward	1	2%

Hospital admissions and ED attendance

Only one patient (2%) was admitted to hospital. This patient was admitted to ICU and had a length of stay of 5 days. They were discharged from hospital back to their usual place of residence. In addition to the hospital admission, a small number of patients (2, 5%) attended an emergency department setting. Neither patient was admitted, and both were discharged from ED back to the virtual ward.

Post discharge

Data on hospital admissions 30 after discharge from the virtual ward showed that 7 patient admissions (17%) had been admitted to hospital in the 30 days after being discharged from the virtual ward. Information on deaths in the 30 days following discharge was also obtained showing that 3 patient admissions (7%) had died in the 30 days following discharge from the virtual ward.

Staff interviews explored perspectives on patient health and wellbeing outcomes associated with the Kingston and Richmond virtual ward. The following positive outcomes were identified:

- **Encouraging self-management:** staff agreed that being on the virtual ward could encourage patients to become aware of their symptoms and vital signs and give them a 'confidence boost', so they felt empowered to take more insight into their own health. One shared the case of a patient who had bought a blood pressure cuff following his discharge, so he could carry on monitoring his vital signs.
- **Getting patients to move around more at home and engaging in normal activity of daily living,** with positive implications on their recovery:

*"When we get people home, they're now moving around the house, which means that they're breathing deeper, which means that they're getting more oxygen into their lungs and you're able to wean them off. And like when they climb the stairs and they're puffing out, you know, their heart rate might go up and their rest rate might increase, but then it settles back down. And for someone who's elderly cause, it's not unusual. **Our patients, that's a workout for them (...).**"*

- **Getting a chance for staff to optimise patients' medication,** post hospital-discharge:

*"One thing that's been great with the virtual ward is that say someone went home and their medication wasn't quite right for whatever reason. **It's an opportunity for it to be reviewed by an acute team and then to make sure it really is ironed out as being like they understand what they need to do and how to go forward.**"*

- **Reducing the risk of hospital-acquired infections,** by not keeping vulnerable patients too long on a physical hospital ward:

*"Hospitals are really dangerous places. And people don't seem to grasp that. They always think it's like the best place to be, which it is for a lot of people, but also for those vulnerable individuals that need relatively minimal care compared to others. **It's good to get them out of the danger zone.**"*

4.2.10 What is the financial impact on acute beds?

Due to the discrepancies between the average length of stay in an acute hospital bed compared to the average length of stay on the virtual ward (see section 4.2.2) we have chosen not to do any financial modelling where the assumption is that for every day spent on the virtual ward this would have been an acute bed day.

As the majority of admissions (83%) were referred via a hospital inpatient setting, it is difficult to understand to what extent the Kingston and Richmond virtual ward has reduced the length of stays in hospital for these patients. More data would need to be obtained to understand the impact the virtual ward has had on reduced length of stay by supporting an early hospital discharge.

There were only a small number of patient admissions (7) that were stepped up to the ward by being referred directly from ED, of these it was only possible to match 4 to data obtained on the average length of stay in hospital for certain conditions that are consistent with the general profile of virtual ward patients. In light of this it has not been possible to model the reduction in bed days that the virtual ward has made. It is recommended that this virtual ward continues to collate data on the referral source and primary reason for admission to the virtual ward. Analysis can then be conducted once a larger cohort of patients have benefitted from the care of this virtual ward.

5. Sutton Virtual Ward

This chapter focuses on Sutton virtual ward. It comprises two sections: the first one describes how the service works and delivers patient care, while the second details the findings from the evaluation.

5.1 What are the core components of the Sutton virtual ward model?

As part of COVID-19 response Sutton's Primary Care Network (PCN) Clinical Directors developed Community Response Teams (CRTs), which ran regular webinars with providers, commissioners (from health and social care) and voluntary sector organisations, with a particular focus on clinically vulnerable patients. Those were the starting blocks for the Sutton virtual ward, which was launched in February 2021, with the aim to prevent hospital admissions and reduce prolonged hospital stays by providing more intense monitoring of patients at home.

While it started as a COVID-19 virtual ward, the virtual ward now mainly onboards non-COVID patients at risk of hospital admission, including:

- patients with frailty who need more support.
- patients having exacerbations of long-term conditions, such as heart failure, COPD, asthma.

The service usually has 40 to 50 patients admitted at a time, but its total maximum capacity is 100 patients. The virtual ward team provides up to 14 days of enhanced monitoring to patients admitted to the ward.

5.1.1 A PCN led, community-delivered model

The virtual ward is led by the four Sutton Primary Care Networks and brings together staff from across Primary Care, Social Care, Community Services and Voluntary sector organisations. However, Sutton Health and Care – a partnership made up of the GP federation in Sutton, the London Borough of Sutton, South West London and St George's Mental Health Trust and Epsom and St Helier hospitals – is the 'delivery vehicle' of the virtual ward.

The virtual ward is a multidisciplinary team of St Helier Hospital Consultants, Specialist Community Health and Care Professionals who, with the patient's GP, work together to coordinate virtually wrap-around after-hospital care for patients, including Remote Monitoring and Pulse Oximetry.

It is important to note that only a minority of patients on the Sutton virtual ward are tech-enabled, and spot monitored (rather than continuously monitored). The majority of patients – although the proportion can fluctuate – tend to not be tech-enabled, and instead have face to face visits three times a week or more if required.

Sutton Virtual Ward



-  Launched in February 2021
-  Supports patients with frailty who need more support, and patients with LTCs
-  Primary care led, with Sutton Health and Care delivering the service
-  Onboarding from ED, acute frailty unit, medical wards and primary care
-  Has 40 to 50 patients admitted at a time, but its total maximum capacity is 100
-  Staffed with MDT clinicians including band 8 and 6 nurses
-  Offers spot monitoring-also treats non-tech enabled patients.

5.1.2 Workforce model

The core team of the virtual ward comprises multidisciplinary team (MDT) clinicians working across 23 GP surgeries. Duties include caseload management for pulse oximetry, health and wellbeing checks and MDT complex patients. The team is made up of:

- **Four band 8a nurses (one per PCN):** they are tasked with accepting referrals, assessing cases (through face to face holistic assessments) and presenting them on the ward rounds. As part of their role, they liaise directly with the patients' GPs. As such, they are instrumental in establishing trust in the service.
- **Eight band 6 nurses:** their responsibilities include doing the routine monitoring of patients (through phone calls, home visits and the VCare dashboard for tech enabled patients). They also help with setting up (onboarding) the remote monitoring equipment for tech-enabled patients. As part of their role, they also liaise with band 8a nurses (if a patient deteriorates or if they need their clinical input), and district nurses to arrange patients' follow-up care.
- **An in-reach nurse,** based at St Helier Hospital: her responsibilities include identifying patients staying on the physical wards, who might be suitable to be admitted onto the Sutton virtual ward.
- **Administrative support** is provided by four care coordinators (who are responsible for keeping caseloads, sharing information securely, organising invites for virtual ward rounds, keeping records of personalised plans for patients and collecting data for monitoring and evaluating the service).

There are a number of other staff involved in the delivery of the ward, including:

- **The patient's GP** – who retains primary responsibility for managing the care of the patient (regardless of whether they refer the patient to the ward or not), with advice and guidance from the respective Consultant

at St Helier. The GP is supported by the virtual ward team (with support from the specialist community-based team and community nurses as required) to implement the patient management plan following hospital discharge. The GP or clinical representative from the practice attends the MDT virtual ward round to discuss their patients.

- **PCN Clinical Directors** – who chair and provide support during the virtual ward rounds (see below).
- **Frailty consultants** – who attend the virtual ward round as requested to offer supportive advice and guidance for personalised clinical management plans. This guidance does not mean that the responsibility for the patient changes, but simply provides advice for the GP in terms of the patient's management plan.
- **Social Prescribing Link Workers and Social Care** – who provide input into psychosocial issues.
- **Palliative Care Coordination Hub** – who only attend for relevant cases.
- **The V-Care Technical Team** – who support remote monitoring.
- **SELDOC** – which provides emergency cover for the weekend.

5.1.3 Eligibility criteria and referral processes

To be admitted to the virtual ward, patients must meet the following general criteria:

- Adults aged 18 years and over
- Be registered with a Sutton GP.
- Conditions covered include acute COVID or COVID related symptoms, frailty, chronic disease management, social and mental health problems associated with the above disease specifics. This includes patients within their own homes or within care or residential settings.

Exclusion criteria and thresholds include:

- Patients who do not meet the above criteria.
- Children aged 18 and under.
- Patients who are on the end-of-life care pathway.
- Patients with only mental health conditions discharged from hospital.

Referrals come from GP practices, community nurses and hospital wards, especially the acute frailty unit and medical admissions unit at Epsom and St Helier University Hospitals NHS Trust (i.e. patients there are identified by an in-reach nurse). Patients can also be stepped up or stepped down from the virtual ward into the Pulse Oximetry Service or the Complex MDT Service. Most patients are currently step-down.

The referral process consists of the following steps:

1. The patient is referred through a single point of access to the MDT virtual ward caseload. Documentation includes completed referral form, hospital discharge summary if the patient is referred from the hospital and personalised patient management plan with a clinical escalation plan.
2. Patients discharged from hospital into the virtual ward receive a discharge summary which includes a detailed personalised patient care plan and clinical escalation protocol that will be provided by the hospital discharging team to the patient and their GP practice.
3. The MDT/ virtual nurse admits the referred patient to the virtual ward following discussion and agreement with the patient's GP. If the GP does not engage with the virtual ward process, then the patient cannot be accepted.
4. Upon receiving a referral, the patients are assessed by band 8A nurses and commenced on remote monitoring at home. The patients are triaged during the virtual ward's morning huddles and prioritised for discussion at virtual ward rounds.
5. The MDT/ virtual ward coordinator in liaison with the GP Practice uploads relevant patient information on EMIS.

5.1.4 Monitoring process

The virtual ward operates from 08:00 - 18:30, seven days per week. The monitoring of patients consists of the following elements:

- **Pan Sutton MDT daily huddle/ virtual ward round:** each morning, the list of patients is prepared with the virtual ward nurses and the coordinators then arrange the patient's GP or representative to attend the ward round. The coordinators complete the Patient Summaries, which are checked by the chair and pharmacist. They also share the VCare remote monitoring records and complete/monitor Data gathering spreadsheets.
- **Virtual Ward rounds:** the ward rounds take place virtually three times per week with input from hospital respiratory consultants. During each round, an average of five or six patients are discussed, and joint personalised care plans are made. The virtual ward rounds consist of the following:
 - The patients' own GPs are invited to attend the ward rounds by one of the care coordinators and are given a 10 minute slot for when their patient is to be discussed.
 - A GP or Senior Clinician chairs the round and leads the organisation and coordination of the round.
 - The Chair asks the senior nurse to present their assessment and the patient's own GP adds any other useful information.
 - A holistic assessment is presented including reason for referral to the virtual ward, other medical conditions, current health status and any social care needs. A pharmacist then comments on the medication which they have reviewed. The hospital frailty consultant then leads on the management plan, in conjunction with the patient's own GP and the pharmacist.
 - The plan may include further monitoring, referrals to other services and planned discharge of the patient from the virtual ward.
 - Other specialists, social prescribing link workers and palliative care team attend the rounds as needed to provide input into cases.
- **Home visits:** they include routine monitoring, and escalation visits.
- **Remote monitoring:** enhanced support can be provided via remote monitoring of vital signs – such as blood pressure, temperature, and oxygen saturation up-to-three times daily. Virtual ward nurses are tasked with onboarding patients who agreed to use tech to be remotely monitored. The ward currently uses VCare technology to spot monitor the health of patients, and this tends to be driven by patient choice and/ or equipment availability. As part of this, patients are asked to submit readings (such as temperature, pulse rate, respiration rate, blood pressure etc., depending on their reason for admission) once or several times a day, through the VCare app (or over the phone if they are not tech-enabled). Continuous monitoring is not currently offered by the ward, but will be available in future through the South West London central remote monitoring hub model that is being developed currently.
- **Out of hours care:** this is provided through SELDOC and NHS 111 in line with the personalised patient management plan and clinical escalation plan.

5.1.5 Discharge process

Once recovered from their acute episode, patients are not immediately discharged. For MDT complex patients, a social prescribing model exists; as such, a package of care will be arranged for them. Primary care patient follow-up will also be arranged after 6 weeks.

5.1.6 Plans for future development

The service is quickly expanding its remit, with plans to:

- offer continuous monitoring to patients through the SWL central monitoring hub.

- strengthen links between virtual ward and district nurses.
- streamline processes to set up packages of care and therapies quickly and efficiently to avoid long stays on the ward, and to focus on short acute interventions.
- Recruit additional staff including more in-reach nurses, and a dedicated consultant.

5.2 Evaluation Findings

5.2.1 Sutton virtual ward methodology to data collection

Quantitative data collection

A range of quantitative data relating to the patient profile of Sutton's virtual ward patients, referral pathways, discharge outcomes and contact between clinical staff and virtual ward patients was provided in order to undertake this evaluation. There is not yet an embedded way of recording structured information regarding virtual ward patients in Sutton, so information used for this evaluation was pulled off by the Epsom and St Helier Business Intelligence team that has access to a range of data across primary and secondary care services. Much of this data is available only in a case notes format so the business intelligence team have applied natural language processing algorithms to extract and quantify this data based on searches for certain words. For this reason some of the data will not be completely accurate as the context in which a term has been mentioned may get lost.

Due to the way in which the quantitative data was recorded and extracted it has not been possible to identify the subset of Sutton virtual ward patients that were using remote monitoring technology to be monitored at home. Sutton virtual ward team offer remote monitoring kits provided by VCare to all patients when they are admitted to the virtual ward but not all patients take up the offer of using the technology. The data from VCare suggests that 79 patients were onboarded to the VCare platform between November 2021-July 2022, whereas the data provided by the business intelligence team relates to the full virtual ward patient cohort of 458 patient admissions. The quantitative analysis included in this section therefore focuses on all 458 patient admissions.

Qualitative data collection

In addition to the analysis of quantitative data, a number of qualitative interviews with patients and staff were carried out. A total of five key staff involved in the implementation and delivery of the virtual ward, nine patients and five carers were interviewed as part of this evaluation.

Staff interviewed included staff at Sutton Health and Care, Epsom and St Helier University Hospitals NHS Trust, and Sutton Primary Care Networks. Interviews mainly focused on implementation barriers and enablers. Unfortunately, we were not able to interview virtual ward nurses about their experiences of working on Sutton virtual ward.

Six patient interviews, one carer interview and 3 joint interviews with a patient and their carer took place:

- The majority of patients were aged 75+, and all were admitted to the Sutton virtual ward following a hospital admission.
- Most were referred as part of their hospital discharge process however a small number of patients were contacted at home via telephone once discharged, and were informed they would be admitted to the ward.
- The circumstances and/or conditions leading to admission on the virtual ward ranged between patients and included dehydration, pneumonia, asthma, high blood pressure, COPD, pacemaker implantation and a toe amputation, which became infected.
- Seven patient interviews were tech-enabled.
- A number of patients, particularly older patients, had a paid or unpaid carer or spouse who supported with technology adherence.

5.2.2 Overview of virtual ward activity

From 1st November 2021 to 5th August 2022 there were 470 referrals to the Sutton virtual ward. The majority of referrals (97%) were accepted onto the ward for monitoring, with a small number of rejected referrals (12, 3%). Unfortunately, the reason for these referrals being rejected has not been recorded.

The 458 referrals that were accepted onto the ward related to 402 individual patients, with 89% of patients having one admission to the virtual ward during this period and 11% having more than one admission. The full break down of the number of admissions per patient can be seen in table 5.1 below.

Table 5.1: Number and percentage of virtual ward admissions per patient

No of admissions	No of patients	% of patients
1	358	89.1%
2	36	9.0%
3	5	1.2%
4	2	0.5%
5	1	0.2%

Over half (53%) of referrals to the virtual ward came from an acute hospital inpatient department, with 41% of referrals coming from GP practices and 5% coming via a community health service. There were a small number (6, 1%) that were referred via other routes including the ambulance service, via a self-referral route or via the telephone access service.

The small number (12) of rejected referrals were from a range of different referral sources as can be seen in table 5.2 below.

Table 5.2: Referral source by whether the referral was accepted or rejected

Referral Source	Rejected referrals		Accepted referrals		All referrals	
Acute hospital inpatient department	3	25.0%	246	53.7%	249	53.0%
GP Practice	5	41.7%	186	40.6%	191	40.6%
Community Health Service	4	33.3%	20	4.4%	24	5.1%
Other	-	-	6	1.3%	6	1.3%
Total	12		458		470	

The average (median) length of stay on the virtual ward was 10 days. Length of stays ranged from 0 to 142 days, with a standard deviation of 15.

The distribution in length of stays can be seen in table 2.3 below, with 4% of virtual ward admissions staying less than a day, 11% staying for 1-2 days and just over a fifth (23%) staying for 21 days or more.

Table 5.3: Length of Stay (in time bands of days) on the virtual ward

LOS (in bands)	No. of patient admissions	% of patient admissions
0 days	16	3.5%
1-2	51	11.1%
3-5 days	79	17.2%
6-10 days	96	21.0%
11-20 days	111	24.2%
21+ days	105	22.9%
Total	458	

As there was not enough coded data on the reasons for admission to the ward it has not been possible for the Sutton virtual ward to compare length of stays on the ward for certain health conditions to the average length of stay at the local hospital trust Epsom and St Helier. More on the reasons for admission to the ward can be found in section 5.2.4.

5.2.3 What factors have supported the successful implementation of the virtual wards?

Considering the implementation of the service, staff were asked to identify aspects of the virtual ward which they thought worked well, and which aspects they think could have worked better. A number of key themes were discussed around the service design, and its workforce model. It was felt overall the service was highly beneficial to patients, even though getting different stakeholders' buy-in, especially GPs, could be challenging. Where there were trust between GPs and virtual ward nurses, the service worked at its best.

Service design

Being a hybrid model – which is PCN led, with Sutton Health and Care as the delivery vehicle – was seen as both presenting challenges and opportunities:

- From a patient perspective, having such a model was viewed to be highly beneficial. Staff interviewed felt the service was well-positioned to **provide holistic care**, including being able to offer packages of care when discharging patients.

"There's a benefit of it being led by primary care is that if you think of the patient, then they're their experience is predominantly. And lived in the community. And so having a primary care focus on coordination and delivering the support for the virtual ward does make sense to me and it can provide the right kind of networking and things with other services in the community."

- From a staff perspective, it could sometimes be challenging working with multiple partners, and having a **clearly defined SOP** was viewed to be especially important in this context. While disagreements could occur between GPs and virtual ward nurses (see below), it was also noted that the model provided an opportunity to promote relationship-building across the PCN, with some potential long-term benefits.

Including non-tech enabled patients – staff felt strongly that while remote monitoring equipment was a useful tool to support the delivery of the Sutton virtual ward, it should not be at the centre of it. Decisions on whether to use the tech or not were reported as mainly driven by the patient and how comfortable they felt using it. As a result, staff felt the virtual ward was inclusive and could look after complex, elderly patients (necessitating more face-to-face care).

Workforce model

Staff were keen to emphasise how the team composition chosen for the service had a number of benefits. They identified the following elements as key factors to the success of the virtual ward in delivering remote care to patients with acute and complex needs:

- **Having a senior and experienced workforce:** Sutton virtual ward's nurses have a higher banding than staff on some other virtual wards. When setting up the ward, it was decided that clinicians would be Band 8a; not only to attract staff (i.e. 8a clinical roles can be very attractive to nurses as the banding is usually associated with more managerial roles) but also due to their clinical competencies, and their ability to make decisions around patient care autonomously.

"Nurse practitioners can deal with 70% of the care that GPs can deal with. A band 7 nurse does not have these advanced level skills, and therefore could not assess a patient, start treatment, and discharge them comfortably. This is the reason four nurse practitioners were chosen as they can make decisions and be comfortable taking accountability."

- **Having a leadership team, including an operations manager with a clinical background** – so the team can understand how nurses think and work.

"If you don't have a clinical background, I don't see that it can work really well, and that's what I think helps in the virtual ward, is all the leaders that we have are clinical."

- **Having an in-reach nurse identifying/sourcing patients on the physical ward** – this has been key to help identify the right patients and help free up hospital beds. The introduction of an in-reach nurse working in collaboration with the virtual ward helped not only increase the number of patients admitted onto the ward, but also raised overall awareness of the service among hospital staff.

"It works really well because we couldn't get traction. We were sitting about 10-14 patients. It's like, what are we doing? Why can't we get these patients? And it's because when you talk to the hospital, they were sort of saying 'Oh I don't know this', 'Who's the virtual ward?' or 'I don't understand it'."

Challenges to delivery

The main challenges identified by staff were linked to having to maintain good engagement within the PCN setting, which could be difficult with staff turnover. More specifically, staff mentioned:

- **There could be variability in the way the virtual ward rounds were delivered.** As such, establishing a minimum standard for how the virtual wards are delivered was identified as a key priority.
- **There could be a lack of understanding about what the service aimed to achieve.** For instance, while there were many examples of GPs working successfully with the virtual ward, there also could be issues with some concerned around how the service could increase their workload, rather than alleviating it.

"Some GPs still haven't incorporated it that virtual ward slots should be one of their patient slots. I think that it would help if their mindset will change because at the moment they're looking at virtual ward rounds like an extra job to do, rather than just, you know, put it in that diary that this is the slot."

As a result, staff noted the importance of establishing trust, and communicating the benefits of the virtual ward through a clear engagement plan. As such, at the time of writing, a series of workshops with the different components of the frailty programme was being developed.

5.2.4 Who are the patients being admitted to virtual wards?

Data on the primary complaint/ reason for admission to the virtual ward was only recorded for 80 patient admissions (17%). Of these, 25 patients (31%) were admitted due to respiratory conditions or symptoms such as shortness of breath, asthma, COPD and breathing issues. A further 14 patients (18%) were admitted with an infection, including infected wounds, urinary tract infections and cellulitis, 12 patients (15%) were admitted with trauma and musculoskeletal conditions such as falls and fractures, and 8 patients (10%) were admitted due to an altered mental state or neurological symptoms such as confusion, delirium and seizure. A further 21 patients (26%) were admitted with some general symptoms such as pain or dizziness or with an exacerbation of a non-respiratory condition such as heart failure, hypotension, diabetes and gastritis.

Table 5.4: Patient admissions by primary complaint

Primary Complaint	No. of patient admissions	% of patient admissions
Respiratory	25	31.3%
Infections	14	17.5%
Trauma and Musculoskeletal	12	15.0%
Altered mental state/neurological	8	10.0%
General symptoms/other	21	26.3%
	80	

The majority of patient admissions were aged over 75, with 74% of admissions being aged 75 or over, 13% of admissions were for those aged between 65-74 years, with 14% of admissions being aged under 65 years old. The full break down by age band can be seen in table 5.5 below.

Table 5.5: Patient admissions by age band

Age Band	No of patient admissions	% of patient admissions
18-34	11	2.4%
35-44	9	2.0%
45-54	20	4.4%
55-64	22	4.8%
65-74	58	12.7%
75-84	155	33.8%
85+	183	40.0%
Total	458	

There were a higher proportion of patient admissions that were female (57%) than male (43%), possibly linked to the fact that the majority of patients were older and therefore more likely to be female.

Table 5.6: Patient admissions by gender

Gender	No. of patient admissions	% of patient admissions
Female	261	57%
Male	197	43%
Total	458	

Ethnicity was not known for 30% of patient admissions. Of those patient admissions where ethnicity was recorded 91% were white, 6% were Asian or Asian British, 2% were Chinese or other ethnic group and 2% were of mixed ethnic background or Black and Black British (please note these two ethnic categories have been combined to protect patient anonymity).

Table 5.7: Patient admissions by ethnicity

Ethnicity	No. of patient admissions	% of patient admissions
White	292	91.0%
Asian or Asian British	18	5.6%
Chinese or other ethnic group	6	1.9%
Black or Black British or Mixed ethnicity	5	1.6%
Total	321	
Unknown or not stated	137	29.9%

5.2.5 What is patient engagement with and adherence to the remote monitoring technology?

The Sutton virtual ward used a remote monitoring kit provided by VCare that was not worn continuously. The Sutton model uses spot monitoring by having patients take health observations using the provided kit at regular intervals. The kits included temperature, respiratory rate, blood pressure, oxygen saturation and heart rate monitors. A Memorandum of Understanding is in place that encourages patients to undertake tests at least once a day and a maximum of 3 times a day to help staff monitor these patients.

Data from VCare shows that there were 79 virtual ward patients in Sutton that were onboarded onto the VCare platform between November 2021 and July 2022, which equates to approximately 17% of virtual ward patients. All patients are offered the remote monitoring kits meaning that approximately 83% declined the use of the kits. Reasons for declining have not been recorded.

As the Sutton model does not include continuous monitoring it is not possible to understand adherence through the proportion of time a patient is wearing or using a device. However, information on the number of observations taken each day gives an idea of whether the recommended number of observations are being taken. As with the other models the Length of Stay on the virtual ward may be a bit different to the data on Length of Stay collected via the VCare platform as patients may be onboarded onto the platform after being admitted to the ward and may be discharged from the ward prior to being discharged from the platform. For this reason, the data presented below is just indicative of usage, the real usage is likely to be at a higher rate per day.

Of the 79 patients who used the kits all took some form of observations during their time on the platform. Of the 68 patients that were on the platform for a day or more the average number of observations taken per patient per day was 5.3 across all tests.

As can be seen in table 5.8 below the tests were used to different extents, with the blood pressure monitor used the most with 1.9 observations made per patient per day. All tests met the MOU threshold of between 1-3 tests being taken per patient per day except for the respiratory rate observations which were only taken approx. every 3 days per patient.

On the whole adherence was good, with patients on average undertaking most tests at least once a day.

Table 5.8: Numbers and rates per patient per day of observations taken

Observation type	Total no. of observations taken	No. of observation outside normal range	Proportion of observations outside normal range	Average no. of observations per day	Average no. of observations outside normal range per day
Temperature	1667	525	31.5%	1.4	0.4
Respiratory rate	69	23	33.3%	0.3	0.1
Blood pressure	2279	698	30.6%	1.9	0.6
Oxygen saturation	1643	692	42.1%	1.4	0.6
Heart rate	1544	420	27.2%	1.5	0.4

5.2.6 What is patient experience of the virtual ward models?

Qualitative interviews with patients and carers explored their experiences on the Sutton Virtual Ward, including their understanding of the service, their perceptions of the quality of care received and their engagement with the remote monitoring kit. Qualitative fieldwork also explored carers' experiences of supporting patients on the virtual ward (when applicable).

Overall, patients and carers were positive of the service and saw the benefits of being cared for at home rather than on a hospital ward. Both patients and carers welcomed their admission onto the ward, and in interviews high levels of adherence to the remote monitoring technology were reported. They also felt small adjustments could be made to the virtual ward offering to further enhance their overall experience and care (outlined below). Some also mentioned how they felt being cared for at home could benefit the wider health and care system.

"We assumed, you know, instead of going into hospital and having the daily checks... it's not such a strain on the NHS." (Patient)

Referral to the virtual ward: on the whole patients felt they were discharged from hospital at the right time and broadly understood the concepts behind the virtual ward. A few patients however felt they may have benefited from being more involved in the decision to be admitted on to the virtual ward. They explained they would have wanted:

- Further understanding of how the virtual ward operates in practice, as some patients did not realise prior to onboarding they would be looked after by a different team than on the physical ward (for instance through the provision of a frequently asked questions sheet).
- Further explanations of why they still needed to be monitored once discharged from the physical ward.

Experience of using the remote monitoring equipment: engagement with the remote monitoring technology was also explored as part of the qualitative interviews. A majority of patients and carers used remote monitoring equipment, including a tablet to submit their readings. They felt setting it up was relatively straightforward, and they understood how the VCare app worked. Overall, they felt using the remote monitoring equipment brought them reassurance:

"[The nurses] explained to me that if my vitals aren't safe for me to stay at home they would know straight away up on their screens, which was really good like to know." (Patient)

Positive experiences of the technology were also linked to:

- **Carer support:** responsibility for the technology predominantly fell to patients' carers (both paid and non-

paid) or a family member, who assumed responsibility for the adherence to the remote monitoring technology:

"My husband did it all. I don't understand all these electronic things. We got on very well actually. I was quite shocked...there was no technical issues." (Patient)

- **Swift technical support from the virtual ward team:** some patients had experienced technical issues which could reduce their confidence in the service. However, most felt it was easy to resolve either thanks to the swift technical support offered by the virtual ward team, or switching to manual mode to input readings (although some patients and carers would also have welcomed a direct number to contact their nurse on if needed):

"I told her I don't think it's working and she came around to see me and fixed it for me. And she explained to me if it happens again how to sort it out. It was very straight forward." (Patient)

Two patients discussed how they had requested a remote monitoring kit but were not provided with one due to lack of availability – suggesting a potential need for more equipment to be provided to the virtual ward.

Experience of the care received on the virtual ward: positive experiences were often associated with what patients perceived to be a good level of 'contact' and communication with the virtual ward nurses, as well as recognition of the convenience it offered. Overall, patients and carers were impressed with the care they received and described their interaction with the virtual ward nurses as "not rushed" and "calm," and having a sense of genuinely feeling looked after.

"It wasn't rushed. It was really slow. She asked all the questions that she needed to ask. We'd have a nice chat." (Patient)

A number of patients were also impressed with the scope of the service they received in their home including taking bloods and doing scans. Patients were also touched by the person-centred care they received and articulated high levels of confidence and trust in the service.

"I told her that I have really weak veins, but no one listens to me when I say that. She didn't bruise me. She was so gentle." (Patient)

Among those with more mixed experiences, it was felt that more follow-up action and contact from the team was required, including better communication between the virtual nurses and patients/carers and other NHS departments. One patient for instance explained how a virtual ward nurse told them to go to hospital for a blood test but they were told they needed to have an appointment when they went.

Discharge from the virtual ward: a recurrent theme was the lack of clarity around the discharge process, particularly when carried out over the phone. Being discharged that way (rather than through a face-to-face visit) meant there could be some uncertainty as to whether patients still remained on the virtual ward or had been discharged. Linked to this, some patients reported still having the remote monitoring equipment, despite some attempts to have it collected.

Perceived impact on health and wellbeing outcomes: the majority of patients and carers interviewed acknowledged the positive impact that being cared for at home rather than at the hospital had on their wellbeing. They described the benefits in terms of comfort, interaction with family, ability to choose, cook and eat their own meals, having and interacting with visitors, sitting in the garden and going for an occasional walk, or shopping:

"Interacting with people instead of lying in a bed for three weeks...we're here, we feed Dad, go shopping occasionally, we were able to get out, he interacted with us and you know, being in the home environment." (Carer)

Case study

A female patient, 26, was diagnosed with asthma at the age of 8. She started experiencing frequent asthma attacks in 2018 and currently attends a regular clinic at the Royal Brompton Hospital. Earlier this year she was admitted to St Helier's hospital whilst suffering an asthma attack at home. Once her condition had stabilised, she was admitted onto the Sutton virtual ward. She described a positive experience of the ward: *"The nurses were really helpful, giving medication doses and stuff like that. Explaining anything that I needed to know."*

Despite being impressed with the level of care and support, she did express some uncertainty about the virtual ward, mainly regarding the lack of care during the night: *"I didn't have that care 24/7. I didn't have the nurses there with me all that time. So if I was gonna have an asthma attack, I wouldn't have the capacity or the ability to call her. And my asthma is really bad at night."*

However, as she began to feel better she started to work from home and then went back to work a couple of days later. Following this, the virtual ward team felt her condition had stabilised and she was discharged from the ward. She felt she was *"kept in the loop"* regarding decisions about her care and her discharge from the virtual ward: *"I didn't feel like I didn't know anything."* The virtual ward team informed her of discussions between the Doctors and her GP: *"It was really good that whenever they were having discussions about me, she [virtual ward nurse] would call me and let me know what was going to happen."*

On reflection, she felt being admitted onto the virtual ward contributed to her quick recovery. She concluded, *"I wasn't in a happy place at the hospital...They just kept poking and prodding me. I'd had enough of that...When you're lying in the hospital bed, you see other people ill. And [it] just makes you ill. [On the virtual ward] I was in the comfort of my own home. With my family. With meals that I wanted to have. I got better really quickly."*

5.2.7 How do staff engage with and work on virtual wards? (i.e. staff activity)

There was information recorded for 265 patient admissions on the number of times patients were in contact with staff from the virtual ward either via a telephone call or a home visit. Across all 265 patient admissions there were 514 phone calls made, which equates to 1.9 phone calls per patient. As the length of stay on the ward greatly effects the number of contacts a patient would get a rate of phone calls per patient per day was calculated which equates to patients getting 0.11 phone calls per day or a call approximately every 9 days on the virtual ward.

Similarly for the same patient cohort there were 1,243 home visits to virtual ward patients, giving an average of 4.7 home visits per patient admission. Similarly, when taking the length of stay on the ward into account this equates to 0.26 home visits per patient per day or approximately a home visit every 4 days on the virtual ward.

Table 5.9: Contacts with virtual ward staff

Contact Type	No of contacts	No of contacts per patient admission	No of contacts per patient per day	Standard Deviation	Total patient admissions with information on contacts
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Telephone Calls	514	1.9	0.11	2.87	265
Home Visits	1,243	4.7	0.26	5.34	265
Total	1,757		0.37		265

The number of telephone calls received per admission varied from 0 up to 20 calls, with a standard deviation of 2.87. A large proportion of patient admissions (39%) did not receive any phone calls, with just over a third (34%) receiving one or two phone calls, 18% received between three and five phone calls and 9% received six or more phone calls.

In terms of home visits, the number of home visits per patient admission ranged from 1 up to 43 home visits, with a standard deviation of 5.34. There were no patients that did not receive a home visit. Just under half of patients (47%) received between one and two home visits, a quarter (25%) received between three and five home visits and 28% received six or more home visits during their time on the virtual ward.

Table 5.10: No of contacts per admission by mode of contact

No of contacts	telephone calls per patient admission		home visits per patient admission	
0	103	38.9%	0	0%
1-2	91	34.3%	125	47.2%
3-5	48	18.1%	66	24.9%
6+	23	8.7%	74	27.9%

5.2.8 What is staff experience of the virtual ward models?

The evaluation team was not able to interview virtual ward clinicians about their experiences of working for the Sutton virtual ward. Some information relating to staff experience is described in section 5.2.4 – in relation to Band 8a nurses feeling positive about being able to focus on completing clinical tasks and delivering patient care as part of their day-to-day role.

5.2.9 What patient outcomes are associated with the virtual ward models?

The majority of patient admissions were discharged back to their usual place of residence (74%), with just over a quarter (26%) that were admitted to an acute hospital.

The analysis in table 5.11 is based on the 385 patient admissions where a discharge destination was recorded.

Table 5.11: Discharge destination of patient admissions

Discharge Destination	No. of patient admissions	% of patient admissions
Usual place of residence	286	74.3%
Admission to hospital	99	25.7%
Total	385	

The proportion of patients admitted to hospital was slightly higher for patients that were stepped up to the virtual ward (29%), compared to those stepped down from hospital whereby 23% were admitted to hospital.

Of the 48 patients that were stepped down to the virtual ward and then discharged from the virtual ward back into an inpatient hospital bed the average length of stay (median) was 8 days (2 days less than the ALOS of all virtual ward patients).

5.2.10 What is the financial impact on acute beds?

Due to a lack of data on the primary complaint of Sutton virtual ward patients it has not been possible to use information on length of stay to model the financial impact of the virtual ward on acute bed days for this virtual ward.

A consultant interviewed as part of the evaluation noted how he felt confident to discharge his patients earlier onto the virtual ward than he would have done without, highlighting a positive impact on acute bed usage.

"If I have a patient on the ward, in the acute frailty unit, who is from Sutton vs a patient from somewhere else, I'm much more likely to discharge the patient earlier if they are from Sutton because I know they will be cared in the community. It is the first thing I would ask the patient. That has impacted on my style of practice. I'll keep patients longer if they're out of borough."

6. Croydon Virtual Ward

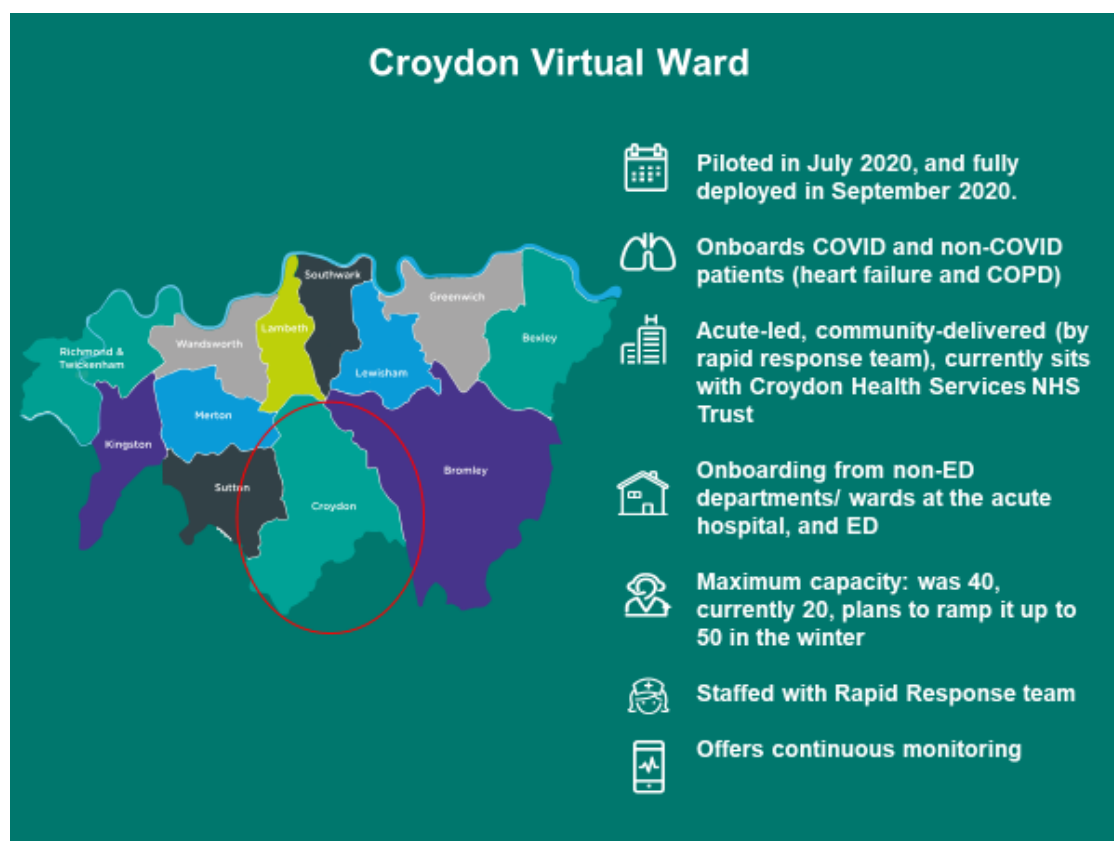
This chapter focuses on the Croydon virtual ward. It provides an update of an evaluation <https://healthinnovationnetwork.com/wp-content/uploads/2022/01/Croydon-VW-Evaluation-Report-to-NHSX-v10.pdf> of the service carried out by the HIN in 2021.¹⁰

6.1 What are the core components of Croydon virtual ward?

The Croydon virtual ward was first deployed during the COVID-19 pandemic in July 2020 – taking an initial few patients onto the ward (27 patients over the first 3 months), followed by a full opening in September 2020 when it ramped up to monitoring a maximum of 30 patients on the ward at a time. It uses continuous remote monitoring for both COVID-19 and non-COVID-19 patients at home (with plans to also introduce spot monitoring imminently).

The virtual ward sits within Croydon Health Services NHS Trust, in the Community Services arm of the Trust within their Rapid Response team. The Croydon Health Services Rapid Response team are responsible for the overall delivery and governance of remote patient monitoring. Remote monitoring kits are procured from Current Health.

A full description of how the service operates can be found in the HIN’s 2021 evaluation report of the service. A table detailing the key features of the virtual ward is also included below.



¹⁰ Health Innovation Network (2021) Rapid Evaluation of Croydon Virtual Ward, Health Innovation Network: London. Available on: <https://healthinnovationnetwork.com/wp-content/uploads/2022/01/Croydon-VW-Evaluation-Report-to-NHSX-v10.pdf>

Developments since the 2021 evaluation

Since the 2021 HIN evaluation was published, there have been a number of key developments to highlight:

- **Diversification of reasons for admission:** as the number of patients who require monitoring for COVID-19 reduced, the team started expanding the virtual ward to monitor other conditions, such as heart failure and COPD. Despite COVID-19 patients having the only agreed pathway to date (with all other conditions decided at the point of referral onto the virtual ward), the service started opening up to other conditions.
- **Pathway development:** linked to the above, as the severity of the pandemic gradually reduced, the team has been working on developing new pathways (although none of them have been formally agreed yet). Intravenous treatment for infection and maternity have been identified as priority areas for pathway development.
- **An increasing number of supported discharges:** the number of supported discharges has slowly but steadily increased over time.
- **Reduction in capacity:** at the time of writing, a maximum of 20 patients could be monitored on the ward at a time. However, there are currently plans to ramp up capacity to a maximum of 50 as new pathways are agreed, and winter pressures kick in.

At the time of writing, the 24/7 central remote monitoring hub, hosted by the Croydon virtual ward, is due to launch at the end of November 2022. This will have a significant impact on how the Croydon virtual ward operates – with virtual ward staff focusing more on home visits and administering treatment to patients, and hub staff expected to undertake monitoring and equipment management. This is likely to release capacity within the local virtual team and enable monitoring at scale, with more patients referred to the service.

6.2 Evaluation Findings

6.2.1 Croydon virtual ward methodology to data collection

As mentioned above, the Health Innovation Network undertook a rapid evaluation of the Croydon virtual ward in 2021¹¹. The data included in this evaluation was extensive but very time consuming to collect. As a result, it was decided to include Croydon within this evaluation, but a lighter touch approach was taken to data collection for this virtual ward than the other two sites which had not been evaluated previously.

The quantitative data used within this evaluation gives a picture of some of the key data fields for a more recent time period (October 2021-July 2022) than was included in the previous evaluation. This data was obtained through an existing local monitoring spreadsheet used by the service to manage patients on the ward. All patients admitted to the Croydon virtual ward meet the NHSE virtual ward definition of being acute avoidance admissions and all patients are monitored via continuous remote monitoring technology.

In addition to the analysis of a range of pre-existing quantitative data provided by Croydon Health Services, the evaluation also comprised interviews with key staff working on the virtual ward. Discussions focused on implementation lessons, experiences of working for the service, and perspectives on patient care and outcomes. Furthermore, insights gathered by Dr Liz Heitz, (Consultant Community Geriatrician) as part of her Master's

¹¹ Health Innovation Network (2021) Rapid Evaluation of Croydon Virtual Ward, Health Innovation Network: London. Available on: <https://healthinnovationnetwork.com/wp-content/uploads/2022/01/Croydon-VW-Evaluation-Report-to-NHSX-v10.pdf>

Dissertation¹² and kindly shared with the HIN, are also mentioned in sections 6.2.4 and 6.2.9.

Due to timings and the limited scope of the evaluation, no patient interviews were conducted. However, some patient interviews were carried out as part of the 2021 evaluation, and perspectives on patient experience were also discussed as part of the interviews with staff. Those are discussed below.

6.2.2 Overview of virtual ward activity

Between October 2021 and July 2022 there were 272 admissions to the Croydon virtual ward which is approximately 27 admissions per month.

Referrals into the Croydon virtual ward came from a range of different sources. The highest proportion of referrals (39%) came via non-emergency departments (ED)/ wards at the acute hospital, with a further 20% of referrals coming from ED. Smaller proportions of referrals came via GPs (15%), the Rapid Response team where the ward is hosted (14%) and community nursing staff (5%). The full breakdown can be seen in table 6.1 below.

Table 6.1: Source of referral to virtual ward

Source of referral	No. of patient admissions	% of patient admissions
Acute hospital	106	39.0%
ED	54	19.9%
GPs	42	15.4%
Rapid Response	37	13.6%
Community Matrons /Nurse consultant	13	4.8%
London Ambulance Service	7	2.6%
Patient / Family	7	2.6%
Other	6	2.2%
	272	

Average (median) length of stay on the ward was 7 days. Length of Stays ranged between 0 and 48 days, with a standard deviation of 6.5. As the length of stay data is not normally distributed a median length of stay is most appropriate. However, comparative data on ALOS in hospital was gained to understand the differences and this was provided as a mean. Therefore, for comparative purposes the mean length of stay for all virtual ward patients has been included, which is 8.7 days.

Table 6.2 gives a sense of the distribution of length of stays of patients on the virtual ward, with 9% of admissions staying for 0-1 days, 19% staying between 2-5 days, almost half of admissions (49%) staying between 6-10 days, 17% staying between 11-20 days and a small proportion staying for longer than 21 days (6%) with the maximum stay being 48 days for a patient with COVID-19.

¹² Heitz, Liz (2022) Optimisation, evaluation and service development of a community-based, technology-enabled, acute virtual ward: an evaluation study. Unpublished Master's dissertation, Faculty of the Institute of Global Health Innovation, Imperial College London.

Table 6.2: Length of Stay (in time bands of days) on the virtual ward

LOS (in bands)	No. of patient admissions	% of patient admissions
0-1 days	25	9.2%
2-5 days	52	19.1%
6-10 days	133	48.9%
11-20 days	47	17.3%
21+ days	15	5.5%
Total	272	

The average length of stay (mean) on the virtual ward was compared to the ALOS in Croydon Health Services acute hospital for patients admitted for certain conditions that would be appropriate to monitor via a virtual ward during 2021-22. Table 6.3 below summarises the differences, with longer length of stays on the virtual ward than in an acute hospital bed for all three conditions (COVID-19, COPD and Heart Failure). Patients with COPD were on average on the virtual ward for 1.9 days more than an acute hospital stay for COPD, with COVID-19 patients having longer stays by less than a day (0.6 days) and heart failure patients staying on average half a day longer (0.5) than they would have in hospital.

Table 6.3: Comparison of Average Length of Stay (ALOS) between virtual ward and hospital admissions for certain health conditions

	Virtual Ward		Croydon Health Services Hospital Admissions 2021-22		Difference in days (VW ALOS – Hosp ALOS) days
	n	ALOS (days)	n	ALOS (days)	
COVID-19	137	10.2	581	9.6	0.6
COPD	18	7.7	667	5.8	1.9
Heart Failure	20	8.4	582	7.9	0.5

6.2.3 What factors have supported the successful implementation of the virtual wards?

In the 2021 evaluation report, staff identified a number of factors they saw as essential to making a virtual ward model effective, namely the ward being run by community (not acute) services, pathways in place to ensure emergency treatment is accessed when needed, upskilling staff on continuous monitoring and knowing when to use continuous versus spot monitoring, and having a cross-system multidisciplinary team.

As part of this evaluation, staff who were involved in the early phases of implementing the virtual ward discussed what they thought had worked well, and what they would have done differently, had they had more time to roll out the service. However, it is important to note that overall staff felt proud about what the service had managed to achieve to date.

"Patients liked it. It was a success. And it kept people safe and allowed for people to be with their families when the hospital can't allow it. So I think we did a good job."

It is important to note that the Croydon virtual ward was set up at pace in response to the first wave of COVID-19, with little time for planning and no dedicated project manager involved in the implementation (i.e. the project management function was completed by clinical staff). Despite the pandemic making its implementation challenging, staff also acknowledged it had presented an opportunity to rethink processes and fast-track change.

"And so in terms of being able to implement something how I would have liked to, I couldn't do that because it was a pandemic. Interestingly, a lot of people were actually willing to try new things unexpectedly. I wasn't kind of expecting that response. So that was actually quite good and sort of pushed it forward a little bit for me."

Pros and cons of the model set-up

Staff discussed how sitting within an urgent community response team had a number of advantages which helped with implementing the virtual ward, including:

- Being able to make use of pre-established relationships with GPs, and the hospital.
- Having access both to hospital and community EPR systems.

"So the patient knows that we know what went on in the hospital. We also know what's going on historically with them and they don't have to keep repeating themselves to us because we have that information. We have a lot of their information. We have their blood results and all those kind of things that help speed along treatment."

Noted downsides of the model included the perceived lack of continuity of care from a patient perspective, with some patients initially concerned about being looked after in the community rather than in hospital. This highlights the need for promoting community nurses' skills – both to staff and patients – to increase trust and referrals.

"If a patient is meant to be in that hospital bed and we're trying to bring them out early, and we're saying 'You can be looked after in the community and it's not a hospital-led model', how much trust would they have in that? "

Implementation lessons

As part of the interviews, staff were asked to consider what they would have done differently, and the key factors to consider when setting up a community services-led virtual ward. In doing so, they identified the following elements:

Acknowledging the culture change required in implementing a virtual ward: beyond service transformation, implementation of virtual wards require fundamental culture change, from staff and patients. This can be facilitated:

- (for virtual ward staff) by providing training and support on continuous monitoring (as discussed in our 2021 report and section 6.2.8).
- (for staff in other services) by increasing engagement with the virtual ward. Practically, it was noted that developing an organisational development model would be highly beneficial to raise awareness of the service and get clinicians' buy-in. However, as noted by Heitz (2022), changing referral behaviour and patterns is complex and likely to require multiple interventions.
- (for patients) through raising awareness of the service, and confidence in using remote monitoring equipment.

Linked to the above, having an effective communication/engagement plan in place: Heitz (2022)¹³ identified lack of awareness of the virtual wards was a critical barrier. This was echoed by staff interviewed as part of this evaluation, who agreed that raising awareness of the service should be a key priority going forward. It was noted

¹³ Heitz, Liz (2022) Optimisation, evaluation and service development of a community-based, technology-enabled, acute virtual ward: an evaluation study. Unpublished Master's dissertation, Faculty of the Institute of Global Health Innovation, Imperial College London.

that to achieve this, it was important to focus on alleviating clinicians' concerns by emphasising:

- the ability and skills of the virtual ward to manage their patients, and
- highlighting how the service could help reduce their workloads, and pressure on acute and emergency services, rather than adding to it.

This is something staff felt the virtual ward had not yet prioritised due to the pace of implementation.

"It was and it's really difficult to get that message across when you're sort of pushing something onto someone saying will you need to use this, you need to use this. We need to actually be there demonstrating and showing it to them."

As part of an effective engagement plan, face to face engagement was viewed as a key requirement – not only to raise awareness of the service but also to ensure its aims and ways of operating were clearly understood. As part of this, it was noted that having a 'face of the virtual ward' could be an effective way to promote the service more widely. Heitz (2022) also recommends regular shared learning events, such as grand-round, staff induction and clinical governance to improve awareness, visibility and confidence in the virtual ward team across Croydon's health system.

Basing a member of the rapid response staff within the acute hospital: this was identified as a key enabler during the early phases of delivery, but also beyond this, to maintain communication and awareness of the virtual ward. Building relationships between the community services and acute teams (and developing a network of services that understand the work of the virtual ward) meant the pathways into treatment for virtual ward patients could run smoothly. As such, it was noted that having a permanent presence in the acute hospital was especially important due to the high levels of clinical staff turnover.

*"I based myself there working so I could pluck patients. I was doing my clinical work whilst chatting to other people, so I sort of doubling it up to make that better. So that's why ED took off, I think because I was there a lot (...) It makes a big difference. And I think those areas have such high turnovers of staff, the numbers of staff that run one shift is quite large (...) So **trying to capture everyone and trying to get everyone to remember you as well, it's quite a challenge. So being present makes the difference.**"*

Diversification of patient pathways: clinical pathway development was viewed as critical to service development and sustainability (with intravenous treatment for infection identified as a priority area for pathway development).

Resourcing the virtual ward with an appropriate number of staff, especially in the early phase of implementation: project management support is especially helpful in the early phase of implementation, and administrative support throughout, to help with data collection and perform other administrative tasks so clinical staff have more time to focus on engagement and setting up training.

Developing a comprehensive training offer for the virtual ward staff (as also discussed in greater details in section 6.2.8), to ensure virtual ward clinicians are equipped with the right digital and clinical skills to treat patients effectively.

Considering the impact the energy and costs of living crisis could have on patients: reflecting on what could hinder delivery, one staff raised concerns around low-income patients and how the impact of the energy crisis and energy bills going up could have on their ability to charge up the monitoring equipment if offered to them. As such, it will be important to undertake a full equalities impact assessment in the future.

"And this is a big issue we need to solve because the majority of our patients in Croydon are ...very deprived and things and how we're going to justify telling them: 'This is going to cost them this much extra, not being in our hospital'".

6.2.4 Who are the patients being admitted to virtual wards?

A large proportion of virtual ward admissions were for acute episodes (60%), these included 50% of patients that were admitted due to COVID-19, 6% due to an infection and 4% due to pneumonia or a lower respiratory tract infection.

A further 30% of patient admissions were for an exacerbation of a long-term condition, including 9% for hypertension or hypotension, 7% for heart failure, 7% for COPD, 4% for asthma and 3% for post COVID.

Smaller proportions (4%) were admitted for further investigations and monitoring, which included tachycardia, postural hypotension, oxygen assessments and complex management.

Table 6.4: Primary complaint of virtual ward admissions

Primary Complaint	No. of patient admissions	% of patient admissions
Acute incident		
<i>Covid-19</i>	137	50.4%
<i>Infection</i>	15	5.5%
<i>Pneumonia / Lower respiratory tract infection</i>	11	4.0%
Exacerbation of LTC		
<i>Asthma</i>	11	4.0%
<i>COPD</i>	18	6.6%
<i>Post Covid</i>	9	3.3%
<i>Heart Failure</i>	20	7.4%
<i>Hypertension/ Hypotension</i>	24	8.8%
Investigation and monitoring	11	4.0%
Other	16	5.9%
	272	

The age of virtual ward admissions was recorded on the local monitoring spreadsheet from January 2022 onwards and has therefore been included for 173 patient admissions. Whilst the majority (61%) of patient admissions were aged 65 or older there were still a significant number of admissions of working age (39%). The full breakdown of patient admissions by age can be found in table 6.5 below.

Table 6.5: Patient admissions by age band

Age band	No. of patient admissions	% of patient admissions
18-44	16	9.2%
45-64	51	29.5%
65-74	30	17.3%
75-84	47	27.2%
85+	29	16.8%
Total	173	

As with age, gender was recorded for patients admitted from January 2022 onwards and has been included for 176 patient admissions. There were a higher proportion of females (59%) admitted to the virtual ward than males (41%), however this is probably to be expected due to the number of patient admissions from the older age groups.

Table 6.6: Patient admissions by gender

Gender	No. of patient admissions	% of patient admissions
Female	103	58.5%
Male	72	40.9%
Total	176	100.0%

The ethnicity of virtual ward patients was recorded on the local monitoring spreadsheet from May 2022 and therefore has only been included for 66 patient admissions admitted between May – July 2022. Of these admissions the majority were white (62%), 15% were from an Asian ethnic background, 15% were of black ethnicity and a further 8% were either from a mixed or multiple ethnic background or from another ethnic group. These two ethnic classifications have been groups together to protect patient anonymity.

Table 6.7: Patient admissions by ethnicity

Ethnicity	No. of patient admissions	% of patient admissions
White	41	62.1%
Asian	10	15.2%
Black	10	15.2%
Any other ethnic group/ Mixed or multiple ethnic groups	5	7.6%
Total	66	

6.2.5 What is patient engagement with and adherence to the remote monitoring technology?

The 2021 evaluation highlighted high levels of acceptability and adherence with the technology. Feedback survey scores were largely very positive – with 89% rating using the kit as easy, and 87% agreeing it was simple to use it.

The analysis undertaken as part of this evaluation found that there were a small number of patients (5, 2%) that declined the use of the technology and self-discharged from the virtual ward. The vast majority (98%) of patient admissions were able to engage with the technology.

Although levels of engagement with and adherence to the technology were very high, qualitative interviews with the staff revealed how there could occasionally be misunderstandings around what the technology could do – highlighting the importance of taking the time to explain to patients what the remote monitoring equipment could and could not do.

"There were questions on whether I could see them all the time "Are you're going to watch me?" So people thought I was still invading their personal space."

6.2.6 What is patient experience of the virtual ward models?

Patient insights were collected as part of the 2021 evaluation, with interviewed patients reporting overall positive experiences of the virtual ward. Patient experience scores (collected via the Current Health patient experience questionnaire) were also very high with a net promoter score of 55, which is classed as 'excellent'. This means that most patients who completed the questionnaire would recommend the Current Health devices to family and

friends.

Patients felt they were being kept out of hospital whilst receiving the same standard of care as they would in a hospital environment. As part of this, patients also reported having their needs met above and beyond what they had anticipated, which in some instances exceeded their experience of being treated in hospital in terms of feeling safe.

While patient insights were not gathered as part of this evaluation, staff interviewed also reported receiving positive feedback from patients about their experiences of being treated on the virtual ward.

"You don't have to depend on somebody. If you don't have to eat hospital food, you're gonna use your own food (...) you're not restricted in who you meet. Your loved ones can come and see you and give you a cuddle at the same time. You know it's a kind of lovely place to be. If you are getting treated at home."

While positive experiences were mostly linked to being treated at home rather than hospital, one staff explained how the service could also benefit patients who are wary of going to hospital, and therefore do not seek care when they need it. In doing so, she mentioned the case of one patient:

"We got him out of the hospital and we monitored him but then he developed COVID because he caught a COVID in a hospital. Symptoms came after discharge. And he said "Oh I'm just feeling tired, unwell". If he wasn't monitored, he would have gotten really worstBecause we called them saying "Your oxygen level is going very down. I think you need to go back to hospital now. You need an oxygen supplement." But if it hadn't been monitored, he would have still stayed home. Because he doesn't like to go to hospital."

6.2.7 How do staff engage with and work on virtual wards? (i.e. staff activity)

Quantitative data on staff engagements with virtual ward patients was not collected for this evaluation. A previous analysis of mode of interactions between staff and patients can be found in the 2021 Croydon virtual ward evaluation. However, we do know that 9% of patient admissions received at least one home visit from a community nurse during their time on the ward.

6.2.8 What is staff experience of the virtual ward models?

When asked to reflect on their experiences of working on the Croydon virtual ward, staff discussed benefits of working for the virtual ward, and how a consistent training offer could improve staff experience.

Staff benefits

Heitz (2022) identified a number of staff benefits of working on the virtual ward, including: increase of community and hospital collaborative working, skill acquisition (such as remote assessment and trend monitoring), reduction of in-person visits, and the opportunity for remote working.

Insights gathered through the staff interviews highlighted how these benefits could have positive implications in relation to workforce retention, with hybrid working perceived as not only helping retain staff but also improving workforce inclusion.

Training

When asked to reflect on their experiences of working for the service, **staff emphasised how working on a virtual ward required a specific set of skills, and identified the development of a comprehensive training offer as a key priority for the service** (as highlighted in section 6.2.3). In addition to upskilling staff, training was viewed as critical to help alleviate staff concerns around remote monitoring.

Heitz (2022) identified training of virtual ward staff as a key priority for the service going forward – Including:

- **training on the device and technology**, noting that training had been mostly ad hoc and often done by another team member rather than formal training. Suggestions for improvement included a patient troubleshooting guide and a training video for staff.
- **training in digital skills**, such as using the clinical dashboards and clinical training to ensure understanding of the difference between spot monitoring and continuous monitoring while assessing a patient remotely.

Interviews carried out with staff identified additional elements the training offer could include, such as:

- **learning how to read non-verbal cues**, so virtual ward clinicians could easily pick up issues when calling patients.

*"I think it is a skill that we really actually tapped into now (...) With virtual [wards], you are **relying on your questioning skills**, so your ability to inquire into what's going on with the patient."*

- **learning how to monitor deterioration**, including how to handle continuous monitoring and read patient trends, which was viewed as especially important for nurses who have never worked in an acute setting. The use of real-life scenarios was suggested as an effective way to support active learning in this area.

"It is getting used to [monitoring deterioration]. So deteriorating patients.... understanding kind of what that looks like, what you see, what the trends look like (...) You can help someone by training them by putting in those processes to help them learn as well, so presenting them scenarios to look at this, you know this person's getting sick and this one's not. I think that's what's really important."

- **training on data collection and quality improvement**, which was perceived especially important due to the novelty of the service.

6.2.9 What patient outcomes are associated with the virtual ward models?

The discharge outcome of patient admissions on the Croydon virtual ward showed that 81% of patient admissions remained at home until they were discharged from the ward, this included 72% that remained at home with only remote access to healthcare, with a further 9% who also remained at home but received a home visit during their time on the virtual ward.

A number of patients (33, 12%) were discharged from the virtual ward into a hospital inpatient setting.

The remaining patient admissions were discharged early from the virtual ward either due to the realisation that telehealth services were not appropriate for a small number of patient admissions (13, 5%), or due to patients declining the technology and self-discharging from the virtual ward (5, 2%).

Table 6.8: Discharge outcome of patient admissions

Discharge Outcome	No. of patient admissions	% of patient admissions
Remained at home	197	72.4%
Admitted to hospital	33	12.1%
Remained at home with home visit	24	8.8%
Telehealth not appropriate referred to other service	13	4.8%
Patient declined/ self-discharged from telehealth	5	1.8%
Total	272	

6.2.10 What is the financial impact on acute beds?

To understand the potential reduction in acute bed usage as a result of the virtual ward, data was used on average length of stays at Croydon hospital in 2021-22 for certain conditions that are consistent with the profile of virtual ward patients (COVID-19, COPD and heart failure).

A total of 100 virtual ward admissions that were not referred by an acute inpatient setting (step up) were matched by condition to the hospital average length of stay data, this makes up 63% of all patients that were stepped up to the virtual ward. If the virtual ward had not been in place and all 100 patients had been in an acute hospital bed the estimated cost to the hospital would've been £453,080 based on an average bed day cost of £482 (National Schedule of NHS costs, 2020-21¹⁴). This equates to an average of £4,531 per admission.

Table 6.9: Acute bed cost modelling for scenario where all step up patients are admitted to an acute bed

If all went into acute hospital						
	No of VW patient admissions that were step up	ALOS at Croydon hospital (2021-22)	Total bed days	Bed day cost	Total acute cost	Average acute cost per patient
Covid-19	81	10	810	£482	£390,420	£4,820
Heart Failure	8	8	64	£482	£30,848	£3,856
COPD	11	6	66	£482	£31,812	£2,892
Total	100		940		£453,080	£4,531

We know that 17 of these step up patients with covid-19, COPD or heart failure were discharged from the virtual ward into a hospital bed, leaving 83 patients that were not admitted to hospital. The saving across these patients would have been approximately £374,996, based on saving 778 bed days at a cost of £482. This means that the cost of acute beds for the 17 patients that were discharged from the virtual ward directly into hospital would have been about £78,084. Although it is possible the ALOS would be lower for these patients due to the care they had already received via the virtual ward.

When applying the estimated cost saving to the number of patients used in this modelling (100) this would equate to a cost saving of approximately £3,750 per patient that was admitted to the virtual ward.

¹⁴ NHS England, National Cost Collection: National Schedule of NHS Costs 2020-21 <https://www.england.nhs.uk/costing-in-the-nhs/national-cost-collection/#ncc1819>

Table 6.10: Acute bed cost modelling for patients that were managed at home

Cost saving for those that stayed at home						
	No. of step up VW admissions not discharged to acute hospital	ALOS at Croydon hospital (2021-22)	Total bed days	Bed day cost	Acute cost saving	Average saving per patient
Covid-19	67	10	670	£482	£322,940	£3,987
Heart Failure	6	8	48	£482	£23,136	£2,892
COPD	10	6	60	£482	£28,920	£2,629
Total	83		778		£374,996	£3,750

As the modelling above is based on just 62% of all virtual ward admissions that were stepped up, when applying the average saving per patient to the full 159 patients on the virtual ward that were stepped up and applying a 20% level of variance it is likely that there was a cost saving in terms of acute beds of between **£477,000 – £715,500 with a cost saving per patient of approximately £3,000 - £4,500.**

The total acute bed savings as a result of the virtual wards will be higher than this as patients that were referred via an acute inpatient setting (stepped down) are likely to also save bed days as a result of a reduced length of stay in hospital, however more data and economic analysis would be required to understand what the financial impact of patients that have been stepped down is.

Insights gathered through the staff interviews show how their views on whether the service was cost-effective were inconclusive, but it was believed that overall the service had a positive impact on alleviating the pressures on acute services.

*"The feedback from the patients was they felt better having someone there, having someone they could ring or that you know that daily call to check in. So it meant that they **didn't call anyone else that their doctor or an ambulance or go to the urgent care centre or I think they stayed at home and spoke to us instead.** So gave more work to the person doing the monitoring. But potentially it took work away from other people who wouldn't have known that patient was going to come to them. So, for instance, the urgent care. But I won't be able to put a number on that. "*

It was felt the service would become increasingly efficient over time, as capacity increases, and staffing levels and resources needed to manage the service are refined, especially following the introduction of the remote monitoring hub (which will require mapping demand over a twenty-four-hour period as well as capturing capacity, capability and staffing levels to meet the demand across the Croydon system).

7. Conclusions

This evaluation has shown that the three South West London Virtual Ward models, although set-up differently, were all successful at treating patients safely and comfortably at home. Data collected highlights some clear benefits of virtual wards from a patient and staff perspective.

Although discharge outcomes varied between the different virtual ward models, patients across the three services were on the whole able to be cared for at home, through a combination of remote monitoring, telephone calls and home visits.

Patients and their carers felt they were being kept out of hospital whilst receiving the same standard of care as they would in a hospital environment, and saw the benefits of being cared for at home. They were generally compliant and satisfied with remote monitoring solutions (for both continuous and spot monitoring models). Acceptability of remote technology solutions was highest when clinical teams were given dedicated time to support patients in how to use the technology optimally. This was especially important for patients with limited digital skills and was key to increase their confidence in using the technology autonomously.

Interviews with clinical virtual ward staff also highlighted positive experiences of working on the ward. Those were linked to working among multidisciplinary teams, and developing new skills, as well as being proud of working for an innovative service, and receiving positive patient feedback. Developing a comprehensive training offer for virtual ward staff was identified as a key priority going forward.

There was also some indicative modelling of the financial savings associated with acute bed days saved for one of the virtual wards, with estimated savings of between £3,000 - £4,500 per patient. Although it is important to note this does not take into account the costs associated with running the virtual wards.

Data collected and analysed across the three models highlighted a number of key enablers for virtual wards to prevent admissions into acute hospital beds, or supporting early discharge out of hospital, including:

- **Offering continuous monitoring to all patients**, as it was generally preferred by patients over spot monitoring and required minimum technical confidence and experience from patients.
- **Referring a small but targeted cohort of patients**, with a focus on respiratory and cardiovascular conditions and symptoms, which can be monitored using the range of monitoring devices and tests offered by the remote monitoring kits.
- **Having established clinical and referral pathways**, ideally from a range of sources including ED, inpatient wards and community services.
- **Having in-reach virtual ward staff based in acute settings**, so they can help with identifying suitable patients and referring them onto the ward when clinically appropriate.
- **Strengthening relationships with acute trust staff**: although it is not essential for the virtual ward to be hosted by an acute trust to treat patients successfully, the development of strong relationships between virtual ward and acute staff is a key factor to reducing admissions and getting patients onboarded onto the virtual wards quickly and smoothly.
- **Building multi-disciplinary teams**, with a mix of skills among virtual ward staff, to increase job satisfaction, and enhance staff ability to provide holistic care to patients.
- **Having clear clinical governance arrangements in place**, in order to protect both patients and staff, and avoid any confusion around who is responsible for a patient's care while they are on the virtual ward.

At the time of writing, a 24/7 central remote monitoring hub, which will serve the whole South West London population, hosted by the Croydon virtual ward is due to launch at the end of November 2022. This will have a significant impact on how the Croydon, Kingston and Richmond, and Sutton Virtual Wards operate in the future.

This is likely to release capacity within the local virtual teams and enable monitoring to be done at scale and 24 hours of the day, with the hope that more patients will be referred to the virtual wards in future.

8. Limitations

There are a number of limiting factors that impacted on this evaluation. Some of these are directly linked to implementation and delivery challenges experienced across South West London, while others are wider and relate to the evolving nature of virtual wards, and work pressures experienced across the NHS.

- **Delays in launching the central remote monitoring hub** – while the original evaluation design planned to explore the transition and implementation from local virtual ward models towards a centralised remote monitoring hub model in South West London, delays in launching the service has meant that the evaluation had to be rescoped to focus on the Croydon, Sutton, and Kingston and Richmond’s virtual wards instead. The imminent introduction of the hub will have a significant impact on how those services operate, and this has not been captured as part of this evaluation.
- **Consistent recording of quantitative data** - work on the Kingston and Richmond and Sutton virtual wards is still underway to develop specific forms for the collation of coded information on virtual ward patients. Both virtual wards are looking at embedding structured forms within their electronic patient records specifically for virtual ward patients. This will enable the type of information analysed for this evaluation to be collated in a more consistent manner. For the purpose of this evaluation, the sites collected information via either having a clinician review the range of case notes for each virtual ward patient (Kingston and Richmond virtual ward) or using natural language processing algorithms to search case notes for key terms (Sutton virtual ward), both these approaches are prone to inconsistencies in the way data has been recorded and is extracted.
- **Recruitment targets for the qualitative fieldwork were not all met** – due to staff sickness and work pressures, arranging interviews with virtual staff was challenging. For instance, no nurse working as part of the MDT on the Sutton virtual ward was interviewed as part of this evaluation, so data on staff experience is limited for this service. In turn, only one interview with a patient (and their carer) from the Kingston and Richmond virtual ward was conducted, so that insights on patient experience mainly stem from staff interviews. However, it is important to note the qualitative findings reflect a wide range of views and perspectives across the three services – we talked to a total 19 patients and carers (including three patients as part of the 2021 evaluation of the Croydon virtual ward)²⁵, and 14 staff (including a mix of clinical and operational staff).
- **No data was collected about patients not engaging with the virtual ward** – the evaluation team was not able to talk to patients who declined treatment from the virtual ward. In addition, none of the services routinely collect data on why certain patients cannot or do not want to be treated on a virtual ward. The perspective of this group of patients is therefore missing from this evaluation.
- **There has not been a focus within this evaluation on financial return on investment** – this is needed to understand the full costs of setting up a virtual ward and the subsequent financial return. However, we do know that South West London are moving towards a centralised model of monitoring for all their virtual wards which is likely to have an impact on the local resourcing for virtual wards. A health economic evaluation of this new model, once embedded, would be useful to understand this aspect.

²⁵ Health Innovation Network (2021) Rapid Evaluation of Croydon Virtual Ward, Health Innovation Network: London. Available on: <https://healthinnovationnetwork.com/wp-content/uploads/2022/01/Croydon-VW-Evaluation-Report-to-NHSX-v10.pdf>

9. Recommendations

The following recommendations are derived from the insights gathered across the three virtual wards: Kingston and Richmond, Sutton and Croydon. They focus on maximising the effectiveness and the impact of services going forward; as they expand, diversify their referral pathways, and start working with the central monitoring hub.

6.2.11 Further evidence is needed to understand the full impact of the virtual ward services

A full evaluation of the central remote monitoring hub should be carried out, once the service is completely up and running. It will be important to understand how the hub offer impacts on local virtual wards, how demand is managed (especially over a 24/7 period), and how it affects acute trust bed usage across each local system, and across the whole of South West London. The hub will also impact staffing levels and responsibilities in each local system. As such, gathering insights and sharing learnings, as the local virtual wards learn to work with the service, should play a key priority when implementing the hub (and beyond). As there are plans for the hub, and all local virtual wards, to offer both continuous and spot monitoring, the evaluation should also aim to understand if and when continuous monitoring is more effective than spot monitoring at treating patients with specific conditions (and vice versa).

As part of this, a comprehensive economic evaluation would also be needed to understand the cost-effectiveness of the South West London virtual ward offer.

Data monitoring needs to be prioritised, with some standardised data fields in place across the local virtual wards and the central hub. As a minimum, we recommend that the following should be recorded and monitored at regular intervals:

- Primary reason for admission to the virtual ward,
- Discharge destination,
- Virtual ward resource/ interactions, e.g. home visits, telephone calls, staff monitoring
- Acuity score of patients
- Whether patients declined admission to virtual ward and reason for decline
- Demographics of virtual ward patients (as a minimum, age, gender and ethnicity)
- Whether patients were tech enabled/ onboarded for remote monitoring kits
- Patient satisfaction (net promotor) scores

Embedding structured forms in each system's Electronic Patient Records (EPR) is recommended to help with routine collection of data for future monitoring of the services. This should be supplemented by Patient Reported Outcome Measures (PROMs) and Patient Reported Experience Measures (PREMs), gathered through systematic and structured patient and carer feedback. In addition, responsibility for improving recording, analysing and reporting performance monitoring data should be clearly allocated to one or more members of each virtual ward team and to trust business intelligence teams, and consideration must be made of the resource required to perform these tasks.

A full equalities impact assessment should be undertaken. As part of this, a number of areas should be explored including whether some cohorts of patients are more likely to:

- decline being treated on a virtual ward (and their reasons for doing so).
- not be referred to a virtual ward (and why).
- not be offered remote monitoring solutions.
- struggle using the technology (both continuous and spot monitoring solutions).

As part of this, it will also be important to consider how rising energy bills could impact on low-income patients and

their ability to charge up the monitoring equipment if offered to them.

6.2.12 Improving staff experience

While staff reported overall positive experiences of working on virtual wards, some areas of improvement were identified. The following recommendations are therefore proposed:

A comprehensive training offer for the virtual ward staff should be developed, to ensure virtual ward clinicians are equipped with the right digital and clinical skills to treat patients effectively. This should include training on the devices and technology, in relevant digital skills (such as using the clinical dashboards), on how to read non-verbal cues, and how to monitor deterioration, as well as training on data collection and quality improvement.

Because virtual wards are relatively new services, job descriptions should include practical details around the roles on offer. The term 'virtual' can be interpreted in many ways, and job applicants should be clear about what working for a virtual ward entails (i.e. the extent to which staff can work from home for instance).

6.2.13 Improving patient experience, and increasing the inclusivity of the virtual ward

An adequate amount of time needs to be allocated to virtual ward clinicians to support patients to use remote monitoring solutions optimally. As highlighted by the evaluation, acceptability of remote technology solutions was highest when clinical teams were given dedicated time to support patients in how to use the technology. This is especially important for patients with limited digital skills, and this can help ensure the virtual ward offer is as inclusive as it can be. Doing so can also have potentially longer-term implications in encouraging self-management, as patients become empowered to take more control over their own health.

The discharge process should include a home visit, so patients are clear they have been discharged from the virtual ward. Discharge processes over the phone were not viewed as satisfactory by patients, who required a sense of closure. In addition, discharge visits should include collection of the remote monitoring equipment so patients do not have to keep it for long periods of time, and try to arrange to have it collected themselves.

6.2.14 Ensuring the successful implementation of the central remote monitoring hub

Although the central hub was not the focus of this evaluation, there are a number of learnings emerging from the evidence gathered which should be taken into consideration as the hub is being set up.

There should be clearly defined standard operating procedures (SOPs) and governance arrangements in place when the hub is launched. This is critical to get clinicians' buy-in (from primary and acute care settings), as the hub will encourage cross-service working.

An effective and ongoing engagement strategy needs to be put in place, raising awareness of the service should be a key priority going forward. The plan should focus on emphasising the ability and skills of the virtual wards to manage their patients, and highlighting how the service could help reduce pressure on acute and emergency services; through face-to-face engagement and shared learning events.