Wessex Academic Health Science Network

NHS Hampshire Hospitals NHS Foundation Trust

Rapid Evaluation of Hampshire Hospitals NHS Foundation Trust Virtual Ward Programme

Final Report submitted to NHS England, 2nd September 2022

Part of The AHSN Network

Executive summary

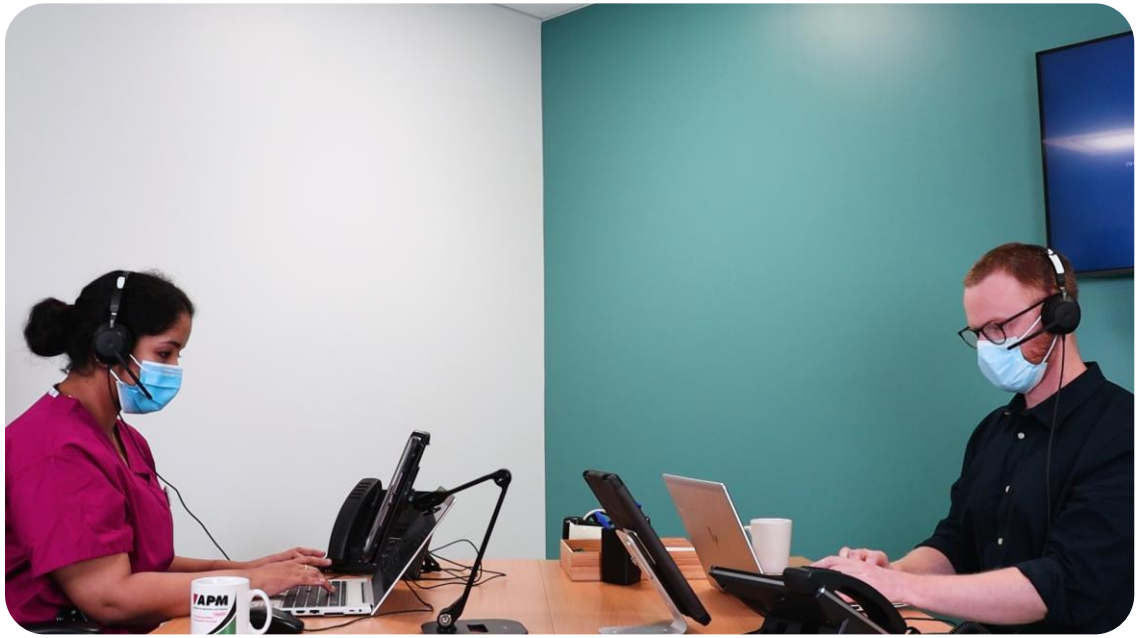
Background: Hampshire Hospitals NHS Foundation Trust (HHFT) developed the Virtual Health Hub (VHH) to co-ordinate and support three services: Virtual Wards (VWs), telemedicine calls from approximately 240 care homes, and the Clinical Communication Centre (CCC). HHFT took an incremental low technological approach to its VW programme and patient care, utilising strengths in patient pathways and collaborative work across the system. This strategy sought to engage and build confidence with both acute care and community staff.

Approach: A rapid evaluation of this HHFT VW programme involved a retrospective analysis of activity data from the programme's inception on 29 March 2021 to 12 June 2022. The analysis splits patients into step down (referred from inpatient spell) and step up (referred from community, Emergency Department [ED], outpatient or internal HHFT referral). 72% of patient VW admission referral sources were successfully tracked. The majority of referrals come from in-patient wards, community and the ED. Patients are mostly White British and sit within the 30% least deprived nationally.

A more detailed case analysis was undertaken between 25 April and 22 May 2022 followed by interviews with patients and staff to gain an in-depth view of patient care and outcomes on the VWs.

Key findings (See next slide): Patients admitted to the VWs were older with multiple co-morbidities, with most recovering from Covid or were people with frailty. There were also patients on the chronic pulmonary obstructive disease (COPD), heart function and general medicine VWs. Patients were managed on the VWs without any unexpected adverse events. Patients were overall satisfied with care provided and welcomed the regular consultations and expertise of staff.

The VHH team, now established as business as usual, feels ready to increase capacity and manage greater patient diversity. This requires improved engagement with referring consultants across specialities to gain their confidence in the VHH.



Executive summary – Key findings

Quantitative Data

1,113 patients were admitted to the VWs between 29 March 2021 and 12 June 2022 (63-week quantitative data period)
Step up (*n*=844), step down (*n*=269)

Key metrics:

- Mean patient age of **70 years (step up)** and **72 years (step down)**
- Mean number of individual patient **co-morbidities** are between **5 (step up)** and **7 (step down)**
- Mean VW **Length of Stay (LoS)** for step down patients ranges between **7.8 days (Covid early discharge) to 10.0 days (heart function)**
- Mean VW **LoS** for step up patients ranges between **5.5 days (COPD) to 8.5 days (heart function)**
- **Readmission rate** for step down patients for 2021/22 is **16.1%,** lower than the 19.8% readmission rate for 2020/21
- VWs saw 22 patient deaths, a **mortality rate of 2%,** lower than the HHFT actual of 2.8% for a similar period.
- The majority of VW admission referral sources came from in-patient wards, community and the Emergency Department (56.9%)
- **Length of inpatient stay (bed days) savings: 3.7 days saved/patient** (step down subgroup)
- **Admission avoidance: 844 patients** (step up)
- Step down bed saving of 676 days (minimum), which translated to a **cost saving of £225,889**
- Step up inpatient bed day saving of 4,351 days, which translates to a **cost saving of £1,452,407**
- There is an overall estimated **VW cost saving of £1,678,297** seen over the quantitative data period of 29 March 2021 to 12 June 2022.

Executive summary – Key findings

Qualitative Data

110 patients admitted to VWs during 25 April and 22 May 2022 (4-week qualitative data period):

- Most patients were stepped up to the Covid VW *(n*=50) or stepped down to the Frailty VW *(n*=48)
- Patients admitted with frailty tended to have longer LoS and needed more or longer consultations with staff.
- Face-to-face care co-ordinated by the VHH team came from a variety of services e.g. Urgent Care Response (UCR), General practitioner (GP), Allied health professionals (AHP) review and nursing.
- 97 patients were discharged with no further intervention. Seven patients were admitted to hospital. Six patients were referred to onward care by a variety of community services.

Themes generated from 30 patient and staff interviews and one VW multidisciplinary team (MDT) meeting observation

- **HHFT's emerging VW model:** VHH established, and staff prepared to receive more patients with a wider spectrum of conditions and needs.
- **System working - VWs provide continuity of care:** Offers the patient integrated and continuity of care between hospital discharge and discharge to the community and prevents hospital admission from the community.
- **The anticipated impact on acute and community services:** Staff identify expected impacts which are not yet measurable**.**
- **Balancing benefits and risks of care at home and in hospital:** Referring consultants balance both risks and benefits to patients of a hospital stay versus discharge home to virtual care and so tend towards caution. Patients prefer home when possible.
- **Emergent workforce model - Skill development and expert practitioners:** VHH team develop generic expertise and will progress the development of tailored training for VW.
- **Moving forward with digital technology:** Identification of technology solutions to support VWs were patient information systems that integrate across different platforms, plus consideration of remote monitoring options for patients. Patients were satisfied with regular telephone calls.

Executive summary – The difference HHFT model made

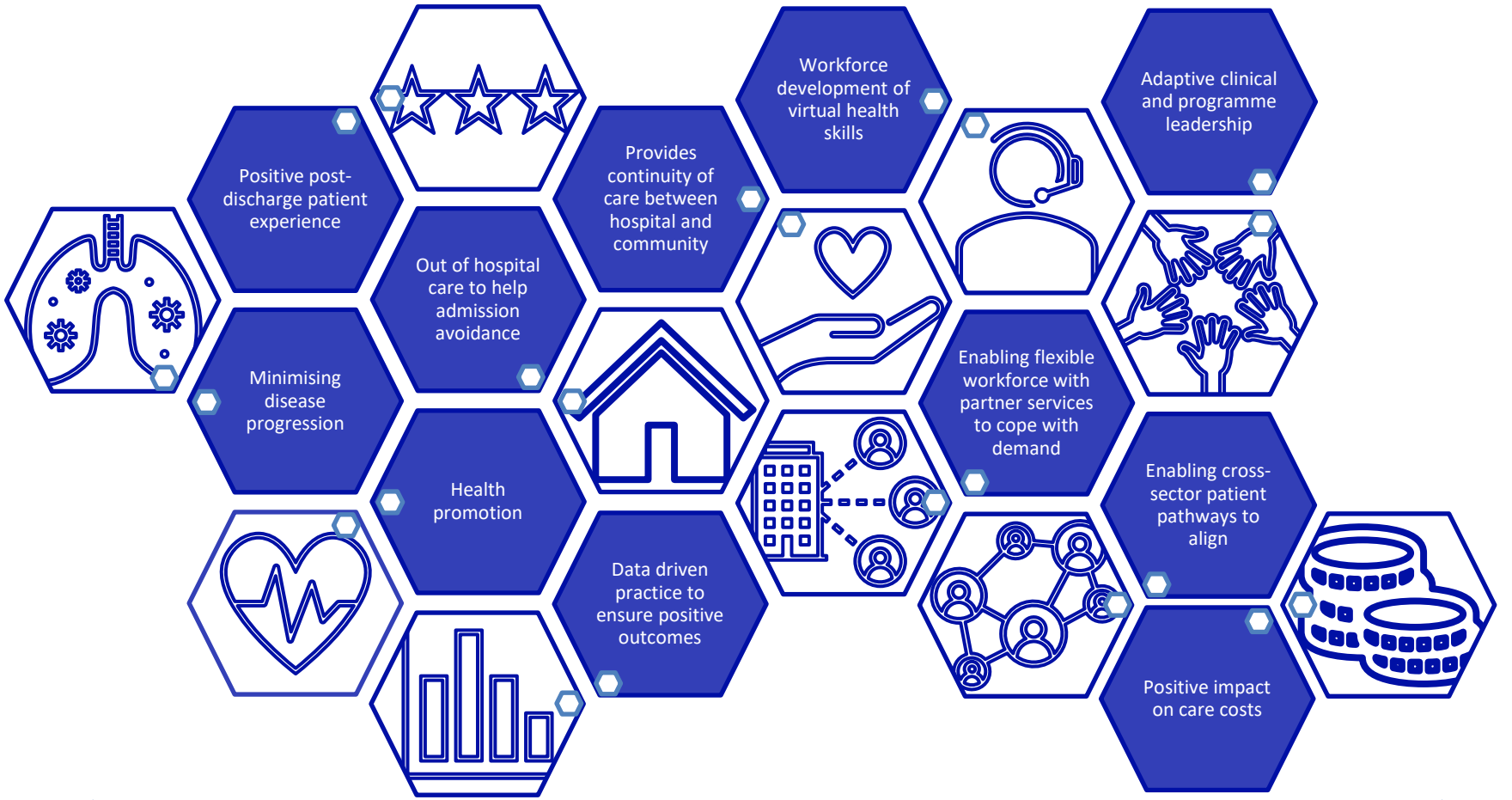


Figure 1 : Diagram of the different HHFT VW model made to their integrated approach to patient care

Plain language summary

HHFT developed and established the VHH. This new service gives care and support to patients at home through VWs. Patients are admitted into this service either by their GP, community team or on discharge by their hospital consultant. The service also provides support to staff looking after people in care homes. The VHH team will regularly call VW patients to assess their clinical condition and ability to manage at home. Some patients will require extra support from other services, and these may include a visit in person at home.

A study was completed to assess the HHFT VHH. Hospital data from the start of the VHH on 29 March 2021 to 12 June 2022 was looked at to understand where patients were coming from. Patients came from hospital in-patient wards, home via the GP, community teams, ED, or outpatients. Patients are mostly White British and from the 30% least deprived people nationally.

More data was taken from a smaller group of patients between 25 April 2022 and 22 May 2022. Interviews were completed with patients and staff to better understand their views of patient care and outcomes on the VWs. Most patients were older with many co-morbidities. They were mostly recovering from Covid or were people with frailty. Other patients had breathing or heart difficulties. Most patients were discharged requiring no further intervention. Two patients died unexpectedly, one of whom died on readmission to hospital. Patients interviewed were happy with the care received and liked their regular calls with expert staff.

For the full study period a cost saving of £1,678,297 for the VWs was calculated.

The VHH is well underway and can now receive more patients with different illnesses. Hospital consultants need to refer more patients as they become more aware of the VWs.

Fred's* story

Fred is 68 years old, has Parkinson's, mobility difficulties and a sleep disorder. He was at home with his wife Mary when he had a nasty fall out of bed. He went to the ED where they carried out blood tests, an X-ray and a CT scan of his neck. The ED discharged Fred to the Frailty VW so that he could recover at home. Fred was happy that he did not have to stay in hospital (where he finds it noisy and difficult to sleep). Both he and Mary were pleased that the VHH team would continue to monitor Fred. The VHH team rang every couple of days and spoke to either Fred or Mary. They helped Mary fill in some forms to request a bed rail for Fred to prevent further falls. They also helped her to better understand how to manage his pain relief and gave Fred some advice on doing gentle exercise to stay fit. Mary appreciated the phone calls she received from the VHH, and the knowledge that she could contact them if she needed to. She said,

> *"I felt there was someone there for me and that was really important because I knew I could pick up the phone and ask a question and somebody would get back to me…I'd just like to send our thanks."* **Carer**

June's* story

June is 65 years old and is currently receiving treatment for cancer. She contracted Covid and became unwell so contacted the emergency oncologist who referred her to the Covid VW. Because the cancer treatment affects her immune system, June was pleased not to be admitted to hospital. The VHH team were frequently in touch with June and monitored her temperature and oxygen levels. At one point her temperature rose and the VHH team arranged for her to be admitted for an anti-viral infusion after which she returned home again. June appreciated all the advice that the VHH team gave her saying,

> *"Their advice was greatly appreciated really and helped enormously… I would describe it [VW care] as excellent".* **Patient**

*Pseudonyms

Evaluation team

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HHFT evaluation team

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Dissemination of report

This report will be reviewed and approved by the Medical Divisional governance board within HHFT and shared with NHSE. It will be presented to the trust board of directors along with patient and public voice representative groups. We will further present and share the report with our local stakeholders in primary, community, and social care. The data contained within the report is unique and it will be widely disseminated regionally and nationally. We intend to present and publish the data nationally within peer reviewed scientific and healthcare journals. Wessex AHSN will share a summary of the final report on its public website and social media platforms.

Disclaimer

This final report presents the findings of an evaluation of the HHFT Rapid Evaluation for VWs jointly conducted between HHFT and Wessex AHSN. The findings of this evaluation are those of the authors and do not necessarily represent the views of HHFT or Wessex AHSN.

Acknowledgements

In addition to the authors from Wessex AHSN, Philippa Darnton (Associate Director, Insight), and David Kryl (Director, Insight) and Phoebe Woodhouse (Programme Analyst) are thanked for their contribution to this evaluation.

Wessex AHSN Data retention statement

Our policy is to retain anonymised and pseudo-anonymised data for six years after the actual publication of the final report. We retain identifiable data in accordance with the Data Protection Act (DPA) and General Data Protection Regulation (GDPR) and for a period of 12 months after the actual publication of the final report. Following these retention periods, you will be given notice of imminent destruction and the opportunity to discuss any issues arising with the Project Manager concerned. Once a date has been confirmed the data will be destroyed and you will receive a certificate of destruction.

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List of Abbreviations

AHP	Allied health professionals
AHSN	Academic Health Science Network
AI	Artificial Intelligence
CAS	Clinical Assessment Service
CCC	Clinical Communication Centre
CCG	Clinical Commissioning Group
CHIE	Care and Health Information Exchange
COPD	Chronic Obstructive Pulmonary Disease
ED	Emergency Department
F2F	Face-to-face
GP	General practitioner
HHFT	Hampshire Hospitals NHS Foundation Trust
HRG	Healthcare Resource Group
ICB/S	Integrated Care Board / System
ICD	International Classification of diseases
IP	Inpatient
ITU	Intensive Therapy Unit
IV	Intravenous
LoS	Length of stay
MDT	Multidisciplinary Team
NIC	Nurse in charge
OOH	Out of hours
PCN	Primary Care Network
QI	Quality improvement
SCAS	South Central Ambulance Service
SCV	Special Cause Variation
SD	Standard Deviation
SDEC	Same day emergency care
SDUC	Same day urgent care
SHMI	Summary Hospital-level Mortality Indicator
Sit-rep	Situational report
UCR	Urgent Care Response
VHH	Virtual Health Hub
VW	Virtual Ward
W/E	Week ending
WTE	Whole-time equivalent

Policy and evaluation background

Virtual wards (VWs) are a safe and efficient alternative to NHS bedded care, which can be further enabled by technology. VWs 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 (step up care) or supporting early discharge out of hospital (step down care).

VW models can combine virtual and face-to-face (hospital @home) intervention based on individual patient needs. Technology is used to provide monitoring of the patient's condition and encourage patient confidence to greater self-management of their care.

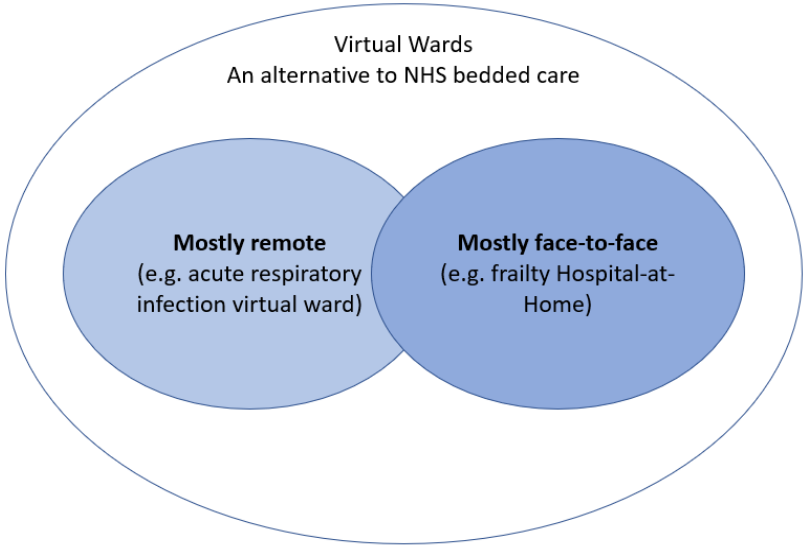


Figure 2: NHS Digital Virtual Ward description

Hampshire Hospitals Foundation NHS Trust (HHFT) invited Wessex AHSN to specify an evaluation for their planned VW Programme in the last quarter of 2021. Due to the rapid development and guidance emerging on VWs, NHS England invited applications for rapid evaluations on virtual programmes underway to inform a planned national evaluation of VWs. Naomi Ratcliffe (Associate Director in Clinical Integration and Strategy) at HHFT successfully obtained funding for a rapid evaluation, along with nine other successful applicants. This was a change to the original scope of the VW evaluation request. Wessex AHSN typically provides both qualitative and analyst support; however, due to capacity limitations, Wessex AHSN agreed to support a qualitative evaluation with HHFT business support undertaking quantitative data analysis. As part of the original planned evaluation a logic model was developed. Copy available at **Appendix 1**.

The NHS England rapid evaluation focus sought to provide evidence on the impact of VWs (bed usage), learning of how workforce redesign and technology can secure the benefits of VWs, inform data developments that support the local and national reporting of VWs and their outcomes. HHFT also wanted to understand the patient experience of VWs and how to ensure they felt safe at home. This included whether the VWs increases patient understanding about their current health condition and the ability to empower patients to self-manage in the future.

Rapid evaluations are not new (Vindrola-Padros et al, 2019). Covid-19 has prompted use of rapid evaluations (Wessex AHSN White Paper) which can provide a viable option to gathering data to inform time sensitive decisions. Follow up periods are short and therefore a limitation. Rapid evaluations typically require more human resources to speed up data collection and truncation of methods to shorten lengthy analysis, especially qualitative analysis.

Description of HHFT VHH – Structure and Purpose

The VHH is a non-medically led service overseen by a Consultant Nurse. The VHH aims to prevent residents and patients in Hampshire being brought into hospital when their care can be provided within the comfort of their own home. The design of the service takes into consideration patient safety, experience, and the reduction of healthcare burden, bringing together recent transformation and innovation projects in the previously separate areas. The VWs in particular, took forward the early learning during Covid and Covid Oximetry @Home (Boniface *et al*. 2022), using the same infrastructure for non-Covid VWs.

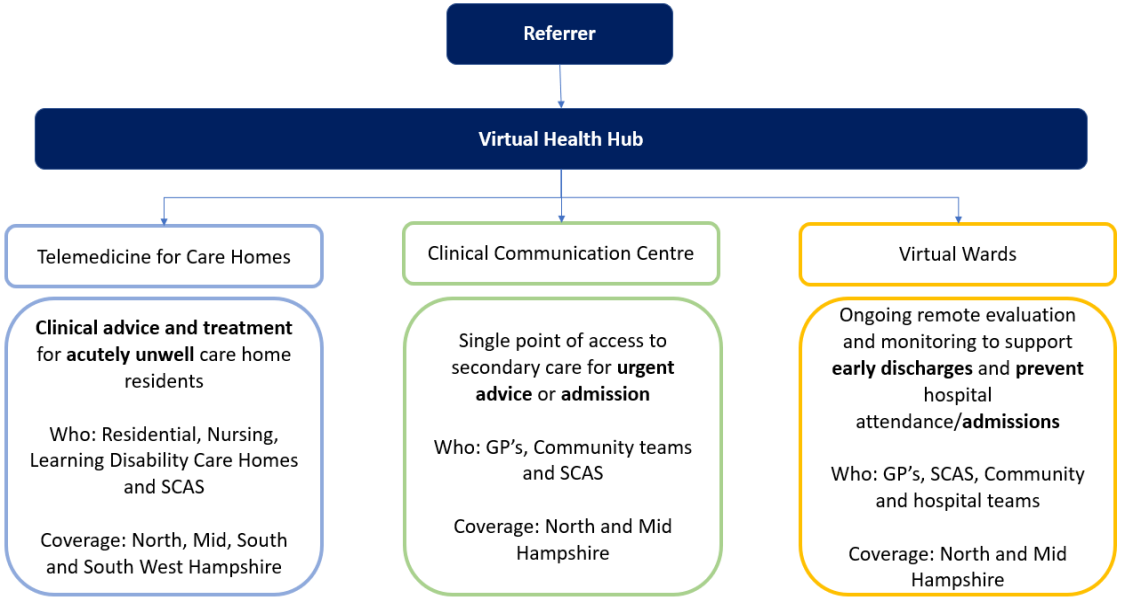


Figure 3: Services delivered by the VHH

The three services implemented under the VHH umbrella are:

1. Telemedicine for care homes across Hampshire and Isle of Wight (HIOW)
2. The CCC for healthcare professionals within North and Mid Hampshire
3. VWs, step up and step down across North and Mid Hampshire.

The VHH aims to:

- Integrate health (physical and mental) and social virtual care
- Enhance existing community pathways, including Hampshire County Council and the voluntary sector
- Enable patients to remain in their usual place of residence (own homes, care homes, prison or other) or reduce LoS for whom hospital admission is necessary
- Identify deterioration early such that when patients do need to come into hospital, this is quick and efficient and they come to the right place, to see the right person, first time
- Improve collaboration of services across the system in terms of workforce, integration of services and overall strategic vision.

The VHH has the opportunity to bring services together using digital tools allowing staff across primary, acute/hospital and community services to work together as a multi-disciplinary team to deliver joined-up care. As a consequence, this model aims to reduce the risk of admission through enabling enhanced care in the community.

Description of HHFT VHH - Digital

Technology used within the VHH

The VHH uses a telephony system called Netcall, which allows professionals and care home staff to call via an 0300 number to access HHFT's Telemedicine service. The Netcall system also has a dedicated patient line to enable our VW patients and carers to call the VHH with any concerns. The Netcall system is designed in layers where multiple options are presented to the caller, this allows the VHH team to see who is calling, prioritise the calls and audit calls post consultation. From an operational perspective, this allows the VHH Clinical Service Manager to understand the call volume, duration and waiting times for each service. Netcall also allows the VHH to assign team members to the call options for the day and to initiate any three-way discussions with specialist teams or senior decision makers.

Referrals to the VW are either by an electronic referral, better known as an ePurple or via our NHS.net email account for our step up patients. The ePurple referral is completed on the Trust's Electronic Patient Record (EPR) system and automatically sent across to the VHH to triage. Once triaged and accepted by the VHH, the patient is added to the appropriate VW on the EPR system. All admission, clinical noting and discharge summaries are completed on EPR. All discharge summaries are sent to the patients' GP and uploaded on to the Care and Health Information Exchange (CHIE).

During the virtual consultation with the patient, carer or care home staff, there is an opportunity for the telephone call to be transferred to a video call via Microsoft Teams. The VHH can also electronically prescribe or de-prescribe medication (if required) and send prescriptions electronically (via EPR on EMIS Web) to a chosen pharmacy, negating the need for the patient to visit the hospital or wait for an out of hours GP to visit, making treatment and symptom control much faster.

The VHH has procured five applications to be installed which allows 100 authorised registered users to use EMIS concurrently. The data on patients is held and stored within the GP patient management systems (EMIS Web, TPP, or equivalent). An NHS Spine match is required, which will then allow the service to access the surgeries notes on the patient and any notes made by the VHH team to notify the relevant GP.

Description of HHFT VHH - Workforce

The VHH is staffed by a mixture of experienced nurses and AHPs, led by a Consultant Nurse and two trainee Advanced Clinical Practitioners, with oversight from the VHH Clinical Director. All staff are skilled to work across the three services within the VHH, which enables flexibility across the service and increases workforce efficiencies.

Table 1 demonstrates the VHH staffing model during the time of this rapid evaluation. Please note, the staffing model is for all three services under the VHH umbrella. All roles have been costed to mid-point of their band and include on-costs along with enhancements where necessary.

Table 1: Annual workforce breakdown for all three services under the VHH

Role	Banding	WTE in post	Enhancements	£
Clinical Director for the VHH	YC72/01	0.2	No	22,754
Consultant Nurse	8b	1.0	Yes	89,891
Clinical Services Manager	8a	1.0	Yes	77,354
Lead Senior Clinical Assessor	7	1.0	Yes	69,139
Senior Clinical Assessor	6	6.72	Yes	376,932
Senior Clinical Assessor & Information Engagement Manager	6	1.0	Yes	56,091
Care Home Engagement Manager	5	1.0	No	42,427
VHH Administrators	4	2.0	No	66,954
Total		**13.92**		**£801,542**

Abbreviation: WTE = Whole-time equivalent

Figure 4 shows the new workforce structure that has been implemented since the evaluation. As illustrated, the Senior Clinical Assessor and Information Engagement Manager, and the Care Home Engagement Manager are solely for the Telemedicine Service.

The Consultant Pharmacist, Operational Service Manager and two Lead Senior Clinical Assessors are new positions and will be in post after the completion of this rapid evaluation.

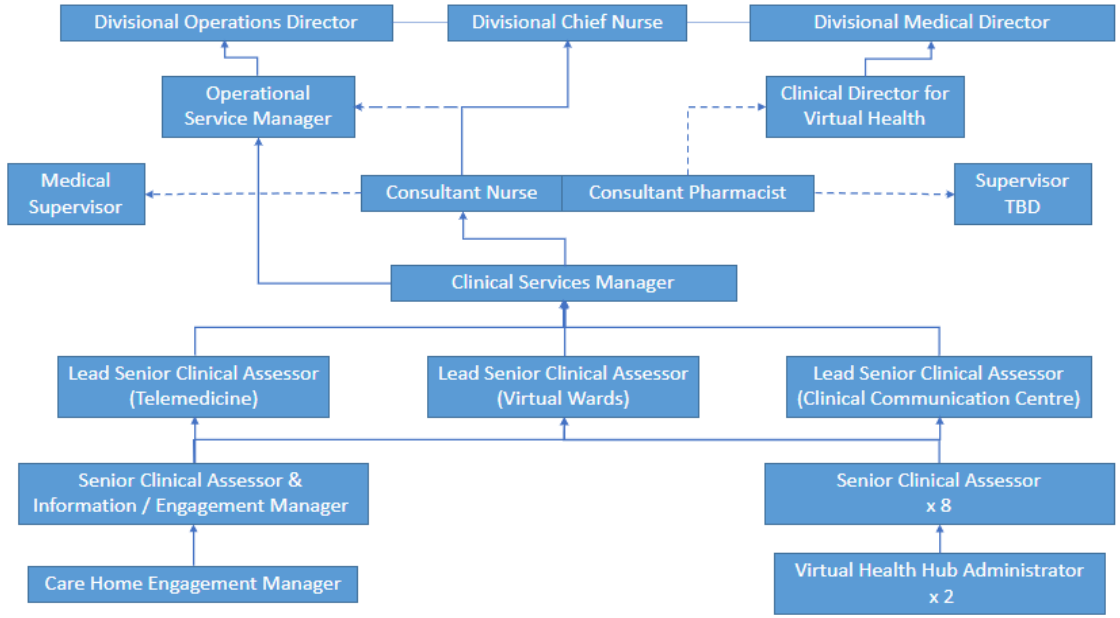


Figure 4: VHH workforce structure post rapid evaluation

Description of HHFT VHH - VW Capacity and Targets

- There are five wards included in this rapid evaluation which are outlined in **Figure 5**, with the quantitative data covering period between 29 March 2021 to 12 June 2022 and the qualitative data covering 25 April 2022 to 24 June 2022. A longer quantitative data period was used to ensure a sufficiently large sample size for analysis.

- The aim of all VWs is to reduce the risk of admission (step up), support early discharges from hospital (step down) and to prevent unnecessary re-admissions. HHFT has created multiple VWs to support this. Each VW supports patients referred from a different speciality, e.g. COPD, Heart function and Frailty, each with its own associated clinical pathway (example of our step up frailty pathway in **Appendix 2**). The VW team proactively call and monitor these patients for early signs of health deterioration and to prevent more severe health deterioration. There is also a dedicated telephone line for the patient to call the VW team with any concerns or issues related to their reason for referral.

- The HHFT VWs currently have the total capacity to manage 40-45 patients.

- Trajectory aspirations: The aim by the end of the year is to meet national targets (**Table 2**) and expand the service to support other areas such as asthma and diagnostic imaging.

Table 2: National VW targets for North and Mid Hampshire

	June 22	Q1	Q2	Q3	Q4
Absolute VW target	45	78	85	96	111
Target per 100,000 (18+ population)	12	21	23	26	30

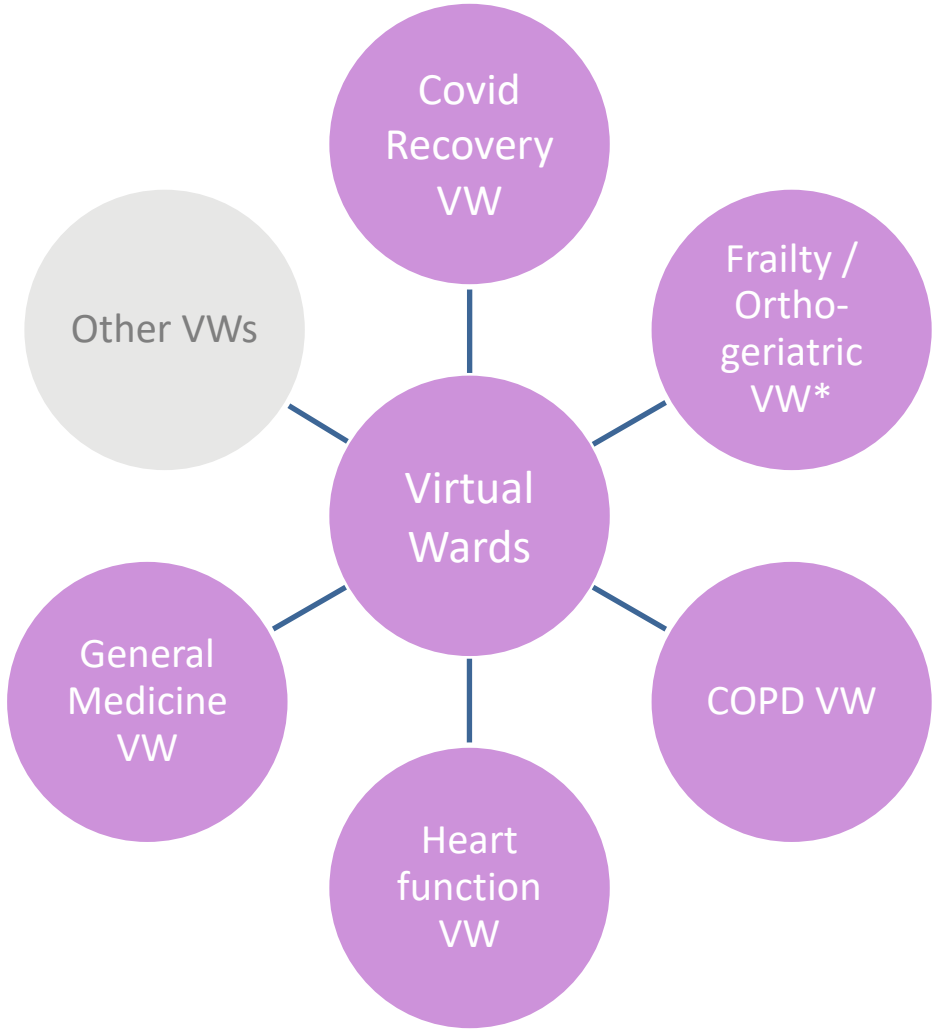


Figure 5: Virtual wards included in the rapid evaluation
*Frailty/Ortho-geriatric VW will be referred to as Frailty VW for the remainder of this document

Description of HHFT VHH – Our Ambition

The medium to long term ambition for VWs is to move to a **more holistic model of virtual care,** with clinician **supported patient self-management at its heart** and an ability to manage differing levels of acuity. The VWs will be **inclusive for all clinical conditions and patient groups**, specifically looking to proactively include those with additional needs or protected characteristics for example, **homeless** people, **prisoners** and those in areas of **deprivation**. In this way, care provided through VWs will be patient specific and managed via individual care plans. Building on and enhancing the current workforce and the digital offer will enable this model and critically will **empower patients** and improve patient-clinician decision making.

The workforce benefits from diverse experience and skills, drawing from different clinical professions and backgrounds, using a **multidisciplinary approach** and consideration of **integrated** and **novel workforce solutions**, working with partners across the health and social care system to deliver. **Digital needs to serve both patients and clinicians** and given the **integrated approach** in North and Mid Hampshire, be **accessible** to all partners. Mindful of the success of the service to date, ensuring that the digital inclusivity needs of those who may not have access to technology are met through other routes.

Finally, to reach our ambition and **increase the scale of offer to our patients**, we will need to **open up new, and enhance existing referral routes**, ensuring patients at any point in their care pathway have access to virtual care where appropriate. All multidisciplinary staff referring to our VWs will have a clear understanding of the benefits and support they will offer, and clear referral pathways will be in place. This will enable us to **maximise care delivery for patients at home, improving patient experience and reducing demand** on acute in-patient beds and other health and social care providers.

HHFT Virtual Hub Team

Evaluation overview

The rapid evaluation used mixed-methods to capture both process and impact outcomes as well as the perspectives of staff and patients. Rapid evaluations are characterised as participatory, team based, iterative and lasting from a few weeks to a few months (McNall and Foster-Fishman, 2007). The original plan to conduct an intense four-week data collection phase for the qualitative data was extended for a further month due to delays to commencing interviews (25 April – 24 June 2022). The quantitative data collection period was 29 March 2021 to 12 June 2022 to ensure a sufficiently large sample size for analysis.

Wessex AHSN produced a proposal outlining evaluation questions and data collection activities (see **Appendix 3**). These questions align with NHS England's questions in their proposal and are addressed in the key findings section.

Quantitative data collection

Data definition

Step up - a patient who has been referred to a VW from an ED attendance, outpatient appointment, ePurple referral (where no inpatient spell identified), community or where an activity link has not been established, and where a patient receives a step up in care.
Step down - a patient referred to a VW from an inpatient admission, who received a step down in care.
EPurple referral- a HHFT internal electronic referral (with no associated inpatient spell).
Mortality- a death within 30 days of VW discharge.
Co-morbidity- the simultaneous presentation of two or more diseases, identified through ICD coding in hospital episodes.
Deprivation- outlines the English Indices of Deprivation deciles.
Readmission- a step down patient non-electively readmitted to hospital within 30 days of VW discharge to the division they were initially discharged from.
Subsequent admission- a step up patient non-electively admitted to hospital within 30 days of VW discharge.
Dominant VW spell- in instances of patient changing VW during their same VW spell, we outlined the 'dominant VW stay' by the VW with the longest LoS during the spell, excluding the lower LoS VW from the analysis.

Study design

An experimental design was employed in this evaluation study, allowing a comparison between the VWs, and a control group (non virtual ward). Retrospective quantitative data was available for extract from digital systems. However, it was not in a structured format and so a novel data methodology was undertaken as outlined below to analyse this data. This approach used EPR as the data source which identified LoS on VWs.

Step down patients were identified as patients admitted to a VW with an inpatient discharge in the 36 hours prior to VW admission. Step up patients were identified as patients with an ED attendance, outpatient appointment, ePurple referral, or free text of 'Community step up' in their EPR record or where no link could be identified. A hierarchy was established to prioritise inpatient spells when multiple instances of activity occurred.

HHFT has begun work on various other VWs and additional pathways, for example the acute diagnostic VWs and high intensity users, as well as direct referrals from paramedics, but they will be excluded for the purpose of this analysis due to the study period used. For this analysis data included: VW spells starting in the data collection period for referrals, and VW spells ending for LoS/readmissions and deaths to align the methodology to the bi-weekly NHSE VW situational report (sit-rep).

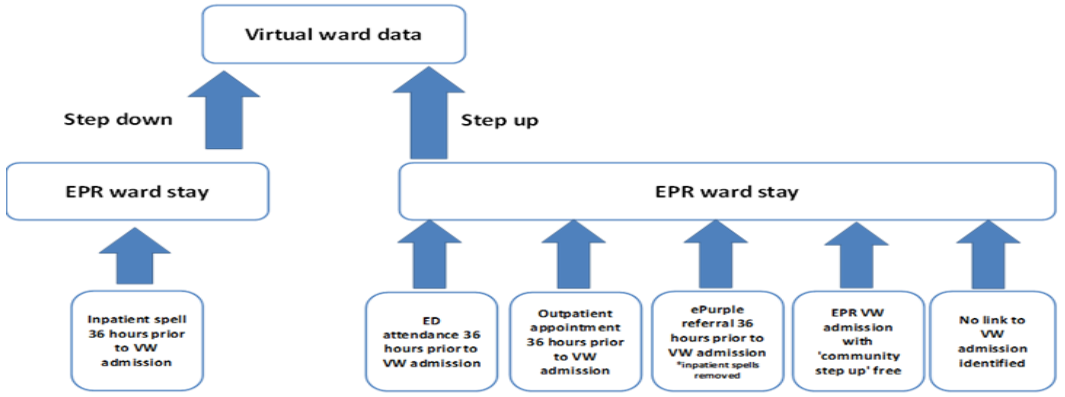


Figure 6: Data extraction methodology

Evaluation overview (cont.)

Qualitative data collection

Qualitative methods involved structured interviews with staff and patients or their carers (*n*=30) and one observation of an MDT frailty team meeting. Patient case profile information was collated for all patients admitted to the VWs over a four-week period (25 April – 22 May 2022). Wessex AHSN conducted 15 structured telephone interviews with VW patients/carers and 15 structured interviews (via telephone or MS Teams) with staff stakeholders:

VWs	Patient (*n*)	Carer (*n*)	Total (*n*)
Covid	5	2	7
Frailty	3	3	6
Ortho-Geriatric	0	1	1
COPD	0	1	1
Total	**8**	**7**	**15**

Table 3: Patient and carer interviews conducted

Staff Group	Interviews (*n*)
VHH staff	4
Referring consultants	6
Primary Care representatives	2
Voluntary service representative	1
Integrated Care Board (ICB) representatives	2
Total	**15**

Table 4: Staff interviews conducted

Interview guides were developed for patients and different staff groups (see **Appendix 4**). Each interview was audio recorded and a structured summary created. Key points in response to the questions addressed from each interview were extracted, paraphrased and collated into a Rapid Analysis Table – one for patients and one for staff.

Evaluation Time Frames (Original and Revised)		
	Original	Revised
Qualitative data collection	25 April - 20 May	6 May - 24 June
Patient case summary data collection	25 April - 22 May	25 April - 22 May
Data analysis and reporting	9 May– 30 May	27 May - 29 July
Interim report	N/A	1 July
Final draft report	1 July	1 August

Table 5: Rapid **e**valuation timescales

A frailty MDT was observed by two Wessex AHSN evaluators (via MS Teams) who introduced themselves at the start of the session then switched off their cameras/ microphones to observe. Observations were guided by a check list. The two evaluators met together immediately after the meeting to combine their observation notes.

The VHH administrator collected data on all VW inpatients admitted between 25 April – 22 May (*n*=110). Data collected included patient related demographic details (including protected characteristics), primary reason for referral, equipment provided, calls (number and length) made, LoS, onward referral and discharge.

Evaluation overview (cont.)

Participant recruitment

Patients were purposively sampled. VHH staff were provided with an invitation script and criteria on patient selection to aid the identification of suitable patients for interview via their routine calls to patients (e.g. a key distinguishing criteria was to ensure the cognitive ability of patients for interview over the phone). VHH staff gained patients' initial consent so that Wessex AHSN staff could contact them to schedule appointments.

The HHFT team supporting this rapid evaluation identified key staff informants for interview. These represented referring consultants, the VHH team, primary care, ICB, and the community or voluntary sector. Once they had asked if these staff were happy to be approached for interview, contact details were passed to the Wessex AHSN team who contacted staff individually to schedule an appointment.

A VHH team member identified a frailty MDT useful for observation, given the number of frailty patients on the VW ward. Wessex AHSN evaluators remotely joined a regular MDT meeting to observe staff interactions and decision-making.

Data Analysis

Qualitative data: Thematic analysis and the development of themes from the interviews used rapid qualitative analysis techniques. Transcripts were not used or coded. Interviews were structured which guided analysis. Summaries of key points were gathered by listening to the interview audio recording. Subsequently, these notes were further summarised and paraphrased into rapid analysis tables containing all relevant interview participant data for theme development (Vindrola-Padros and Johnson, 2020). A team-based approach was employed to analysis and defining themes. Patient case data produced descriptive statistics.

Compliance with Data Protection Act 2018

Services agreement in place between HHFT and Wessex AHSN

Participants' views will be anonymous in the findings and reports. All information obtained will be processed in accordance with the Data Protection Act (2018).

Ethical practice

Interviews for both patients and staff conformed to informed consent practice. Both received information sheets and completed informed consent electronically. For some patients informed consent was conducted over the phone and audio recorded. Those present at the MDT received information on the observation before the meeting and the verbal agreement of those present was taken before observation commenced. The MDT was not audio recorded due to the sensitive nature of the discussion and to ensure personal details of patients discussed were not collected.

Quantitative findings: Introduction

Quantitative summary

Demographic, outcome and impact data was obtained on 1,113 patients admitted to VWs. Data was extracted from the HHFT electronic patient record system for the period of 29 March 2021 to 12 June 2022. The quantitative phase of this evaluation sought to assess these elements over an extended period, to maximise sample size and improve the accuracy of the findings of the study. The data analysis answers the following questions:

Questions addressed

1. What are the patient profiles of those admitted to the VWs?
2. What are the key features of referral to the VWs?
3. What were the patient admission outcomes?
4. Does the VW impact on healthcare utilisation and what type?
5. Did the service deliver any cost savings ?

Quantitative key findings provide the following;

- A summary of demographics of patients accessing the VW service during the data collection period.
- Analysis and comparison of key aspects of patients' VW stay, combined with statistical analysis to determine impact of patient age.
- Analysis and audit of patient deaths within 30 days of VW discharge.
- Analysis and audit of patient non-elective re-admissions within 30 days of VW discharge.
- Overview of financial cost savings due to the impact of the VW programme.

For the following quantitative findings, the step up and step down Covid Recovery VWs are differentiated by Covid early supported discharge and Covid VW respectively.

Step down control group

- A control group was created by outlining the average inpatient LoS by Healthcare Resource Group (HRG) code over a 10 month period, to allow comparison against step down patients by HRG.
- However the average age in the control group was 44 vs 72 in the VW step down group, so the control group age was adjusted to be 2 +/- years of the VW group.
- This allowed a HRG and age matched comparison of 'expected inpatient LoS' vs actual inpatient LoS, to determine if VW availability had an impact.

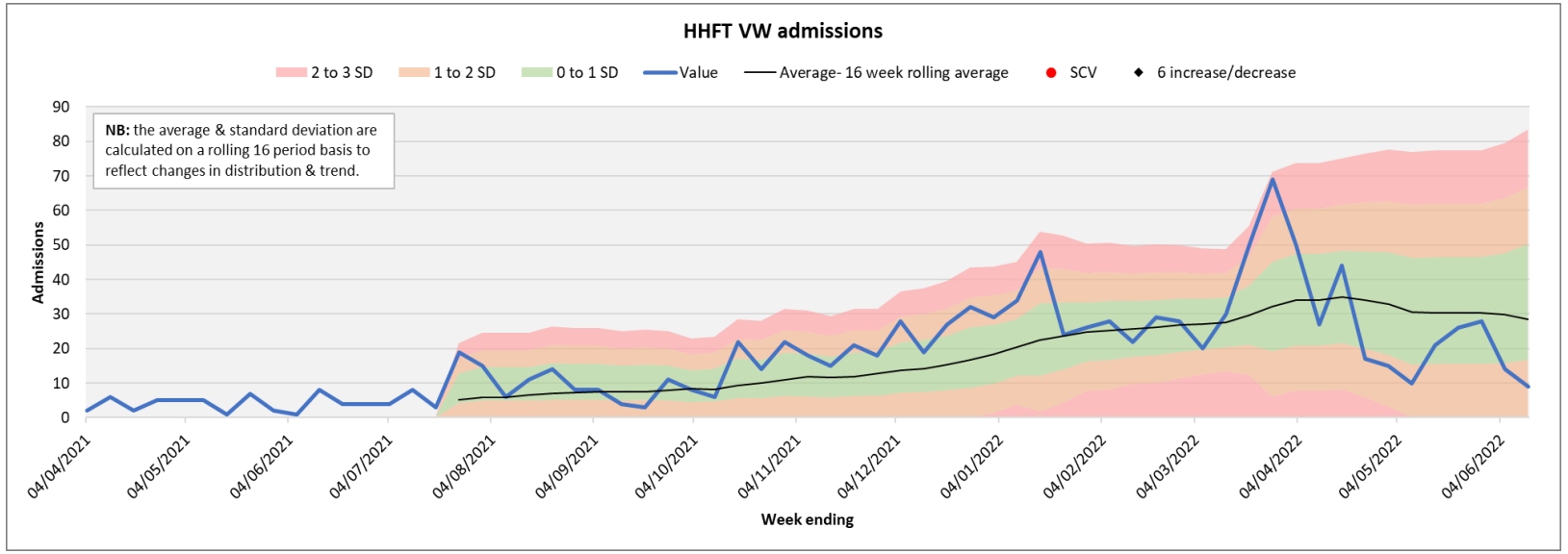
Step up control group/comparison

- A step up control group was developed with the question of 'if admitted to the hospital, what LoS could we expect'.
- To do this we determined the average non-elective LoS by month over the data period analysed.
- We then performed an age match to bring the average age of the control group to within 2 +/- years of the VW step up group.
- This average LoS is applied to the month of the step up patients discharge, to determine an 'expected inpatient LoS' if the patient was to be admitted.

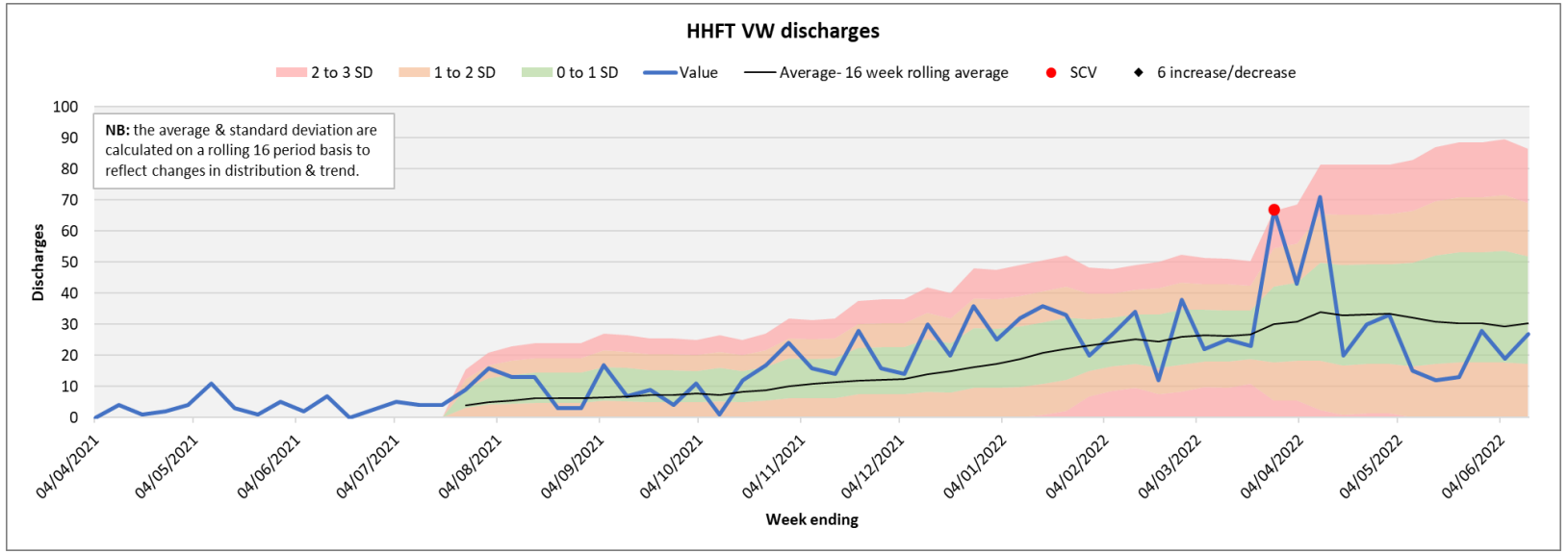
VW utilisation

Activity over time

- **Graph 1** and **Graph 2** demonstrate VW activity over the evaluation data period on a rolling 16 period average and standard deviation (SD). The advantage of this is it provides a dynamic understanding of week-to-week variation and the significance of fluctuation from average.
- **Graph 1** indicates the VW admissions, and shows a gradually rising trend from August 2021, which increased in speed from December 2021 up to April 22. This represented a spike in admissions which peaked in the week ending (w/e) 27 March 22 which coincided with a rise in Covid cases in the Trust and Covid VW admissions.
- There is a variance from the average admission rate between 2 to 3 SDs, which indicates the impact of Covid on virtual ward admissions.
- Following the above average increase, the admission rates drop gradually to below average.
- **Graph 2** indicates the VW discharges, and reflects the findings from **Graph 1**, with a gradual increase up to mid-April 22, which resulted in an instance of 'special cause variation' (SCV) with discharges exceeding three SDs from the average.
- This SCV is the knock-on effect of the rise in admissions caused by a rise in Covid-19.
- However, from this point there has been an incremental reduction in discharges, which has typically remained within 1 SD of the average.
- Discharges appear to show a greater level of week-to-week variation, with large fluctuations.



Graph 1: VW admissions Statistical Process Control (SPC) with rolling 16-week period average and SD

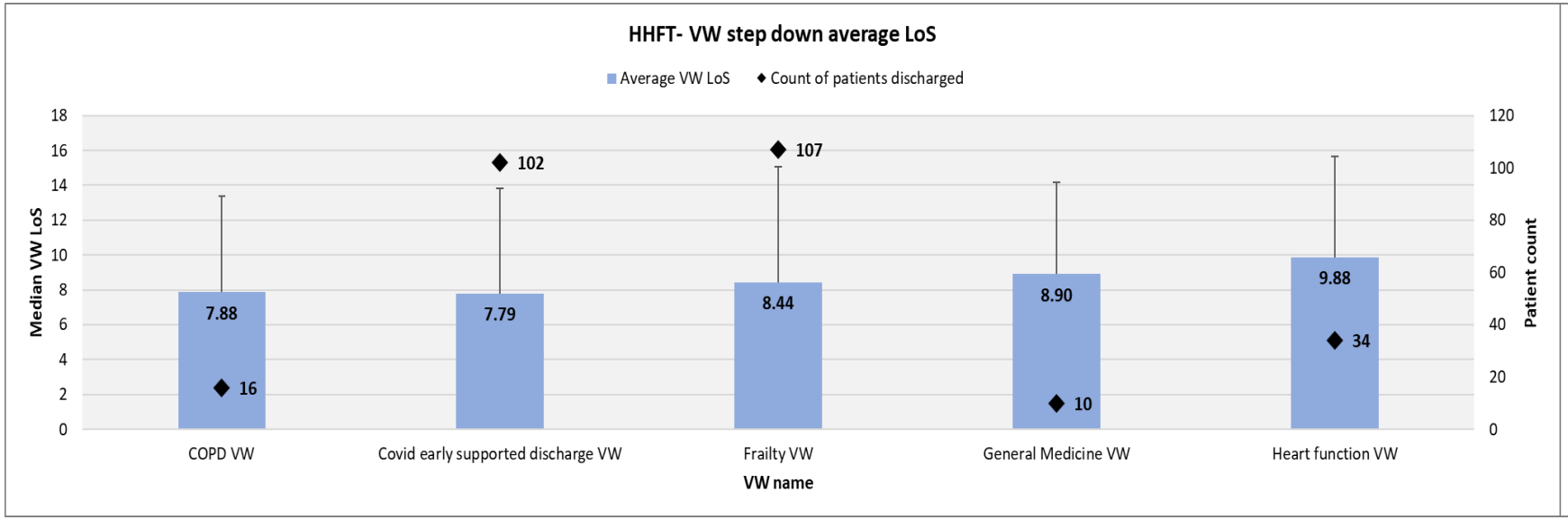


Graph 2: VW discharges SPC with rolling 16-week period average and SD

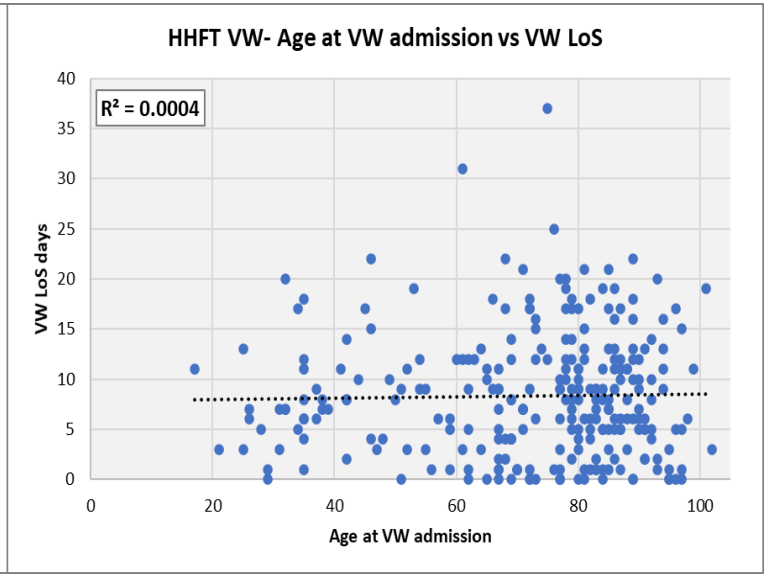
Length of stay for step down patients

Step down patients

- **Graph 3** below outlines the average VW LoS for step down patients discharged from a VW.
- Covid and Frailty, the groups with high patient numbers, have an average VW LoS of 7.79 and 8.44 days respectively
- These VWs also have a high level LoS variation.
- 49% of patients have a VW LoS lower than or equal to 7 days.
- 16% of patients have a VW LoS between 8 and 13 days.
- 35% of patients have a VW LoS greater than or equal to 14 days.
- There is no relationship between VW LoS and age at VW admission, with a correlation of *R= 0.0004* (**Graph 4**).



Graph 3: Average LoS in step down VW

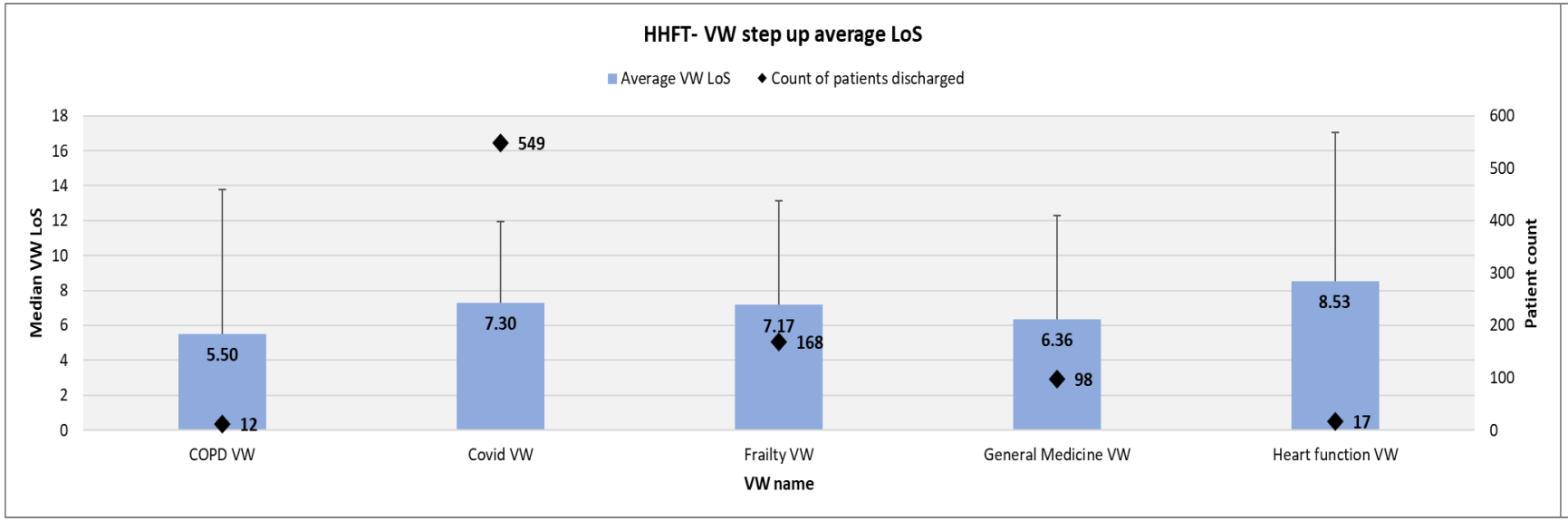


Graph 4: Step down - age at VW admissions vs VW LoS

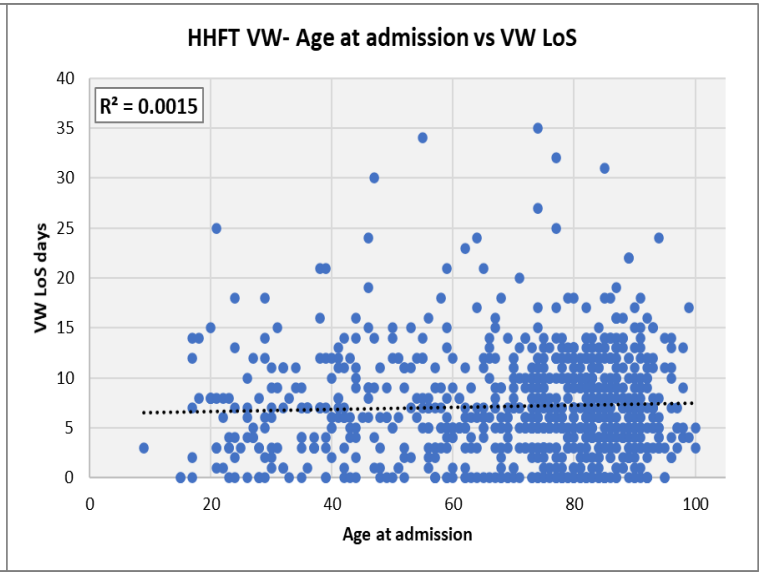
Length of stay for step up patients

Step up patients

- **Graph 5** outlines the average VW LoS for step up patients discharged from a VW.
- The average LoS shows little variation in the VWs with highest patient numbers - Covid, Frailty and General Medicine.
- Of these, Frailty shows the highest level of LoS variation.
- 59% of patients have a VW LoS lower than or equal to 7 days.
- 7% of patients have a VW LoS between 8 and 13 days.
- 34% of patients have a VW LoS greater than or equal to 14 days.
- There is no relationship between VW LoS and age at VW admission, with a correlation of *R= 0.0015* (**Graph 6**).



Graph 5: Average LoS in step up VW



Graph 6: Step up - age at VW admissions vs VW LoS

Readmissions – Step down patients

Step down readmission rate methodology

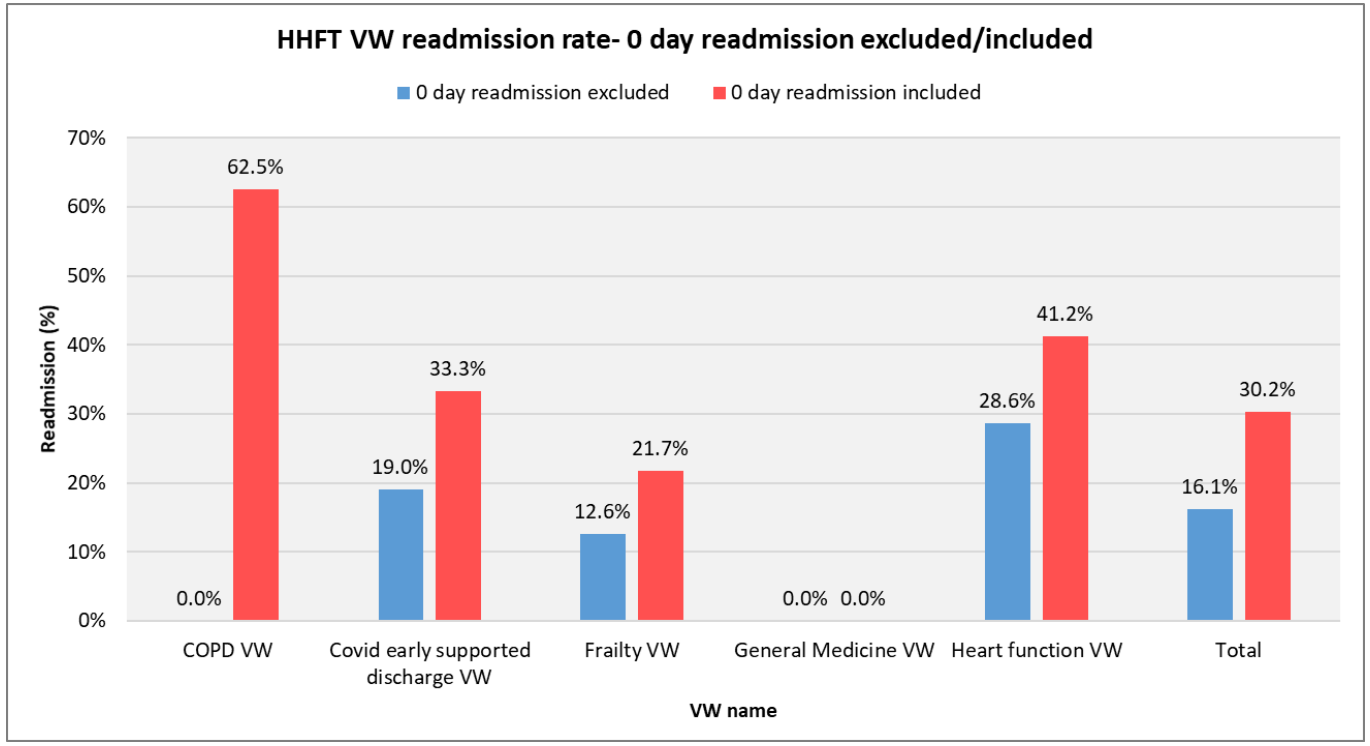
- **Graph 7** outlines the readmission rate by VW and total where 0 day readmission are included and excluded, demonstrating a large variance.
- This demonstrates a large reduction in readmission rate when 0 day readmissions are excluded.
- The current readmission methodology does not account for instances where patients care may be escalated back to the hospital, as the data is not obtainable. It is assumed that patients with a 0 day readmission are escalated or transferred into face-to-face care and therefore do not represent a readmission.
- Therefore, patients with a 0 day readmission for the study were excluded from the analysis, and an audit into this patient cohort will be conducted.

Step down readmission rate analysis

- **Graph 7** shows the total readmissions rate with 0 day readmissions excluded.
- This exclusion reduces the number of readmissions from 81 to 36, indicating a number of patients are 'readmitted' within 0 days of discharge.
- This demonstrates that the VW are safe and do not have an excess readmission rate whilst identifying possible deterioration early and referring to face-to-face services.
- There was a particular impact on the COPD VW pathway when excluding the 0 day readmissions, reducing the readmission rate from 62.5% to 0%, and readmitted patients from 10 to 0. This is likely to be at least in part due to the small sample size but the pathway is new and warrants further review.

Step down readmission- further information

- Readmission rate has been calculated as non-elective readmissions within 30 days of VW discharge to the division the patient was discharged from initially.
- Due to an absence of national VW readmission data, the national inpatient readmission data has been used as a comparator (NHS Digital, 2022a). This methodology focuses on 30-day readmissions from inpatient discharge, rather than VW discharge so is not a like for like comparison.

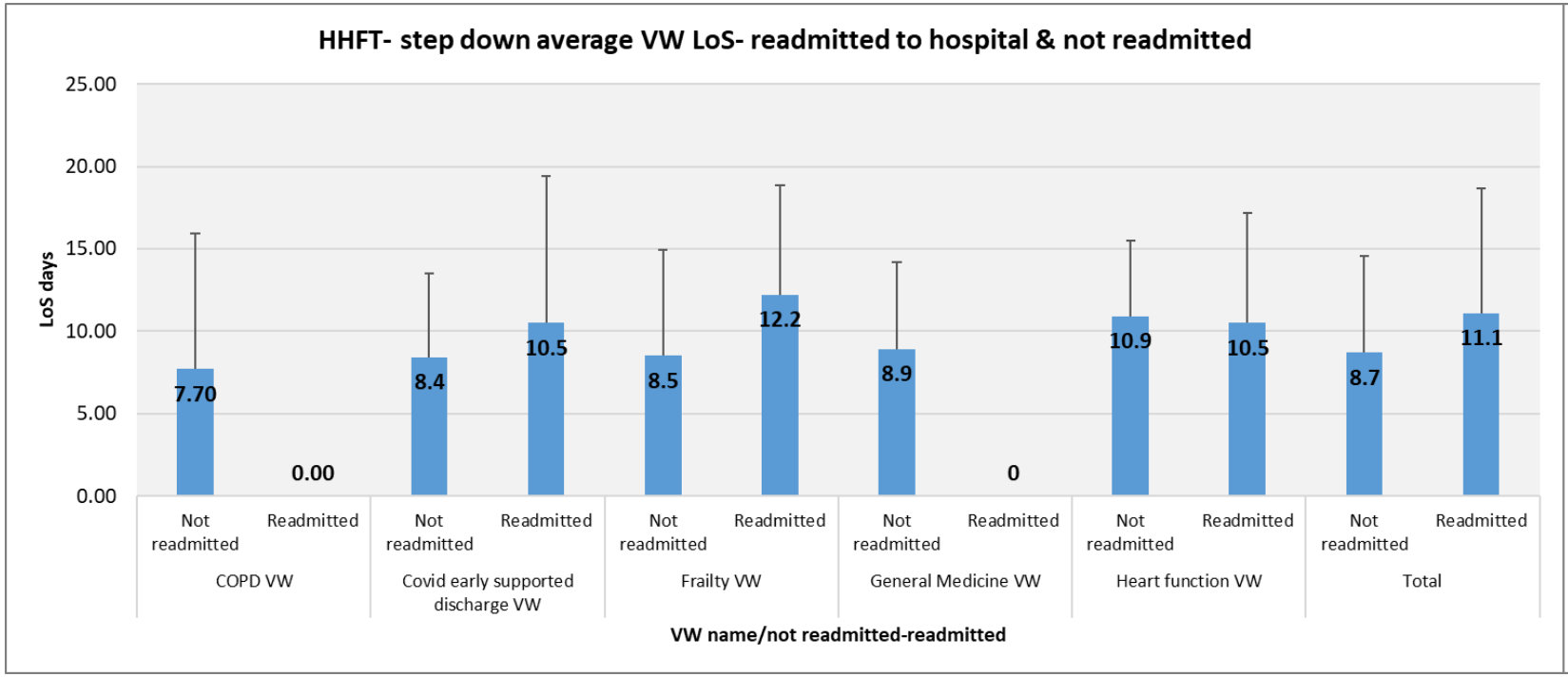


Graph 7: Step down readmission rate 0 day readmission excluded/included

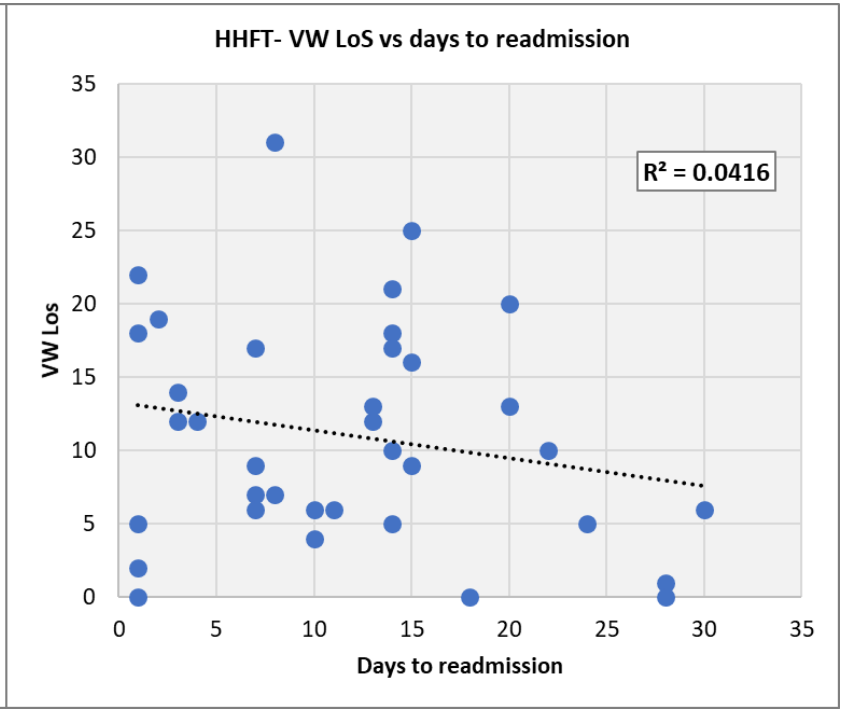
Readmissions – Step down patients

Step down patients

- **Graph 8** outlines the average VW LoS for step down patients who are non-electively readmitted to hospital within 30 days of VW discharge and those who are not readmitted to hospital.
- This demonstrates that patients who are non-electively readmitted, have a longer VW LoS than those who are not.
- A large proportion (91%) of patients admitted to VWs have one co-morbidity and 74% have multiple co-morbidities, which is highlighted as predictors of readmission in COPD and Heart failure (Bottle *et al*, 2018). Post evaluation, it is recommended that quality Improvement work is undertaken to understand the factors that influence readmission rates following VW discharge and determine whether this is a causal link.
- Overall, the step down non-elective readmission rate within 30 days is 16.1% with 0 day readmissions removed. Further work is needed to determine a more accurate readmission comparator, however published data outlined a HHFT readmission rate for over 75s of 19.8% for 20/21 (NHS Digital, 2020a).
- There is a no correlation between VW LoS and the days to non-elective readmission *R=0.0416* (**Graph 9**).



Graph 8: Average step down LoS for those readmitted and those not readmitted

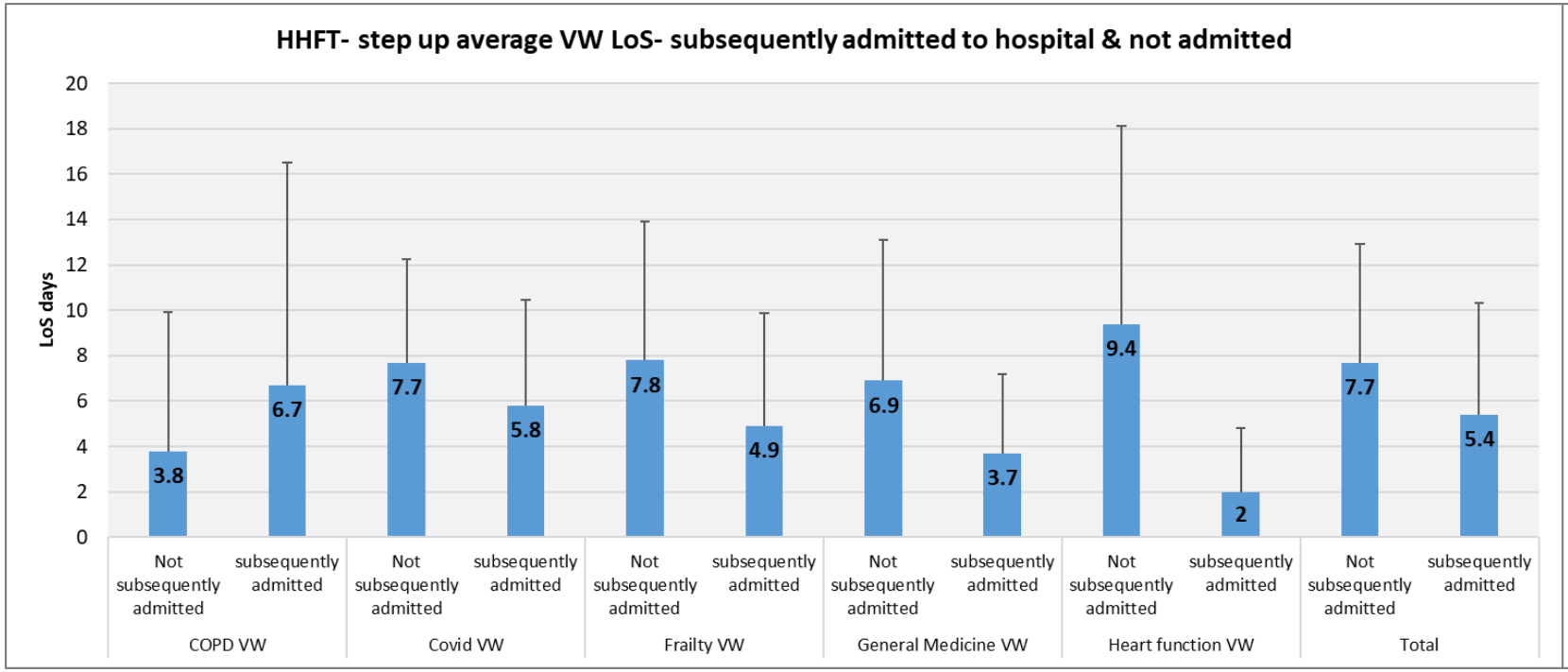


Graph 9: Step down VW LoS vs days to readmission

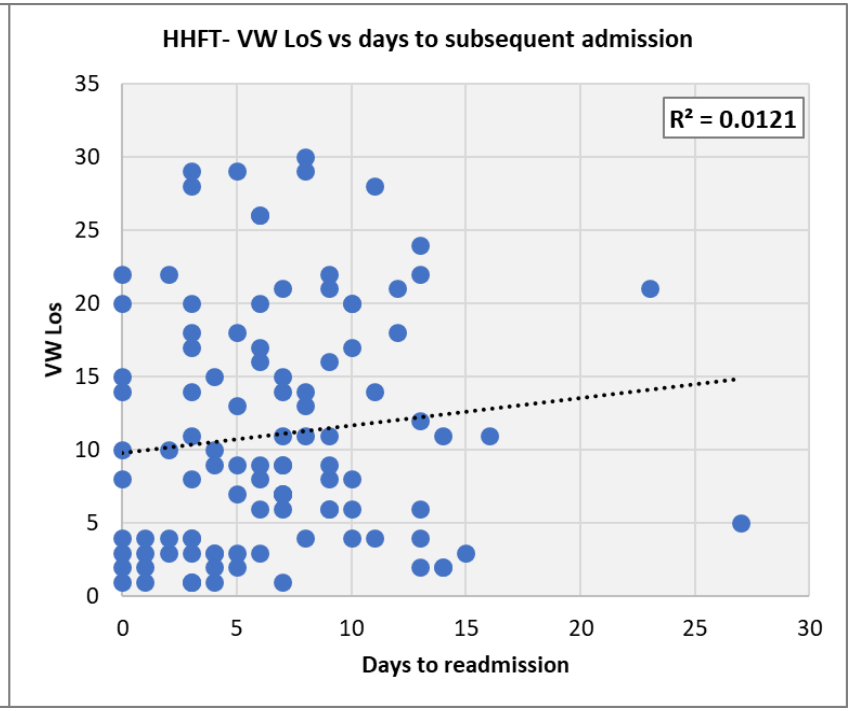
Subsequent admissions – Step up patients

Step up patients

- **Graph 10** outlines the average VW LoS for step up patients who were subsequently non-electively admitted to hospital within 30 days of VW discharge.
- This demonstrates that, with the exception of COPD, those who are subsequently admitted to hospital have a lower average VW LoS than those not.
- This is true across all VW groups, although COPD VW and Heart function VW may be skewed by low patient numbers.
- Post evaluation, it is recommended that quality Improvement work is undertaken to understand the factors that influence subsequent admission rates.
- There is a no correlation between VW LoS and the days to non-elective readmission *R=0.0121* (**Graph 11**).



Graph 10: Average step up LoS for those readmitted and those not readmitted



Graph 11: Step up VW LoS vs days to readmission

Access to virtual ward

Referral source

- In a retrospective data review, we successfully tracked 72% of patient VW admission referral sources.
- The majority of referrals come from in-patient wards, community and the ED.
- In the quantitative analysis 24.2% of referrals originate from inpatient activity, which is comparable to 23.6% reported in the qualitative study (slide 38).
- However the proportion of ED referrals in the quantitative review is less than those reported in the qualitative analysis 9.2% vs 16.4%, for more details refer to slide 38.
- The VWs are a new service and currently a consistent referral method from the community to the hospital-run VWs is not in place; as such, these referrals are not easily identifiable from routine data sources. For example, telephone calls and email are difficult to track.
- It is assumed that community referrals account for the majority of the 28.5% 'unknown' referrals, and there is some evidence for this given that there is no linked inpatient admission and that a significant proportion of unknowns are referred to Covid Recovery VW (a pathway that has been specifically set up in collaboration with primary care to support patients that may otherwise have been digitally excluded).
- The aim of the VWs is to move to a new monitoring platform, this will ensure traceable referrals from all referrers.

Referral source	COPD VW		Covid Recovery VW		Frailty VW		General Medicine VW		Heart function VW		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Emergency department	1	3.6%	36	5.5%	57	20.7%	5	4.6%	3	5.9%	**102**	9.2%
Inpatient	16	57.1%	102	15.7%	107	38.9%	10	9.3%	34	66.7%	**269**	24.2%
Outpatient	2	7.1%	57	8.8%	5	1.8%	17	15.7%	0	0.0%	**81**	7.3%
ePurple referral	2	7.1%	25	3.8%	34	12.4%	14	13.0%	7	13.7%	**82**	7.4%
Community	0	0.0%	262	40.2%	0	0.0%	0	0.0%	0	0.0%	**262**	23.5%
Unknown	7	25.0%	169	26.0%	72	26.2%	62	57.4%	7	13.7%	**317**	28.5%
Total	**28**	**100.0%**	**651**	**100.0%**	**275**	**100.0%**	**108**	**100%**	**51**	**100%**	**1,113**	**100.0%**

Table 6: VW admissions by VW type and referral source

Please note: Each VW has conditional formatting to show the highs as green and lows as yellow

Step down patients accessing service

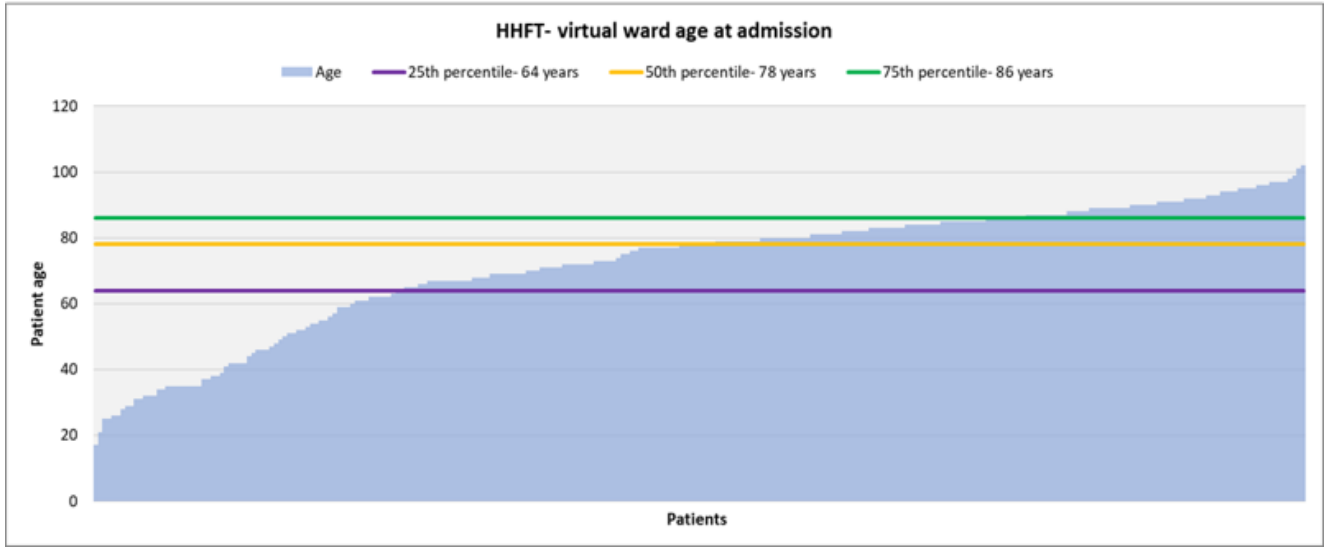
Step down patients

- There have been 269 step down patients admitted to HHFT's VWs, comprising 137 female and 132 male patients with a mean age of 72.0 ± 19.5 years (**Table 7**).
- The majority of these patients were admitted to the Frailty VW (67 female, 40 male mean age 85.2 ± 11.6 years) and Covid early supported discharge VW (44 female, 58 male, mean age 56.7 ± 19.3 years) (**Table 7**).
- Using this it is possible to determine that a significant proportion of patients admitted to a VW are above the Hampshire healthy life expectancy (HLE) of 67.6 for females and 68 for males (ONS, 2019 [online]).
- As a result, it is determined that 68.8% of patients in this cohort are not in 'very good' or 'good' health, which may impact LoS, treatment, discharge and readmission rates. This indicates that patients referred to VWs are more likely to have more complex health and social care requirements.
- **Graph 12**, further supports this, demonstrating a half of patients admitted were aged 78 years or above, and a quarter were aged 86 or above.
- On average there were 7 identified co-morbidities per step down patient.
- The average step down deprivation decile is 7.2 ± 2.39, with one indicating the most deprived 10% nationally and 10 the least deprived 10% nationally. This aligns with the deprivation of all inpatients from the same time period of 7.38 ± 2.36.
- 81% of step down patients were 'White British' which reflects the demographics of patients outlined on the HHFT patient centre system.
- A proportion of patients ethnicity were either 'Not known' (6.2%) or 'Not stated' (4.7%), which aligns with the HHFT patient centre system.
- A breakdown of patients by all national ethnicity category descriptions is shown on slide 30.

Age & gender by virtual ward

	COPD virtual ward	Covid early supported discharge virtual ward	Frailty virtual ward	General medicine	Heart function virtual ward	Total
Admissions	16	102	107	10	34	269
Mean age	69.4	56.7	85.2	61.3	81.2	72.0
SD +/-	19.2	19.3	11.6	29.0	16.3	19.5
Female	12	44	67	0	14	137
Male	4	58	40	10	20	132

Table 7: Step down average age and gender by VW



Graph 12: Step down age at VW admission

Step up patients accessing service

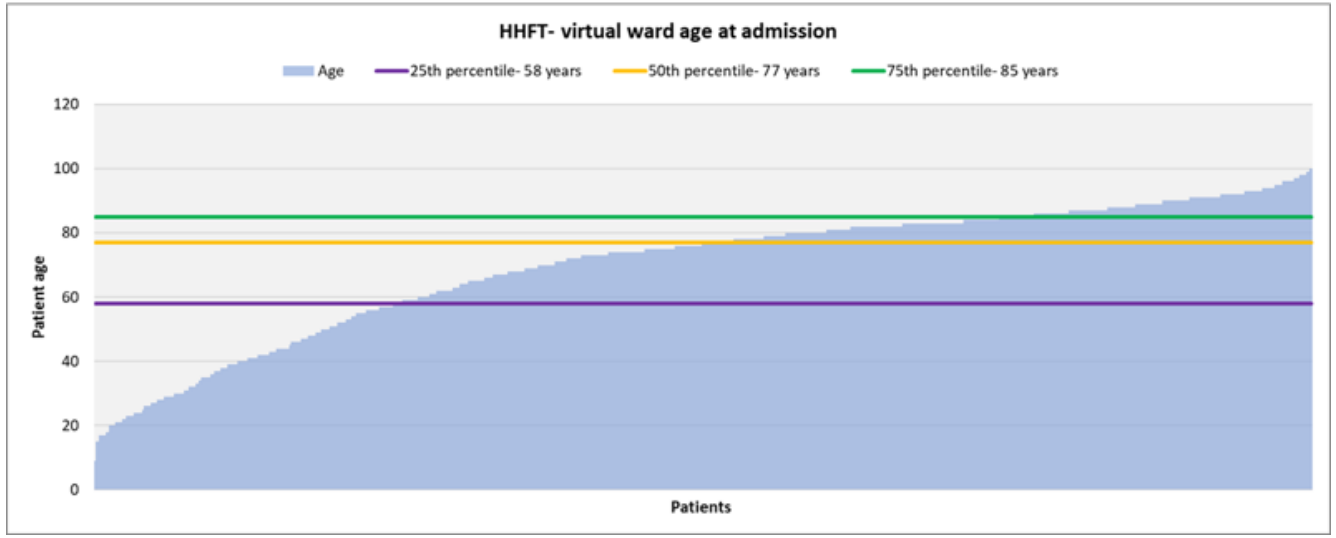
Step up patients

- There have been 844 step up patients admitted to HHFT's VW, comprising 483 female and 361 male patients with a mean age of 69.9 ± 20.4 years (**Table 8**).
- The majority of these patients were admitted to the Covid VW (298 female, 251 male, mean age 68.4 ± 19.6 years) and Frailty VW (108 female, 60 male, mean age 85.1 ± 6.8 years) (**Table 8**).
- Using this it is possible to determine that a significant proportion of patients admitted to a VW are above the Hampshire healthy life expectancy (HLE) of 67.6 for females and 68 for males (ONS, 2019 [online]).
- As a result, we can determine 66.1% of patients in this cohort are not in 'very good' or 'good' health, which may impact LoS, treatment, discharge and readmission rates. This indicates that patients referred to VWs are more likely to have more complex health and social care requirements..
- This is further evidenced by the **Graph 13**, which demonstrates a half of patients admitted were aged 78 years or above, and a quarter were aged 86 or above.
- On average there were 5 identified co-morbidities per step up patient.
- The average step up deprivation decile is 7.8 ± 2.56, with 1 indicating the most deprived 10% nationally and 10 the least deprived 10% nationally.
- 81.5% of step up patients were 'White British' which reflects the demographics of patients outlined on the HHFT patient centre system.
- A proportion of patients ethnicity were either 'Not known' (6.7%) or 'Not stated' (4.1%), which aligns with the HHFT patient centre system.
- A breakdown of patients by all national ethnicity category descriptions is shown on slide 30.

Age & gender by virtual ward

	COPD virtual ward	Covid	Frailty virtual ward	General medicine	Heart function virtual ward	Total
Admissions	12	549	168	98	17	844
Mean age	56.2	68.4	85.1	51.6	80.0	69.9
SD +/-	22.2	19.6	6.8	22.1	11.7	20.4
Female	8	298	108	60	9	483
Male	4	251	60	38	8	361

Table 8: Step up average age and gender by VW

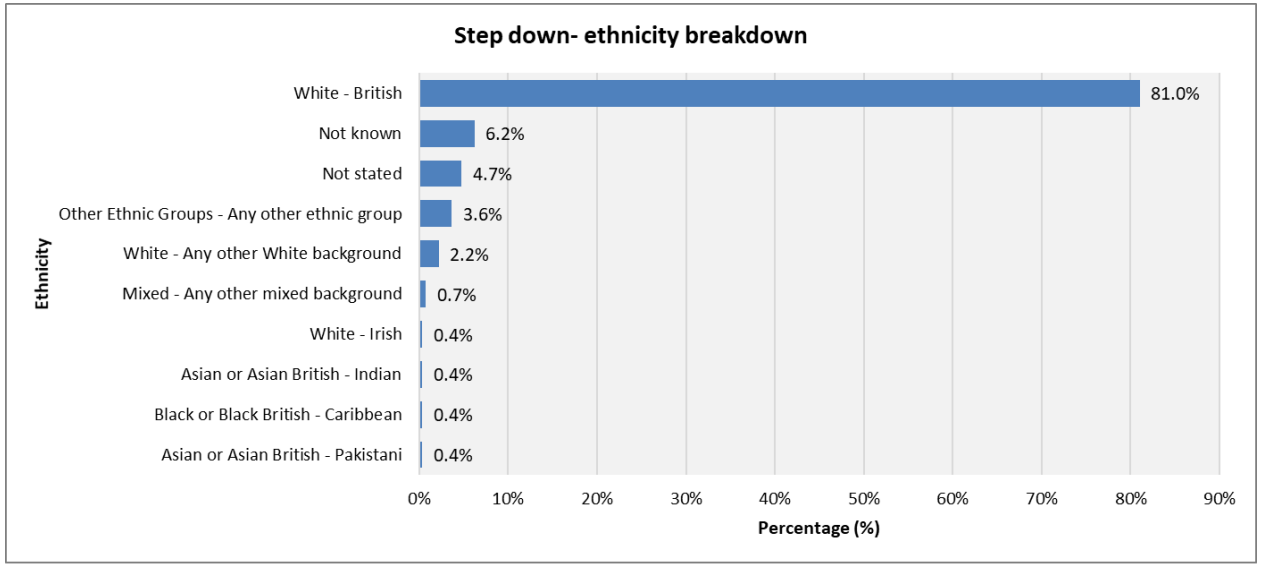


Graph 13: Step up age at VW admission

Ethnicity breakdown - patients accessing service

Step down patients

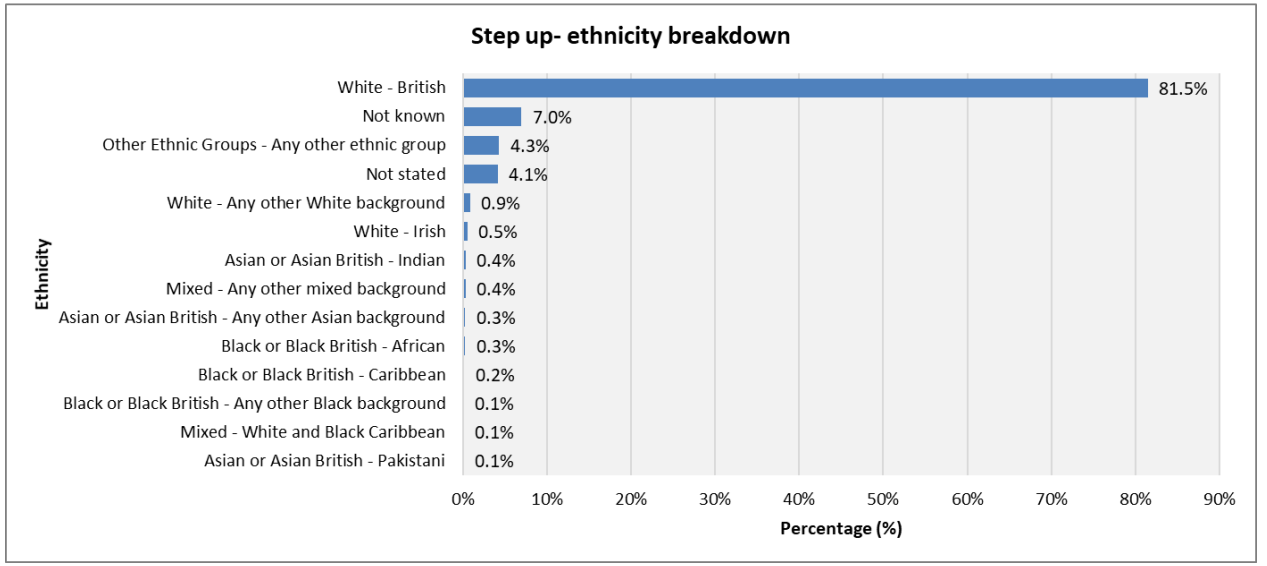
- **Graph 14** outlines the step down patient ethnicity proportions.
- Most patients are 'White British' comprising 81% of step down VW admissions.
- There has been a small number of ethnic minorities admitted with step down care, with the group with the largest proportion being 'Other Ethnic groups' with 3.6%.
- Overall, 8% of patients are from ethnic groups other than 'White British'.
- This breakdown aligns with the HHFT demographics for all patients recorded on the patient centre system.



Graph 14: Step down ethnicity breakdown

Step up patients

- **Graph 15** outlines the step up patient ethnicity proportions.
- The majority of patients are 'White British' comprising 81.5% of step up VW admissions.
- There has been a small number of ethnic minorities admitted with step down care, with the group with the largest proportion being 'Other Ethnic groups' with 4.3%.
- Overall, 7.4% of patients are from ethnic groups other than 'White British'.
- This breakdown aligns with the HHFT demographics for all patients recorded on the patient centre system.

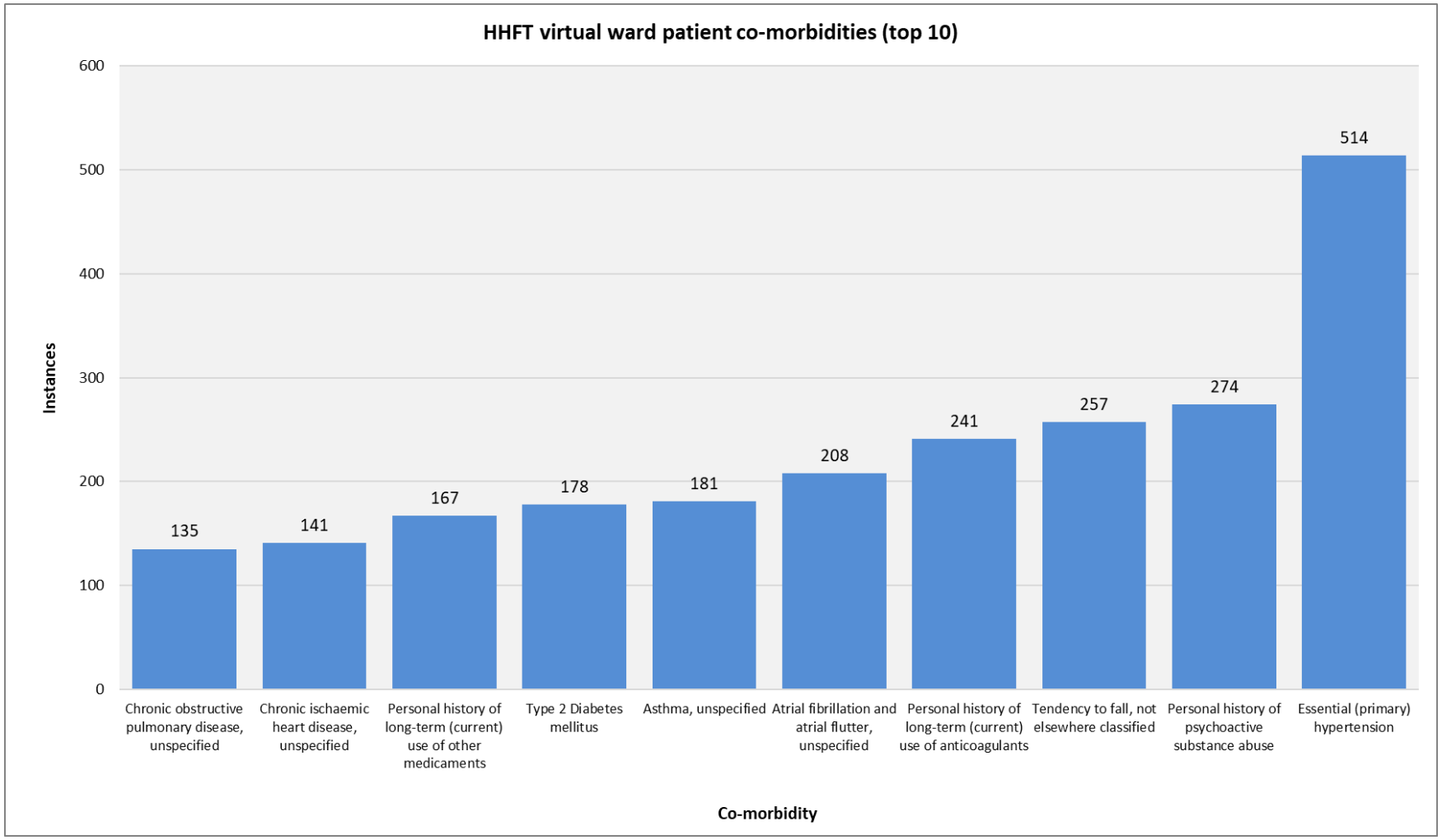


Graph 15: Step up ethnicity breakdown

Co-morbidities of patients

Patient co-morbidities

- A total of 1,070 patients were admitted to a VW in the data collection period, resulting in 1,113 VW patient spells.
- 267 (25%) of patients had no co-morbidity identified.
- Meanwhile 803 (75%) patients have at least 1 identifiable co-morbidity.
- Furthermore 34.8% of patient have 5 or more co-morbidities, and 10.8% have over 10.
- The top 5 co-morbidities are:
  > Essential hypertension
  > Personal history of substance abuse (includes alcohol, drug and tobacco)
  > Tendency to fall
  > Long term use of anticoagulants
  > Atrial Fibrillation.
- Hypertension, personal history of substance abuse and long-term use of anticoagulants are among the most common co-morbidities of all inpatients over the evaluation period, therefore these findings align.



Graph 16: Patient co-morbidities

Patient safety

Patient deaths/mortality

- There have been 22 deaths within 30 days of VW discharge from the 1,113 patients between 29 March 2021 to 12 June 2022, giving a mortality rate of 2.0%.
- The latest 'Summary Hospital-level Mortality Indicator' (SHMI) publication for Feb 2021 to Jan 2022 (NHS Digital, 2020b) outlines HHFT as having a mortality rate of 2.8% within 30 days of inpatient discharge.
- This is lower than the expected for HHFT which is 3.2% (which takes into patient characteristics) and places HHFT VW in the best banding nationally as well as lower than the national rate of 3%.
- Given the demographics of the VW cohort and the number of co-morbidities they have, it was expected that the VW mortality rate would be higher than the HHFT actual of 2.8%; however, this is not the case.
- By applying the HHFT expected deaths rate of 3.2% to the VW cohort, it would have been reasonable to anticipate 36 deaths in the VW patient group, 63.6% more than actually occurred.

Patient information

- Patient deaths were from the following patient cohorts: 8 Frailty, 7 Covid, 3 Heart function, 3 COPD and 1 General Medicine. (**Table 9**).
- A clinical review of the patient medical records for all 22 patients was undertaken. For all 22 patients, their death was found to be unrelated to the primary admission diagnosis to the VW. In many cases there were separate but co-existing clinical conditions, and a significant proportion of patients were under the care of the palliative care team suggesting a possible benefit to patients that through early supported discharges, the VW had enabled patients to die at home rather than in a hospital bed.
- An example of such a case, was a patient referred on the COPD step down pathway who had co-existing cancer diagnosis and following their discharge from the VW was admitted to the hospice for end-of-life care. The VW team are exploring an integrated virtual and face-to-face pathway for palliative care to support the needs of such patients.
- Of the 5 patients with a VW LoS of 0 days, 2 were in end-of-life care, 1 was reviewed by the VW team and sent to ED, 1 had no VW contact and 1 cannot be determined based on information in clinical notes.

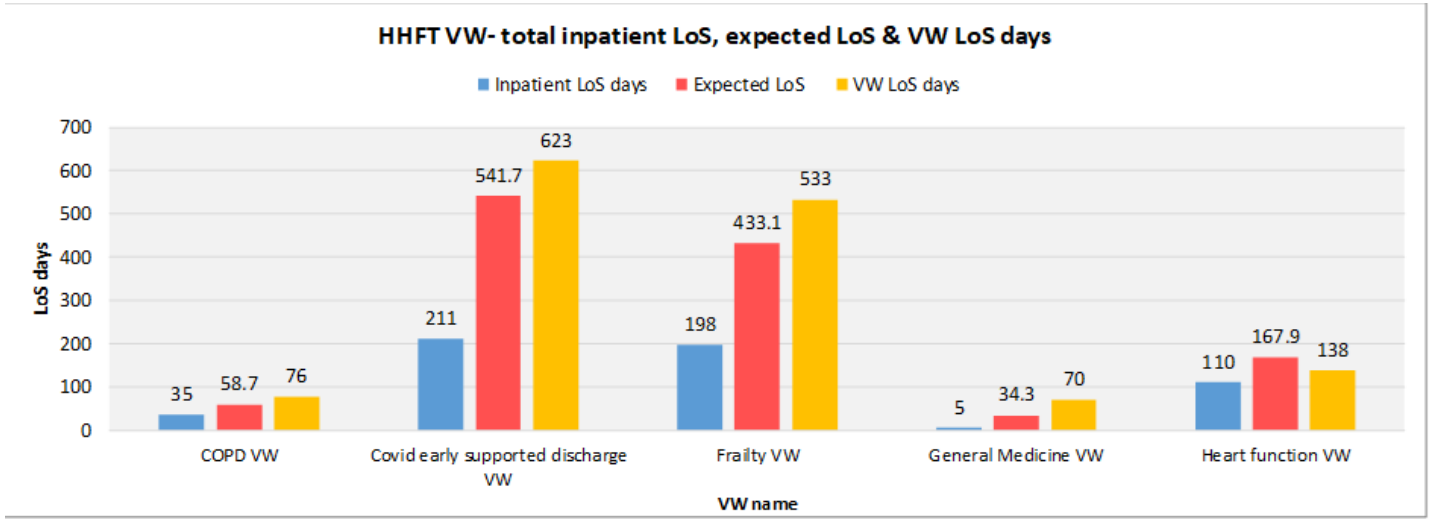
Age group	Referral source	Virtual ward	VW LoS days	Days from VW discharge to death
40 to 49	OP	Covid Recovery VW	1	16
50 to 59	IP	Covid Recovery VW	5	27
60 to 69	IP	Covid Recovery VW	0	23
60 to 69	OP	General Medicine VW	5	23
70 to 79	IP	COPD VW	16	3
70 to 79	IP	COPD VW	9	4
70 to 79	IP	Covid Recovery VW	7	1
70 to 79	OP	Covid Recovery VW	2	2
70 to 79	IP	Frailty VW	0	7
70 to 79	IP	Heart function VW	5	19
70 to 79	IP	Heart function VW	20	21
80+	IP	COPD VW	2	21
80+	NULL	Covid Recovery VW	8	25
80+	Community	Covid Recovery VW	0	19
80+	NULL	Frailty VW	0	20
80+	IP	Frailty VW	0	22
80+	ePurple	Frailty VW	4	2
80+	IP	Frailty VW	6	17
80+	IP	Frailty VW	16	20
80+	IP	Frailty VW	17	14
80+	ED	Frailty VW	1	30
80+	IP	Heart function VW	14	16

Table 9: Patient deaths breakdown

Impact of our VWs on acute care bed usage

Step down bed impact

- Using the age matched, HRG as a control group, it has been determined that a minimum of 676 bed days were saved as a result of step down VW between 29th March 2021 and 12th June 2022.
- This figure has been independently validated by an internal clinical audit of the Frailty VW, which identified savings of 267 bed days (4.3 days saved per patient), which closely aligns with the 235 bed days saved (3.8 days saved per patient) for frailty outlined by the evaluation methodology.
- A subgroup of this step down group had an inpatient LoS longer than 'expected' prior to a VW referral. Whilst it is clear the VW had no adverse impact on LoS, it is also not possible to determine any beneficial impact and bed days saved using the HRG methodology. However, it is reasonable to expect they will benefit to the same extent as the larger step down group analysed because they are at risk of long inpatient LoS due to more complex care conditions. A review will be undertaken to understand the patient characteristics of this sub-group followed by a clinical audit to assess the bed days saving.
- The sample size of the HRG control group was 182 patients (**Table 10**). The average LoS saving per patient across all VWs, is calculated to be 3.7 days.
- Covid VW and Frailty VW demonstrated the largest benefit, with total bed day savings of 331 and 235 bed days respectively (**Graph 17**). It should be noted that these VW had the highest number of admissions.
- Minor savings were also identified in COPD , General Medicine and Heart function (**Graph 17**).
- 57% of patients in this cohort are aged 70+, which is above the Hampshire Healthy life expectancy of 68 (**Table 10**).



Graph 17: Step down wards and HRG control group

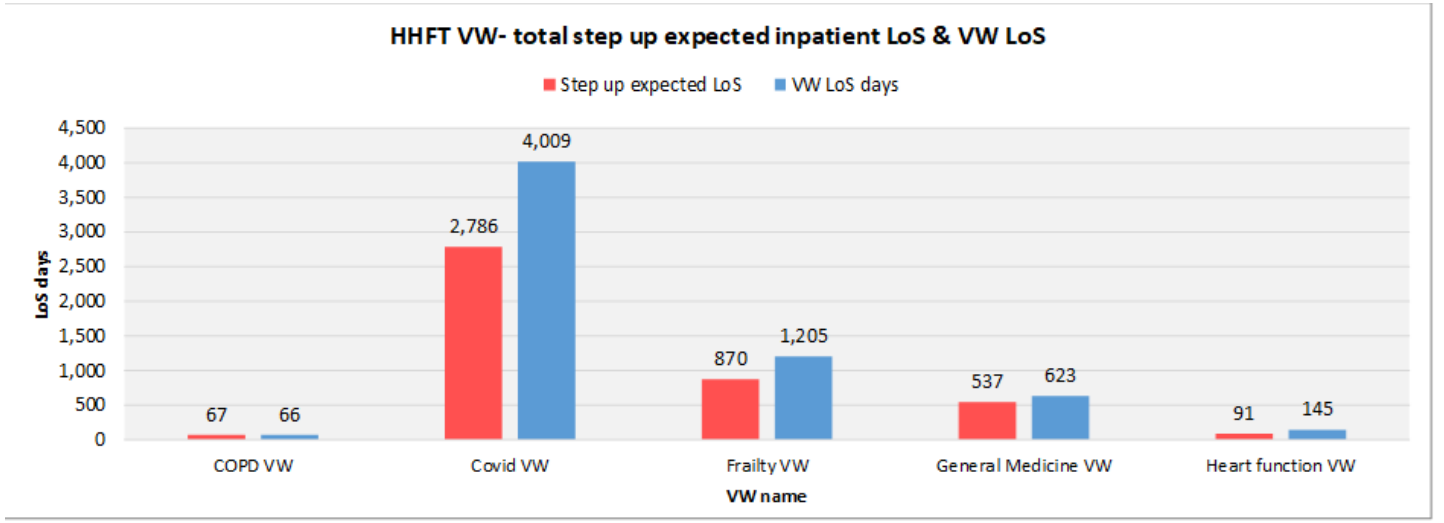
Age group	COPD VW	Covid early supported discharge VW	Frailty VW	General Medicine VW	Heart function VW	Total
0 to 9	0	0	0	0	0	**0**
10 to 19	0	1	0	0	0	**1**
20 to 29	0	7	0	1	0	**8**
30 to 39	0	16	0	1	0	**17**
40 to 49	0	12	0	0	0	**12**
50 to 59	1	8	0	1	0	**10**
60 to 69	6	17	5	1	1	**30**
70 to 79	1	16	10	2	2	**31**
80+	2	8	47	2	14	**73**
Total	**10**	**85**	**62**	**8**	**17**	**182**

Table 10: Step down patients age with HRG control group

Impact of our VWs on acute care bed usage (cont.)

Step up bed impact

- Using the age matched NEL inpatient spell as a control group, it is estimated that 4,351 bed days have been saved because of step up VW utilisation.
- Therefore, it is estimated that each patient would have an inpatient LoS of 5.2 days, if not for the step up VW.
- As shown by **Graph 18**, the biggest savings come from Covid VW 2,786 bed days saved at 5 days per patient, and Frailty VW with 870 bed days saved with an average of 5.2 days per patient.
- Minor savings are also identified for Heart function and General Medicine but are limited by low patient numbers.
- COPD VW displayed 67 bed day savings, which exceeded their VW LoS.
- 63.6% of patients in this cohort are aged 70+, which is above the Hampshire Healthy life expectancy of 68 (**Table 11**).



Graph 18: Step up wards and HRG control group

Age group	COPD VW	Covid VW	Frailty VW	General Medicine VW	Heart function VW	Total
0 to 9	1	0	0	0	0	**1**
10 to 19	1	4	0	4	0	**9**
20 to 29	0	27	0	18	0	**45**
30 to 39	0	30	0	14	0	**44**
40 to 49	0	46	0	12	0	**58**
50 to 59	2	50	0	13	2	**67**
60 to 69	5	64	1	12	1	**83**
70 to 79	3	121	32	12	4	**172**
80+	0	207	135	13	10	**365**
Total	**12**	**549**	**168**	**98**	**17**	**844**

Table 11: Step up patients age with HRG control group

Impact of our VWs on acute care bed usage (cont.)

Methodology of saving calculation

Key information

- Average daily cost of an inpatient bed over the 2020/21 year was £333.81 per day. The assumption of cost is based on local in-house calculations.

Step down

- Multiply the difference between the expected inpatient LoS (control group) and inpatient LoS by the daily inpatient bed cost.
- *Hypothetical* example for illustrative purpose:
    - expected stay = 100 days
    - actual stay = 90 days
    - daily bed cost = £333.81
    - £3,338.10 cost saving ((100-90)*£333.81)

Step up

- Multiply the expected non-elective inpatient LoS (control group) by the daily inpatient bed cost
- *Hypothetical* example for illustrative purpose:
    - expected inpatient stay = 10 days
    - daily bed cost = £333.81
    - £3,338.10 cost saving (10*£333.81)

- Step up savings are split to demonstrate the savings for patients who were subsequently admitted to the hospital non-electively within 30 days, and those not admitted.
- This demonstrates the cost savings which completely avoided a non-elective admission in the 30 days from VW discharge.

Impact of our VWs on acute care bed usage and associated savings

Cost savings

- There is an overall estimated VW cost saving of £1,678,297 seen over the quantitative data period of 29 March 21 to 12 June 2022.
- This is split by a cost saving of £225,889 for step down and £1,452,407 for step up.
- The step up benefit is comprised of £1,131,616 for those who avoid non-elective hospital admission in the 30 days post VW discharge and £320,791 savings for patients who are non-electively admitted in the 30 days following VW discharge.
- The VW of greatest cost saving is Covid VW, with benefits of £1,040,386 seen across step down and up patients.
- The overall estimated VW cost savings of £1,678,297 demonstrates the sustainability of the service in relation to workforce costs (slide 14).

	Step down saving				Step up saving				
	Inpatient LoS	Expected Inpatient LoS	Difference	Saving	VW LoS- not subsequently admitted	Saving (£)	VW LoS- subsequently admitted	Saving (£)	Total saving (£)
COPD VW	35	59	23.7	£7,911	30	£10,014	37	£12,351	£30,277
Covid Recovery VW	211	542	330.7	£110,391	2,173	£725,369	613	£204,626	£1,040,386
Frailty VW	198	433	235.1	£78,479	666	£222,317	204	£68,097	£368,893
General Medicine VW	5	34	29.3	£9,781	441	£147,210	96	£32,046	£189,037
Heart function VW	110	168	57.9	£19,328	80	£26,705	11	£3,672	£49,704
Total	**559**	**1,235.7**	**676.7**	**£225,889**	**3,390**	**£1,131,616**	**961**	**£320,791**	**£1,678,297**

Table 12: VW cost saving benefits

Qualitative findings: Introduction

The qualitative data collection provided an opportunity to gain an insight into the experience of VW patients, VHH staff and other important stakeholders such as referring consultants, primary care and other community support staff. The rapid evaluation sought to provide a snapshot in time of the current status and development of HHFT's VW programme. This included case data collection for all patients admitted to the VWs over a **four-week period** (25 April - 22 May 2022). The HHFT VW programme commenced in April 2021 and gradually increased capacity from less than 10 to 40-50 patients a day with a spike of admissions in April 2022, dropping to under 30 as a rolling daily average in May 2022. Qualitative data collection provides a snapshot of a subset of patients admitted and discharged between 25 April and 22 May 2022.

This qualitative rapid evaluation was conducted to broaden the original NHSE evaluation brief by obtaining insights into the experience of staff and patients and gain an understanding of implementation facilitators or barriers (Further detail on questions, metric and data collection source is provided at **Appendix 3**). See box for the principal questions covered by these qualitative findings. The following presents first the case profile findings followed by six themes as a result of rapid synthesis of patient and staff interviews, and the MDT observation (see **Appendix 5** for theme development). **Figure 7** provides an overview.

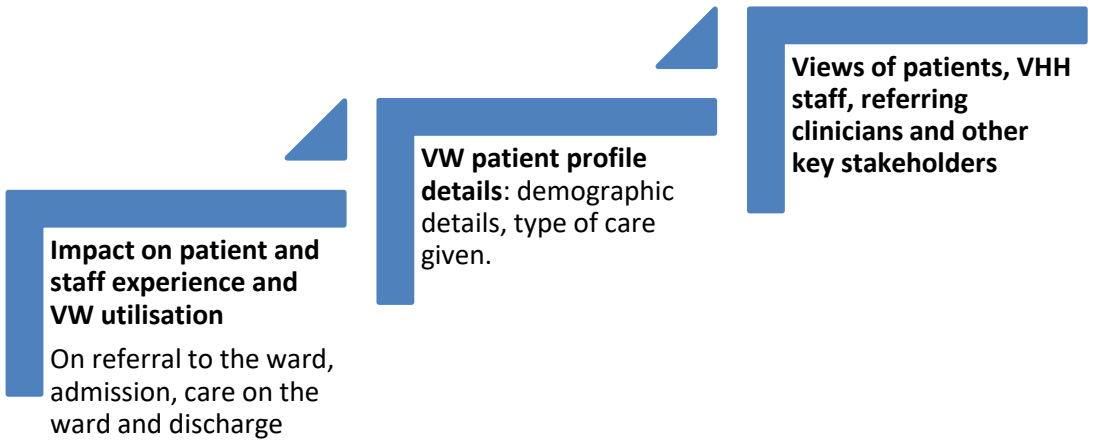


Figure 7. Types of data collected

Questions addressed

1. What are the patient profiles of those admitted to the VWs?
2. What are the key features of referral to the VWs?
3. What were the patient admission outcomes?
4. What is the patient experience of their transfer to the VW and subsequent discharge?
5. What is the carer (relative) experience (where relevant) of supporting the patient on the VW?
6. What is the experience of the VHH staff?
7. Does the VW impact on healthcare utilisation and what type? (e.g. number of referrals and type, admission and readmission rates, LoS on the VW, face to face visits required and calls to primary care, number of calls to patients and time spent with patients)
8. What factors are essential to make the VW model effective?
9. What operational and system barriers impacted on the delivery of the VWs?
10. What aspects of the current HFFT VW model could be enhanced to improve patient care and service delivery?

The following provides a summary of information gathered on all patients for the four-week data collection period and the themes drawn from the analysis of the interview and multi-disciplinary team observation data.

This work was undertaken by Wessex AHSN on behalf of the HHFT VW programme team.

Patient case profiles

Key characteristics of patients and details of their care on the VWs from referral, to admission then discharge and onward referral were gathered during the four-week data collection period (full findings are available in **Appendix 6**). Data was collected on all 110 (100%) patients admitted during this time period. VHH also provide the local care home Telemedicine service, however, no details were collected on these interactions (see slide 12 for more information on the VHH model).

Patient specific details

These 110 patients are a subset of data analysed for the period 29 March 2021 to 12 June 2022 (slide 20). Data gathered on gender, age, ethnicity and religion for this subset matched the larger dataset provided in slides 27-29. Patients were representative and typical for this region with a majority ethnically White British. Two VWs, Covid Recovery *(n*=51) and Frailty *(n*=48), had most patients during this period and therefore more women and a mean older age of 77 years, typical for these ward types. Other key patient characteristics are in **Table 13**.

Referral to VHH and admission details

There were 31 step up patients (from primary care) and 79 step down (from acute care). Primary reasons for referral were recovering from Covid *(n*=50), of which 29 were step up. Another common reason was risk of falls (*n*=17), which were mainly step down patients *(n*=16). However, 43 other referral reasons to the VW were reported. Of these, 27 required monitoring of the patient whilst on the VW (all step down) for a wide variety of reasons, indicating a key function of the VW. These reasons vary from monitoring antibiotic treatment and infections, social needs, medication side effects and mobility plans. Of the remaining 16 patients, example referral reasons included anxiety, chest infection and carer unable to cope with the caring demand.

Characteristic	Key results
Disability	38 recorded with disability, 27 with hearing or mobility issues, 8 with mental health issues and 3 with stamina or breathing difficulties. No correlation was found between mental health or hearing difficulties and LoS or consultation length.
Mobility	52 patients were independent, 31 used a walking frame, 19 used a walking stick or crutches. Data missing for 8 patients.
Rockwood score for frailty[a]	48 patients with frailty and a mean score of 5 (range from 4 to 7), 25 patients had a score of 5 or 6 (mildly to moderately frail). Frailty patients in care homes, in comparison, tend to have Rockwood scores above 7, so severe frailty.
Palliative care	2 patients
Living circumstances	54 lived with a partner and family, 32 lived alone and 12 with professional carers. Of these, 3 lived in a care home and 1 received supported living, 101 owned their own home and 4 lived with relatives (1 place of residence blank).

[a] Moorhouse and Rockwood (2012)

Table 13: Patient characteristics

Step down referrals came from a wide range of wards and departments. There were 18 direct referrals from emergency care and 15 from acute care of the elderly and 7 from acute medicine. Between 1 and 4 patients were referred from 1 of 22 other wards in acute care. This indicates a spread of referral from the acute sector, but numbers are low. This may increase with referral confidence (see Theme 4).

The majority of step up patients were referred by Covid Oximetry @home (*n*=22). These patients were stable enough to be monitored on the VW instead of admission to hospital.

Details of care on the VWs: Patient contact on the ward was a consultation conducted via telephone (see slide 13). Guidance provided proposes patients receive their first consultation within the first 24 hours following discharge from hospital.

Patient case profiles (cont.)

A total of 97 patients received a consultation within 24 hours, including 84% of Covid Recovery patients and 96% of frailty patients. Those who did not receive the first consultation within 24hrs (*n*=13), the reasons reported (*n*=7) included staffing, patient still in hospital and package of care not yet established. On average, patients received 4.7 consultations during their stay in VW. **Table 14** shows the range of the average number of consultations per patient. **Table 15** shows the spread of the average length of consultation by patient case.

Average number of consultation	Step Down (*n*)	Step Up (*n*)	Total (*n*)
0	1	0	1*
1-4	43	18	61
5-9	27	13	40
10-12	8	0	8

*The patient was prospectively referred to VW prior to hospital discharge but unexpectedly died on the ward before the VW consultation was arranged.

Table 14: Average number of consultations per patient

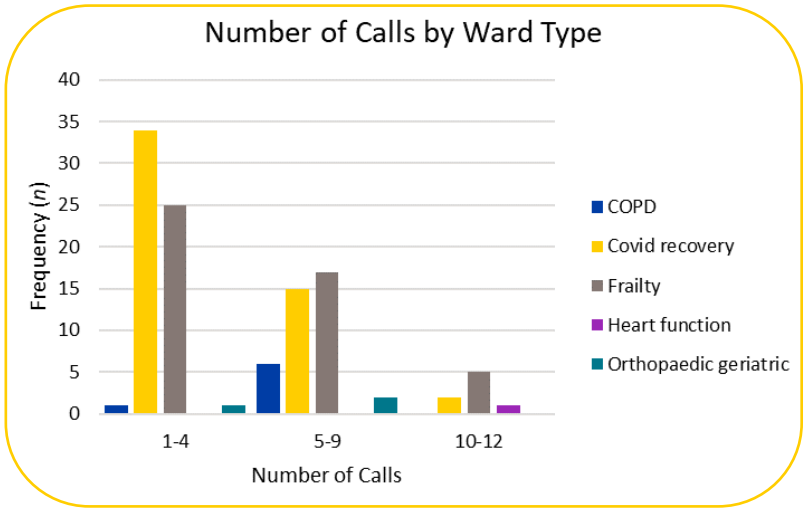
Average length of consultation (min)	Number of patients (*n*)
Under 5	1
5-9	18
10-14	63
15-19	4
20-29	20
30 and over	4

Table 15: Average length of consultations per patient case

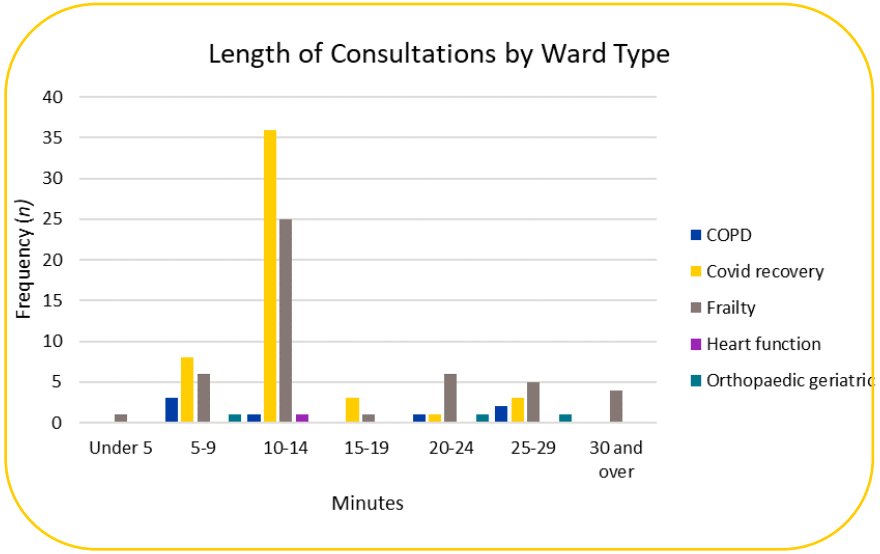
Graphs 19 and **20** illustrates a tendency for frailty consultations, due to complexity of the frailty syndrome and patient needs, to take longer than patients being monitored for symptoms of Covid.

Consultations were initiated by 10 patients during this 4-week period. 1 patient called for 25 minutes, the remaining 9 calls lasted between 5 and 10 minutes. Additionally, 10 carers called during this period, 8 between 5 and 15 minutes and 2 for over 25 minutes. Patients and carers are provided with a contact number and therefore, its use indicates the VHH provides a contact point outside routine consultation times.

No special equipment was provided for most patients, 40 received a pulse oximeter on discharge as you might expect due to the proportion of patients on the Covid Recovery VW.



Graph 19: Number of calls by ward type



Graph 20: Length of consultation by ward type

Patient case profiles (cont.)

Medication reviews took place whilst patients were either on the ward and at discharge. The difference is that a patient's medication may change on discharge once they have been monitored on the ward. This was either done by a nurse prescriber if available or in consultation with a GP. During their stay on the VW, 33 patients received prescription changes for medication optimisation. On discharge there were two medication changes.

LoS varied from under 4 days to over 25 days. See **Table 16** for all types of contact with other services whilst on the ward. Noted are those contacts that were face-to-face (F2F, *n*=74). **Graph 21** shows those types of contact that were recorded as face-to-face contact by LoS. These were UCR, GP, Paramedic and nursing care. This illustrates that longer LoS may correlate to a face-to-face contact. However, there are limitations to the way the data was recorded, which warrants further work. There were 12 ED attendances and 10 readmission to hospital. Of these patients, 6 patients who attended ED were then subsequently readmitted to hospital. There were 2 unexpected deaths recorded on the VWs during this time (see slide 32 for details). For the overall mortality rate for the VW programme please see slide 32.

Discharge outcomes and onward referral details

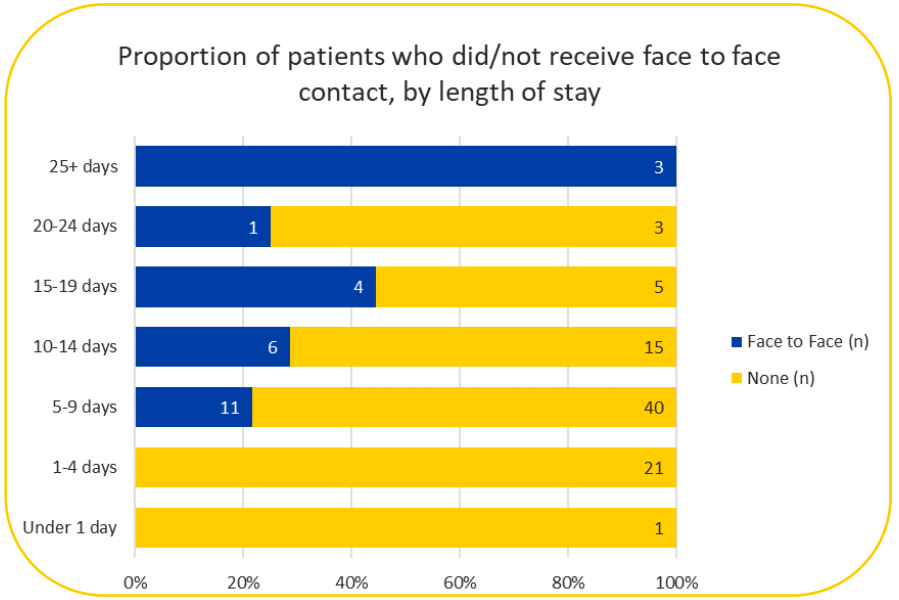
The main reason for discharge was no further intervention required (97 patients). Six patients were referred to the care of the GP, district nurse or community services. Seven patients were recorded as being admitted to hospital, of which all were accounted for within the 10 readmission cases described above.

A wide range of onward referral for social and other needs were made for 10 patients. Examples were social workers, pro-active team, Red Cross and occupational therapy along with GP and district nurse.

Range of contact type	999	111	UCR	GP	AHP	Paramedic	Nursing Care	Ambulatory Care	Total
Number of patients (F2F)	2[a] (2)	2 [b] (2)	11 (8)	38 [c] (8)	43 (43)	11 (2)	34 (7)	2 (2)	100[d] (74)

[a]1 died; [b] 1 died, 1 received UCR; [c] 32 (84.2%) were step down patients; [d] Pts may have received more than 1 contact type

Table 16. Services contacted whilst on the VW



Graph 21. Proportion of patients receiving face-to-face contact by LoS.
The data is presented on 100% stacked bar chart. The value labelled within each stack represents the number of patients (*n*).

KEY FINDINGS PATIENT CASE PROFILE: VW capacity has gradually increased since its inception. It is predominately supporting patients recovering from Covid and living with frailty. Support needs reflect that patient profile and patients with frailty tend towards longer LoS and more consultations. Although virtual, some patients still require face-to-face support in their homes.

Perspectives of VHH staff, referring consultants, patients and their carers and other stakeholders - Themes

Introduction

A rapid analysis of the qualitative interview data and multi-disciplinary team observation notes identified six themes. These six themes provide an overarching narrative that describes how the HHFT VW programme is developing and organising care within the wider system of patient pathways (**Theme 1**).

This emerging model operates in a continuum of care between acute and community services. Patients are enabled to move up and down this continuum, potentially more seamlessly than before the introduction of the HHFT VW programme (**Theme 2**).

Anticipated benefits for acute and community services were reported in the interviews alongside the potential threats to the HHFT VW Programme that might hinder embedding the emergent model (**Theme 3**). The balance between concerns about the negative effects of hospitalisation with negative effects of premature discharge of the patient from hospital was a key element for consideration (**Theme 4**).

Theme 5 describes the current workforce model and the emerging skill development and inclusion of expertise in the form of advanced practitioners such as medication prescribers. Finally, the current HHFT VW model started from a low technology point and **Theme 6** draws out views expressed on future options for digital technology solutions. Patients, however, were happy with receiving telephone calls from the VHH team.

Overall, the HHFT VW model has strengths to maximise as well as some weaknesses to consider. While there are opportunities for greater expansion of the model some threats were also identified. **Figure 8** summarises these.

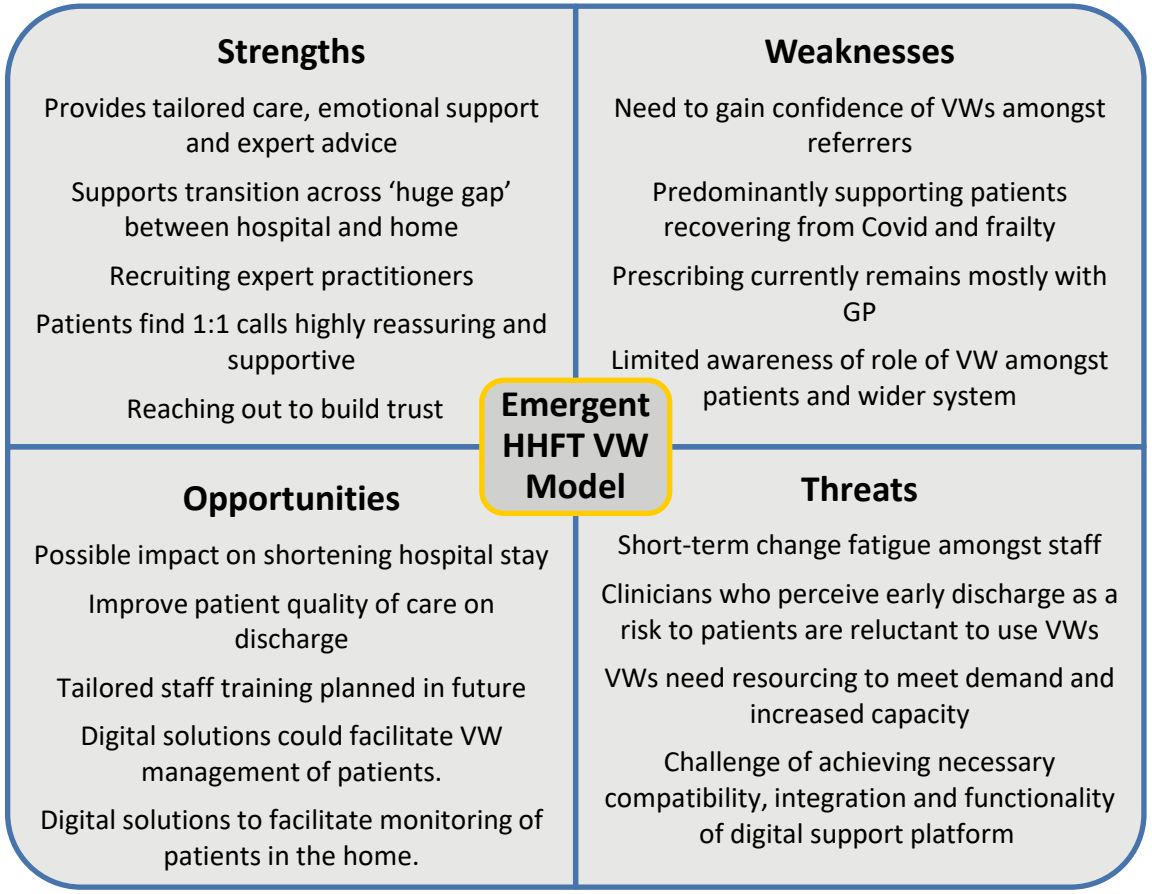


Figure 8. Strengths, weaknesses, opportunities and threats of the emergent HHFT VW model

Theme 1: HHFT's emerging VW model

This first theme includes a description of key aspects of the 'current model' as portrayed in the staff interview data and an 'emerging model' to reflect that staff interviewees considered the model was still evolving with opportunities for development. This principal theme links to other themes discussed in subsequent slides.

Current model

The current model functions as a co-ordinating hub to monitor and check patients over the phone whilst they stay in their own homes. The care is provided as either step down (discharge from hospital) or step up (admitted from community or primary care). VWs aid patients transitioning out of hospital as well as those at home who need closer monitoring of their health. The service advocates for patients' needs and liaises with health and social care services across Hampshire. This enables systems working and VWs sit as part of a continuum of virtual healthcare (see details in **Theme 2**, slide 44).

> *"I think it's imperative really, it's a vital part of reducing readmissions, reducing admissions pre-hospital and providing a better quality of care post-discharge."* **VHH Staff**

VWs provide 1:1 care and individualised support; patients and carers receive emotional support, reassurance and expert advice whilst on a VW (more detail in **Theme 2**, slide 44). As and when required, patient management may involve medication review, referring patient to onward services (e.g., primary, social and community services), liaising on home visits via other services (e.g., paramedic, GP surgery, district nurse, etc.), deciding whether the patient needs to be admitted to hospital, and creating new care plans following discharge from hospital. See **Figure 9**.

> *"There's a lot of emotional support, a lot of reassurance, there's a lot of reflection upon hospital stay and ongoing management of their health conditions…"* **VHH Staff**

The VW staff are experienced healthcare professionals with scope for further professional development to upskill and broaden their specialism (more detail in **Theme 5**, slide 50)

> *"I'm training to be an ACP [advanced clinical practitioner]. I've done my history taking, I've done my diagnostic decision, I've done my research methods and I'm currently finishing my prescribing module at the moment."* **VHH Staff**

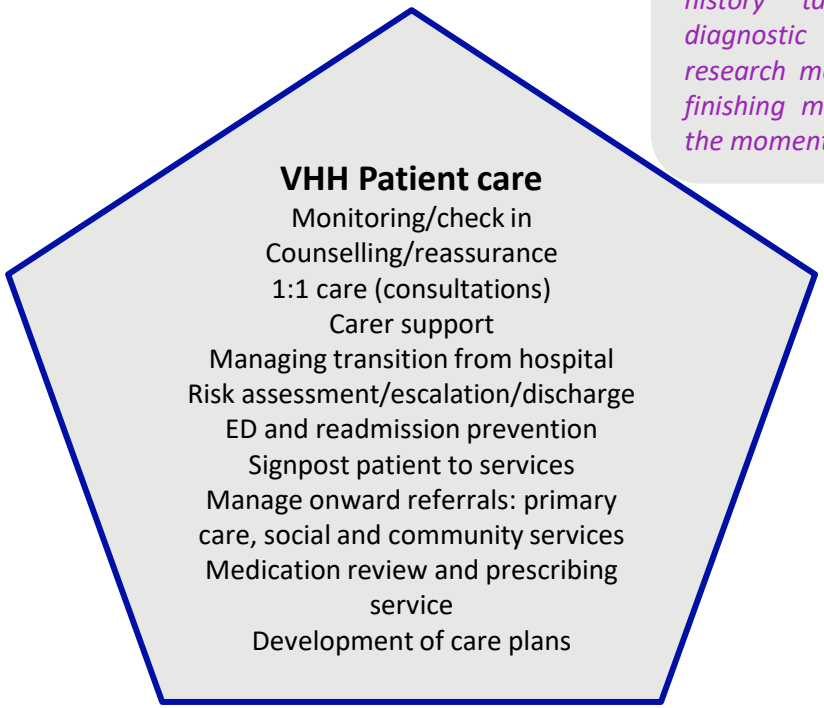


Figure 9. VHH patient care model

Theme 1: HHFT's emerging VW model (cont.)

Emerging model (opportunities for development)

Staff often expressed a desire and enthusiasm for an increase in referrals to VWs. This could be achieved both through an increase in numbers of patients referred, as well as by expanding the service to other patient groups such as individuals with asthma, diabetes, mental health, those who are under palliative care, etc. This expansion could also be in the form of supporting community services on long-term treatment such as intravenous (IV) antibiotics therapy at home. In order to increase referrals, there is a need to raise general awareness amongst healthcare staff on VW care, the criteria and process for referrals. Frontline staff may benefit from having training on the VW standard operating procedure, patient eligibility and how to make the referral.

It was suggested that staff should also be encouraged to have a conversation with patients about whether VW care is suitable for them earlier in their hospital admission or GP consultation, so that they understand that potentially they may be discharged earlier or continue to stay at home instead of admitted to hospital. It was proposed, for step up referrals, primary care needed clearer referral criteria and pathway. Other suggestions include further development of staff expertise such as prescribing (further details in **Theme 5**, slide 50) and interoperability of digital technology across all services (further details in **Theme 6**, slide 51).

"The issues we have with patients accessing community antibiotic therapy, especially at weekends… Just the benefit for them being in their own home; they're not [in the hospital unnecessarily]… Someone coming into your home to give it [IV antibiotics] is so much more beneficial." **Referring Consultant**

"…That [awareness of VW care] just comes down to education and making sure that they are aware of the VW and make referral and know what the processes are." **Referring Consultant**

"[Staff need to] get better at showcasing our VW… At the moment patients don't really understand what a VW means. If you can then be put on to a VW then we can reduce your length of stay by a couple of days and for patients to understand that." **VHH Staff**

"Clearly joining up the step up and step down as well as defining the rules to step up care should be broader and not specific to secondary care only." **ICB Representative**

KEY FINDING THEME 1: The current VW model provides tailored care offering emotional support, reassurance and expert advice whilst patients are at home following their discharge from hospital. Opportunities for development include making wider use of the VW model now that it is established, and including different patient groups. This requires greater awareness amongst staff on what VWs can offer to support patients at home.

Theme 2: System working - VWs provide continuity of care

VWs fit within the space patients find themselves between acute and community care. They provide continuity of care and act as a hospital-link for patients who have recently been discharged. Both staff and patients identified elements of this continuity of care which are 'Working well' as well as 'Opportunities for development'.

Working well: Staff perspective

Interviewees from the ICB and primary care explained that the VW Programme at HHFT had its origins in a successful collaboration with primary care over Covid Oximetry @Home. Covid patients, managed in the community, could be escalated to the HHFT Covid VW if they deteriorated, and de-escalated into the community from the Covid VW on improvement (this pathway may also include an admission to hospital). This partnership working along the patient pathway was judged as extremely successful by the primary care staff interviewed and led one ICB representative to comment on HHFT's experience and skill at systems working. Some preferred the term Virtual Health or Virtual Care, over VW, to reflect this systems approach.

"We are one big virtual (Covid) ward, it's just being managed along a spectrum of lower to higher acuity." **Primary Care Representative**

"We work really closely with the team and I think the biggest thing I take away all of the time is the fact that we really should be working along the patient pathway..." **Primary Care Representative**

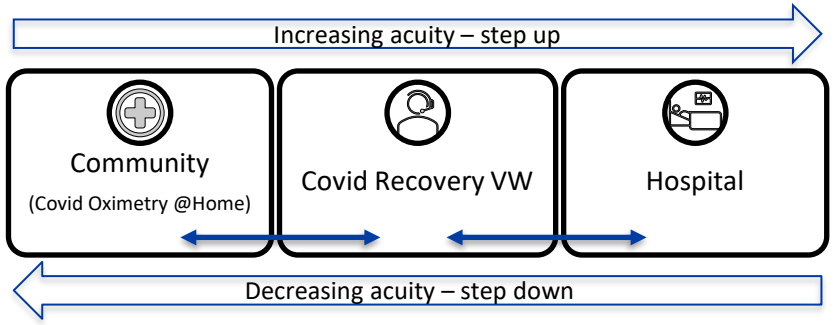


Figure 10. Patient pathway model for Covid treatment

In all VWs, for patients who have been discharged from hospital, the VHH acts as a link or touchpoint to the hospital. VHH staff advocate a joined up and whole patient approach to manage onward referrals, and signpost, to a range of agencies across primary care, the acute and voluntary sectors. An example of this was noted in the observation of VW MDT meeting; the team have reported previous contact with a voluntary organisation to encourage one patient to get out of the house and enjoy gardening by arranging a gardener to visit the patient. The team similarly discussed to arrange respite care for the wife of another patient. Through this approach and their position in the system, the VWs have a role in facilitating earlier discharge from hospital, preventing readmissions to hospital, and in the case of step up Covid cases, preventing admission.

"They [patients] love the fact that we're actually spending time with them and understand the challenges when they get home… having access to other support services through the community and identifying the problems when people go home, because often that's not something identified at discharge and people don't know the problems until they get home… And by us following-up those patients and hopefully then preventing ringing 999 and ambulance or GP… we can resolve that problem for them and it's giving them the support that they require." **VHH Staff**

"They've [HHFT] had time to develop their relationships, their understanding of delivering remote care, they understand the potential of impact that VWs can deliver and they've had time to mature as a provider in system work." **ICB Representative**

"A little biased given that I work here but I think they [VW] are an excellent community service." **VHH Staff**

Theme 2: System working - VWs provide continuity of care (cont.)

Working well: Patient

As described in **Theme 4** (slide 50) patients (and their carers) were universally happy to be going home from hospital. This was enhanced by the extra reassurance provided by continued oversight from the VHH. One patient described the VHH as a 'piece in the armour' to aid the transition home. The feeling of reassurance was reinforced by the approach taken by VHH Staff, for example they listened carefully to concerns raised, gave expert advice (see **Theme 5**, slide 50) and responded swiftly to any signs of deterioration.

"Maybe this is a way…another piece of armour to help deal with the situation and to connect hospital, the huge gap between going to hospital and home. Yes, another sort of form of reassurance, that there is someone…" **Patient**

"I had everything you could wish for… I had my husband home, I had a call like this coming in daily, 7 days, 7 to 10 days I think it was…and you know I just felt if I did have any queries I could ask them, I could talk to them…" **Carer**

"They properly listened, do you know what I mean? With all due respect to health professionals sometimes they hear you, but they don't listen. At the end of the day the patient is the expert because they know their condition don't they?...so they properly listened to the concerns and then came up with a solution, they were very good yes." **Carer**

KEY FINDING THEME 2: Patients and carers experience transfer to a VW as highly reassuring and supportive. The VHH acts as a link back to the hospital and supports transition across the 'huge gap' between hospital and home.

The team exhibited concern for the overall emotional wellbeing of patients and their carers. Patients appreciated the continuity of care that was afforded by the same members of the team regularly contacting them.

"They were very approachable, and I just felt, I'm just overwhelmed. I just thought this is a fantastic idea, why didn't we think of this before?.. It just gives the carer, i.e., me, the confidence and the strength to carry on. Because sometimes you feel like giving up yourself, you feel like screaming and going out to the garden and screaming, it's quite frustrating the conditions that he has…to know that you've got this…it was just fantastic, I was delighted, I'm still singing their praises" **Carer**

"I knew that they were there if I ran into any difficulties and as soon as I did run into difficulties they responded." **Patient**

"Very reassuring. There were just 2 or 3 assistants or nurses…who were part of the team and it's nice to stay within a few who get to know you... It does feel more personal. I spoke to one more at the time… to develop a sense of personal relationship was actually very good. And they were very, very concerned, it wasn't just a bland telephone exercise like cold calling…they seemed to be very respectful as well, and, yeah considerate." **Patient**

Theme 2: System working - VWs provide continuity of care (cont.)

Opportunities for development: Staff perspective

Members of staff recognised there is still some work to do to improve the profile and branding of HHFT's VWs so that patients, hospital staff and those in the wider system are better informed about the service on offer. There was recognition that some parts of the system could work together better with enhanced mapping of referral pathways (e.g., from primary care or to the voluntary sector), compatible IT systems and improved links to the voluntary and community sector (e.g., via a database of useful contacts). There was mention that aspects of Same Day Emergency Care (SDEC), community outreach and intermediate care beds need integration into the existing continuum of care for patients. Staff suggested better GP engagement was required with support to VHH staff to take responsibility for prescribing medicines for VW patients, rather than having to rely on time pressured GPs.

"Better comms so everyone knows what the virtual ward offering is, who leads it, what it does, just the who, why, where, what, when, how type thing, so I think some comms around it and maybe some, in the fullness of time some sort of branding, a system branding of the virtual ward so that it can be seen as a something, and more tangible and more easily understood, where it is virtual, I think it can feel quite intangible." **ICB Representative**

"[we need to] get better at showcasing our VW… at the moment, patients don't really understand what a VW means. Because it's such a new concept, but that will come with time. It almost needs to become everyday business as usual, that it's a normal expectation when you're being in a hospital. If you can then be put on to a VW then we can reduce your length of stay by a couple of days and for patients to understand that." **VHH Staff**

"For me you have virtual, you have SDAC, which is same day assessment clinic*, you have intermediate care beds and you have community teams and then you've got the perfect service".* **Referring Consultant**
*Correct name is SDEC

Opportunities for development: Patient perspective

Patients felt that increased communications around VWs would be helpful. Mostly patients were not informed of their discharge to a VW and were surprised to receive the first telephone call. Several stated that they did not fully remember what information they received and did not have clear recall of that information. This highlights that any information given should be conveyed clearly, ideally with a written version to take away as a prompt. Patients also expressed uncertainty about how much their GP knew about their stay on the VW. Several described difficulties contacting their GPs to obtain prescriptions which they had been told they needed by VW staff. Patients would appreciate VHH staff dispensing their medication to avoid the sometimes, frustrating interactions with the GP surgery.

"Absolutely nothing. And I mean absolutely nothing…. Any information about the virtual ward would have been beneficial." **Patient** (who was told he would be referred to VW, by ED, but given no further information about what it was)

"The only real problem was that I got severely constipated as I wasn't eating very well and I needed something to be prescribed for that and I was referred to my GP who then said that the first available telephone call was 15 June…that was, because you are referred to your GP, the GPs just can't respond at the moment, they just don't respond, actually they did respond in this case because the constipation was so acute that I burst into tears on the phone." **Interviewer:** *"To improve that situation would it have better if the ward could have prescribed it for you?" "It certainly would have been, because every other problem was dealt with, but that wasn't."* **Patient**

"When you're a bit under the weather, your head's going round and you can't take all this sort of information in." **Patient**

Theme 3: The anticipated impact on acute and community services

Staff shared their thoughts on the anticipated impact of VWs on patient care. Staff identified both anticipated 'benefits' and 'threats'. They do not expect observable impact at this early stage in the development of the VW programme, and needs to wait until the service becomes "business as usual" across secondary and primary care. However, published evidence from the Covid Oximetry @Home Service, establishes the clinical benefits of identifying early deterioration.

Anticipated benefits

Reductions in hospital stay, reduced re-admissions, reduced emergency care attendance and better quality of care after hospital discharge were widely given by staff participants as the anticipated benefits of VWs. VWs were first introduced at HHFT during the Covid pandemic, as the need was identified for an interface between the primary care-led Covid Oximetry @Home service and HHFT for sicker patients. This led to the establishment of the Covid Recovery VW. Staff noted that it is too soon to measure the impacts of VWs. However, evidence from the Covid Oximetry @Home (Boniface *et al*. 2022) establishes the benefits of the early identification of deterioration. Based on this experience, it was identified that the VW model could also be implemented with other patient groups such as frailty, heart failure, and COPD.

"We set up a Covid Oximetry @Home service which was a primary care led service. We've had nearly 3,900 patients through that service, and we've got a published paper showing that we've had a significant impact not only on reducing length of stay in hospital for those patients who did deteriorate but also reducing mortality and reducing ITU [Intensive Therapy Unit] admission so some really strong evidence around identifying early deterioration." **Primary Care Representative**

"…I think it would be too soon to draw any sort of large scale information out of that… we're 18 months into this so I'm not expecting anything at the moment." **VHH Staff**

Anticipated threats

A key difficulty was seen as obtaining the necessary degree of compatibility, integration and functionality of any digital support platform moving forwards. Appropriate distribution of resource within the virtual care pathway would also be required to accommodate some of the care roles shifting from the acute setting to the VHH team and primary / community teams.

"It doesn't feel very agile at the moment and….we do need a platform that is agile enough to allow us to pilot some things, work out what works and keep people out of hospital. It would be a shame if that was the stumbling block…" **Primary Care Representative**

"We met with the HHFT team last week, with the digital team… to look at what the digital requirements would be for a system… and I can see a tension coming up where the ICS [Integrated Care System] commissioners want one thing which is… potentially in conflict with what we want locally…I don't think there's an easy fix for that..." **Primary Care Representative**

"The difference is shifting the role to another team and things are still needing to be done…" **Referring Consultant**

"More resources will need to be put in place in the community teams and things to keep these people [patients] where they want to be [home]." **Referring Consultant**

KEY FINDING THEME 3: Staff interviewed expressed both anticipated beneficial impacts on acute and community services and threats that may prevent their realisation. Beneficial impacts include reduction of re-admissions, ED attendances and patient LoS, as well as improvements to patient quality of care on discharge. However, system improvements, resources and confidence are need to ensure VWs becomes 'business as usual'.

Theme 4: Balancing benefits and risks of care at home and in hospital

This theme relates to the perceptions of risk discussed by both staff and patients concerning either virtual care at home or hospital-based care. Discussion centred around three subthemes: 'Risks related to care at home' (staff interviews), 'Risks related to care in hospital and benefits of care at home' (patient and staff interviews) and 'Building trust in VWs and care at home' (staff interviews).

Risks related to care at home (staff)

Staff expressed several risks related to caring for patients at home, which must be considered by consultants referring to a VW. Risks included the fear that patients may deteriorate fast without access to a clinical team, a fear of litigation or criticism and, in the case of frail elderly patients, a risk that there is not adequate support at home to support discharge. Some respondents held the view that consultant mindsets need to shift from seeing hospital as safe and home as dangerous.

"There is a perceived risk of litigation or criticism if you remove patients to a non-hospital environment… A patient could get ill very seriously very quickly and if that happens in the hospital you have the appropriate support team to be able to deal with that. If that happens at home, then you don't." **Referring Consultant**

"You'll always get clinicians who would not refer patients to things like this because you see the same within hospitals where lots of doctors and senior nurses etc. that will not send patients home until they have been given the ok by somebody else. Because they're not willing to take that risk and that will not change. The way to improve the use of VW is at least to start to change that culture so that there isn't that a perceived risk to that individual [staff] who are referring to the VW service." **Referring Consultant**

Risks related to care in hospital and benefits of care at home (patients and staff)

On the other hand, every patient and carer expressed a preference for care at home and associated hospitals with risks (e.g. infection) and discomfort (e.g. noise, lack of sleep). Patients appreciated the comfort of their home environment, their own bed and proximity to loved ones and pets. As stated in **Theme 2** (slide 44) patients (and their carers) felt confident to cope at home due to VW support. Risks of hospital were also articulated by a number of consultants.

"Delighted actually, I'd rather not go into hospital…. I think a lot of people are actually catching Covid in hospital, that's my perception I know, but I do think it's somewhere I need to stay away from." **Patient**

"He certainly preferred to be at home than in hospital…when you're in hospital you're not in control really and you're in a noisy ward, you're out of your depth, you're out of your comfort zone…the virtual ward were very attentive with frequent phone conversations and advice about pain relief and asking if there was anything else we need, they were super." **Carer**

"The perceived wisdom is that if you are in the hospital, you are safe and if you're at home you're not. My view is the exact opposite – I think being in a hospital is exceptionally dangerous place to be. You're at risk of hospital acquired infection, drug errors that happen in hospital, being in hospital is a really dangerous place to be." **Referring Consultant**

Theme 4: Balancing benefits and risks of care at home and in hospital (cont.)

Building trust in VWs and care at home (staff)

Whilst there are acknowledged benefits and risks associated with each location of care, it is part of the VHH team's role to 'tip the balance' of clinicians' thinking so that they start to see VWs as a safe option for their patients. VHH staff expressed the aspiration that referring consultants begin to refer patients earlier when they are 'less recovered.' This will necessitate some shifting of mindsets and the building of trust in the VHH. The team is engaged in outreach work amongst colleagues to showcase its successful care for patients in an attempt to 'win hearts and minds'.

In frailty, it was recognised that the team needed to become more confident in releasing patients earlier with support from their own networks (rather than awaiting care packages which delay discharge). However, this shift in mindset can be a slow process.

"There's a lot of face-to-face work, a lot of going out, hearts and minds going out to the teams, a lot of data to prove that these patients that we're taking through are really good, no one is becoming unwell, you can probably take a bit more of a risk. I think it's finding your key change agent that's willing to take a punt and then supporting their colleagues to say look this is what I'm doing, it's not a disaster, you can do this too…case study feedback, the QI [quality improvement] route of presenting, it's just hitting every single thing that you possibly can really to continue to review its efficacy and use the data and the subjective information that we're getting back as well to prove what we're doing and why you need to take more risk and take a punt on the team." **VHH Staff**

"Many patients are better looked after in their home setting and my specialty in particular, there is a lot of data and information about frail older people moving into hospital causing them, just that move causing them to become delirious, so the hospital setting for frail older people, for many, can be a really backward step, so making sure that they are still having a high standard of care in their own home can prevent a whole load of other illnesses in that group of patients"[….]"I suppose the thing we need to improve on is thinking, does this person need to stay in for another 2-3 days. I think we're slowly getting there with that, or can they be monitored at home." **Referring Consultant**

KEY FINDING THEME 4: There are acknowledged risks and benefits associated with both home and hospital-based care. Patients and some consultants favour home-based care whenever possible. Other consultants perceive early discharge home to be higher risk and are less willing to refer to a VW. The VW team is engaged in outreach work amongst colleagues to showcase its successful care for patients and to build trust amongst referring consultants.

Theme 5: Emergent Workforce model - Skill development and expert practitioners

The VW workforce model (see slide 14) consists of a team of experienced staff who have access to a network of specialist support. The experience of the VHH team indicates the need for greater skill development and further recruitment to the team of expert practitioners. Future opportunities for development include working towards accredited pre- and post-registration modules specific to virtual patient care.

The current workforce model provides senior nurses and team leaders with administrative support. Induction and training of new staff is self-directed with support from both within the current team and beyond the immediate team via colleagues in acute care. Patients and carers commented on the expertise and skill of the staff that they interacted with during their (or their relatives) time on the VW. Staff participants noted skills brought into the team opportunistically and were able to gain skills through shadowing external colleagues. There are opportunities for staff to undertake advanced practitioner training. Expertise from outside the VW team is available to draw on when required. This led to a view that staff were growing as generic practitioners across multiple specialist disciplines and illustrated an integrated care approach.

> *"They always rang to find out if I was alright… so they looked after my welfare as well as my husband's so it was very refreshing… Their advice was greatly appreciated really and helped enormously."* **Carer**

> *"It was fantastic honestly, it was really reassuring. It was better than being on the ward because on the ward you have healthcare assistants who come and do your observations, whereas here you were talking to a qualified person who was giving you advice all the time."* **Patient**

The workforce model also offers opportunities for development both for individuals and the team. There was a recognition that specific specialisms such as pharmacists or prescribers would benefit the VHH team. Suggested future development included working towards an accredited modules for post- and pre- registration degrees in virtual patient care. It was also recognised that it is important for nursing staff to retain face-to-face skills, and therefore to access ongoing opportunities to deliver face-to-face care (e.g. by doing shifts in hospital wards).

> *"Thinking about how the VW workforce can integrate with other community teams… people would be less risk at burnout if they have a more varied role… a new way of thinking around integration, integrated workforce"* **ICB representative**

> *"Trying to manage patient virtually is a very different skillset, and something we are very mindful of.. I'm working with [the local] university… to develop the skills they require to perform virtual consultations and reviews."* **VHH Staff**

> *"We need pharmacy support for our teams going forward…Why can't we look at a pharmacist doing an advanced practice role."* **VHH Staff**

KEY FINDING THEME 5: An emergent workforce model indicates that VHH staff will need to develop a range of skills to manage the care of a diverse set of patients. Training and skill development that is currently self directed will evolve into a modular training format. Aside from developing the skill base, recruitment of expert practitioners within the VHH team, such as nurse prescribers or pharmacy support, is in progress.

Theme 6: Moving forward with digital technology

HHFT currently runs a low technology VW model with the intention of becoming more technology enabled. Staff frequently spoke about the 'advantages and requirements of enhanced technology', which included increased capacity to care for patients and different conditions. Patients did not express a requirement for further technology but professed 'satisfaction with telephone contact'.

Advantages and requirements of enhanced technology (staff)

VHH staff and an ICB representative explained that the enhanced use of technology would increase capacity within the team. For example, patients could provide initial details either via text or upload their readings to a digital platform – VHH team could monitor these returns but would only need to follow up with patients at risk. In effect, this is a stratification of VW care needs, with only the more acute patients needing a formal consultation. Another member of the VHH team explained that whilst they currently have access to several systems used by their partners, they must manually move patient details around due to lack of compatibility. Their own integrated system would therefore improve referrals and the processing of patients. Respondents pointed out that any new platform via which patients could upload their own readings would need to be agile enough to process new and different types of data as the range of VW wards expands.

"…if you want to run virtual wards at scale, you need technology, so we speak to a lot of people each day and we don't do much intervention… If that can be done by text you can manage hundreds of people via text messages… and then mange a few people who need that intensity of care, so you can probably increase your capacity tenfold." **VHH Staff**

"We need a digital solution in order to have greater capacity to manage virtual ward patients." **ICB Representative**

Some staff remarked that future generations would expect technological solutions to be part of health care and commented on the range of solutions now available, for example Artificial Intelligence (AI) monitoring in the home. The difficulties and practicalities associated with governance, compatibility and commissioning of any new digital platform were also recognised.

"There's a lot of things that we need to consider; the governance, making sure that data is secure, making sure that it aligns with our primary care colleagues… and that they all become one platform. There are so many options out there that it's not something that we can just decide quickly." **VHH Staff**

"We do need a digital solution that allows us to be quite responsive in this virtual care world as we develop it." **Primary Care Representative**

Theme 6: Moving forward with digital technology (cont.)

Satisfaction with telephone contact (patients)

Patients and carers, on the other hand, were all happy with the current offering of contact via telephone – feeling that this method was simple, convenient and did not require accessing a computer (which some felt they would have been too ill to do). A small number of patients recognised that a phone call may be difficult if you are hard of hearing or not confident to use the phone, and that video calls may be good in some instances (but that they themselves had been happy with using the telephone).

"No, I was in bed, it [phone call] was absolutely fine. I was not well enough to walk down, switch on the computer and arrange a video call." **Patient**

"No, I don't think it would have been necessary. A phone call was perfect, a phone call was absolutely perfect and it did what it was supposed to do, it kept us in the routine, kept me, as I say, confident." **Carer**

KEY FINDING THEME 6: Staff felt that an improved digital solution would increase capacity to manage VW patients. An enhanced digital offering could provide the opportunity to triage patients via text message, for patients to upload their own readings onto a digital platform and, at the far end of the spectrum, even monitor patients' movements within their own homes automatically using AI. When asked about their own preferences for methods of communication, patients all expressed satisfaction with contact by telephone.

Qualitative data summary

This rapid qualitative evaluation can only provide a **snapshot of the development status** of the HHFT VW programme since its inception from a low number of patients, less than 10 to its current capacity of 40 to 50 patients. Due to overall numbers and the gradual implementation of the HHFT VW programme a further follow up longitudinal evaluation will allow any impacts time to follow through. Case by case data was captured for all patients (*n*=110) for a four-week period during April and May in 2022 only. Patient demographics, patient referral pathways, care on the VW and key contact points and finally discharge were reported with no major unexpected findings. Interviews of staff and patients provided insights into their experience of VWs and what was important to note for the development of HHFT's VW model. The VW programme has the opportunity to provide **continuity of care for the patient and additional support on discharge** from hospital bridging a gap often experienced by patients. In this time period, patients were predominantly recovering or required monitoring for Covid or were patients with frailty. Frailty patients tended towards longer ward stays and more telephone consultations.

Patients found the regular telephone consultations **highly reassuring and supportive**. They also welcomed the uninterrupted communication with staff that they noted provided **expertise** during their **consultation**. They were happy with telephone calls rather than virtual calls. Some patients still required some face-to-face intervention e.g. GPs, district nurses, paramedic practitioners or an AHP review.

Referring consultants are trying to **balance risks of hospital against risks of early discharge** and this might limit referrals until greater trust and confidence is gained with the HHFT VW model. VHH staff were engaging in outreach activities to improve referral rates.

The VHH team were positive about the **potential for VWs**. In particular, they considered they could provide support to a **wider variety of different patient diagnostic categories**. They also felt **ready to take stable but less well patients** who could be **monitored at home**. The workforce model is developing to gain the necessary skillsets inhouse and this includes recruiting expert practitioners such as nurse prescribers. Training will evolve to provide tailored skillsets for VW staff.

HHFT **started with a low technology model** to get established. Staff interviewed propose **development of digital solutions** to manage patient information seamlessly across systems. They also proposed digital solutions to **manage and monitor patients in their homes** and a mechanism to **triage patients more effectively**.

Overall, this rapid evaluation provides an emerging picture of the HHFT VW programme. It has gathered momentum from its inception in March 2021 and seems ready to expand its patient categories and monitor a greater proportion of stabilised patients. A **skilled staff team** seem **key to building confidence in both patients and referring consultants** and plans are in place to establish appropriate training.

Data limitations

Quantitative Data

- Full attribution - due to multiple interacting and changing variables in current healthcare, it is not possible to be 100% certain that all benefits identified are a direct and sole consequence of VW intervention. To increase confidence, we have utilised both quantitative and qualitative analysis, supported by clinical audit where appropriate.

- As described in the data methodology, we have matched VW admissions to hospital activity in the 36 hours prior to admission, as a result some admission methods may not be correctly identified. A prototype form is in development which will improve the accuracy of this and other VW data in the future.

- There may be an element of selection bias for the patients referred to the VW, as these patients often have complex medical needs and pathways which are not uniformly reflected across the inpatient population. This group cannot be replicated in the control group, therefore this methodology may under report benefits.

- When patients die in the community, the hospital are not always informed immediately or at all. Therefore, it is possible the mortality within 30 days for VW patients is under reported, this would equally affect the control group.

- As outlined on slide 24, there are key differences in the point at which the 30-day readmission starts between our methodology and nationally published data. Therefore, the data is a not a full like for like comparison, although is similar and if anything, likely to under report benefits.

- Nationally, there is no universally recognised methodology to analyse VW admissions and bed days saved. Internally we developed our own methodologies involving a control group and mechanism to detect instances of bed day savings. However, this approach is not complete, as it fails to recognise any additional bed day savings from VWs of patients who exceeded the 'expected LoS', despite potential savings existing.

Qualitative Data

- The qualitative data was collected over a four-week period, which may not have been typical. A longer data collection period would have allowed the capture of fluctuations that occur over longer time periods.

- The rapid analysis approach employed would not be viewed as equally rigorous as the traditional approach to qualitative research in which interviews are transcribed in full and coded, with themes built from the systematic organisation of codes. However, we followed an accepted, team based, process for rapid evaluation, including the use of structured interview questions, listening to interview audio recordings, followed by the creation of interview summaries and rapid analysis tables, from which emergent themes were identified.

- The VHH team and its team project manager identified potential interview respondents for both the patient and staff interviews to facilitate rapid data collection. This approach may have introduced selection bias.

- Many patients and carers expressed difficulty in recalling certain details of their experiences (e.g. information received and which agencies were involved in their care at home), which introduces the possibility of some recall bias.

- Whilst a range of job roles were represented amongst staff interviewees, the voice of GPs outside of the Covid Oximetry @Home service or and care home staff (as additional step up referrers) were not represented within our dataset.

- Whilst staff members anticipate a range of benefits of the VWs (based at least partly on evidence in relation to the Covid Oximetry @Home), it is too early to measure the full impact of the VW programme. It is recommended that future work establishes patient relevant outcomes in relationship to the workforce model most beneficial to managing patient needs and capacity. In addition, it would help to better understand the referrer perspectives around the balance of risk between hospitalisation and early discharge.

Lessons, recommendations and HHFT's future plans

Key lessons from the evaluation

Contribution to learning from this HHFT VW programme evaluation will inform the ongoing emergent care model now established. HHFT introduced VWs as an additional arm to the VHH formally in January 2021 starting from a limited capacity of under 10 virtual beds, now currently between 40-50 beds. This variability accounts for staffing levels and complexity of patient needs (e.g. high intensity). The VHH team and other related staff interviewed were positive about the options and development opportunity provided by the 'Hub'. The evolving model indicates a highly skilled and well trained generic workforce that is eager to manage patients with diverse diagnoses and care needs.

The VHH team recently gathered to reflect on progress, that is, what went well, what did not, what improvements were needed and what factors were beyond their control (**Figure 11**). The HHFT model is making good progress and no adverse events reported. Patients are also responding well. There remains some reluctance to refer patients to the VWs and a need to engage more with GPs. Digital and patient management systems need improvement. Whilst the ambition of including VWs under the VHH umbrella has contributed to the team's ability to focus on the VWs and improve engagement and referrals, there are challenges due to increase demands through the Clinical Communication Centre and Telemedicine service. However, the interviews indicate a drive towards an integrated system, particularly as individual patients may well move between different services, and the VHH has the opportunity to provide greater continuity of care for the patient. From this short evaluation they felt well supported by the reassurance and expertise they received.

The VHH team considered the following as important points to share:

- Focus and engagement should go beyond the clinical workforce and include Business Intelligence, communications, digital and IT support.
- Ongoing learning should be captured through key metrics and other forms of data capture as illustrated in this evaluation.
- The service will need to ensure options for face-to-face care where necessary to further prevent the patient attending the hospital setting.
- Wider communications and dissemination of learning to improve awareness and engagement.
- Ensure completeness of the patient pathway – transfers of care across community, primary care and secondary care.

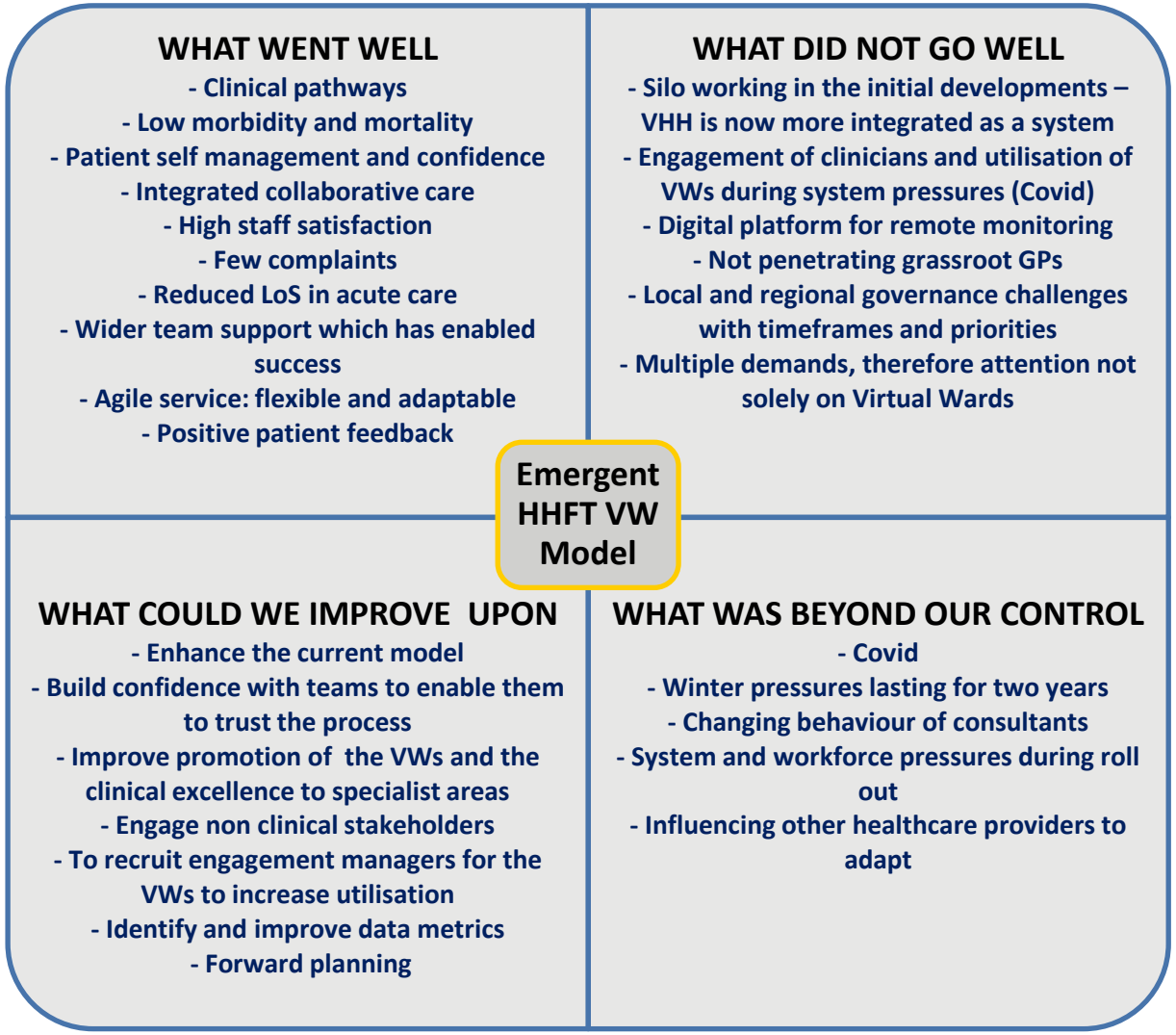


Figure 11: VHH team reflections 20 July 2022

Lessons, recommendations and HHFT's future plans (cont.)

Conclusion

This rapid evaluation has demonstrated that the VWs provided by the HHFT VHH is safe and efficient and has been well received by patients and clinicians. This fledgling service was to develop an alternative to hospital admission for the *unwell patient*. The virtual wards aimed to provide step up (admission avoidance) and step down (early supported discharge) healthcare. The aim being to treat patients virtually, minimising the sequalae of unnecessary traditional hospital-based care.

Over 1,110 patients have used the service over 14 months without any adverse advents. Readmission and patient mortality rates were both lower than the control groups, whilst reducing inpatient LoS by almost 4 days per patient.

Five virtual wards were reviewed in this evaluation. Within three months of the retrospective review the portfolio of virtual wards had increased by 40%. This demonstrates the demand for this innovative effective solution to healthcare. HHFT are working across all specialties within HHFT to further develop 'a hospital without walls'.

HHFT have described their ambition (slide 16), moving beyond virtual wards to drive a more holistic model of 'virtual healthcare' with clinician supported patient self-management at its heart. To develop a model of virtual healthcare to be inclusive of all clinical conditions and patient groups, specifically looking to proactively include those with additional needs or protected characteristics for example, homeless people, prisoners, and those in areas of deprivation. A diverse, experienced dynamic workforce is key to further develop integrated novel workforce solutions to deliver this service. The findings from this evaluation, combined with the recommendations for further work, will help inform the strategic direction and operational delivery to achieve that ambition. Through the qualitative aspect of this evaluation, it was recognised that increased referral rates, further expansion of clinical pathways and the move to take patients earlier in their disease pathway (supported by enhanced home monitoring and a bespoke digital platform) would enable a phased approach towards reaching the VHH ambition.

This evaluation demonstrates that the VWs provide highly efficient well-coordinated care for patients by working collaboratively with local system partners.

Recommendations for future development of the VW programme

For audit and evaluation of the HHFT VHH

The case form provided a local data collection tool completed by an administrative worker with support from the VHH team. This tool with revision and development could provide an opportunity to regularly audit and provide a detailed account of the patient journey from referral, admission, care on the ward to onward referral and discharge. This data would provide insights into patient care and interaction on the VWs, their subsequent discharge and onward referral needs. Particularly an understanding of onward referral success outcomes.

Opportunities for longitudinal evaluations to capture the complexities of patient needs and responses would inform development of the patient pathways across different services and their evolving integration of care. A wider evaluation would also provide the opportunity to gain perspectives of a more representative set of referring and potential referring consultants across a range of target specialities, other services in particular GPs and opportunities for step up referrals. Finally, although patients were satisfied with care provided in this low technological model it is important as model improvements and changes are made with the inclusion of a broader range of patients from different diagnostic categories to keep abreast of their response to change.

Further recommendations referenced in the evaluation:

- Clinical Review of readmission day 0 subgroup (step down) (slide 24)
- Quality Improvement work to review factors that influence readmission rates following step down VW discharge and subsequent admission rate following discharge from a step up VW (slides 24 – 26)
- Consideration of a more sensitive readmission comparator for future service evaluation (slides 24 – 26)
- Consideration of evaluation of potential benefits for patients with palliative care needs who are able to die in their place of choice
- Longitudinal evaluation (slide 53).

List of references and appendices

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Appendices

Appendix 1 Virtual ward logic model v2
Appendix 2 Frailty step up patient pathway v05
Appendix 3 Evaluation Questions table for report
Appendix 4 Interview schedules for participants
Appendix 5 Qualitative theme summary table
Appendix 6 Case by case data summary table

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