Evidence Brief: Virtual Wards

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*Help accessing articles or papers

Where a report/ journal article or resource is freely available the link has been provided. If an NHS OpenAthens account is required this has been indicated. It has also been highlighted if only the abstract is available. If you do not have an OpenAthens account you can self-register here.

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Key publications – the big picture

For the latest information see the NHS England page on Virtual Wards

Virtual wards and hospital at home
UK Parliament POST, April 2025
Virtual wards aim to provide hospital level healthcare in patients' homes. What are the opportunities and risks for patients, carers and the NHS?

Hospital at home and virtual wards: What works?
National Institute for Health and Care Research, March 2025
In March 2025, NIHR Evidence held a webinar showcasing research on 2 home-based alternatives to hospital care from 3 evidence reviews: admission avoidance hospital at home and virtual wards for people with frailty.

Making the most of virtual wards, including Hospital at Home
Getting it Right First Time and NHS England Virtual Ward Programme, September 2024
The Getting It Right First Time (GIRFT) and Virtual Ward programmes at NHS England have produced this guide, which outlines how the NHS can make better use of virtual wards, including Hospital at Home, allowing more patients to get the care they need at home, safely and conveniently, rather than being in hospital.

Joint Statement: 'Hospital at Home' not 'virtual wards'
British Geriatrics Society, August 2024
The British Geriatrics Society (BGS), the UK Hospital at Home Society, and the Royal College of Physicians London have released a joint statement in support of use of the term 'Hospital at Home', instead of 'virtual wards'.

What do virtual wards look like in England?
The Health Foundation, February 2024
In April 2022, NHS England launched its national virtual ward programme with the long-term aim of providing 40 to 50 virtual ward beds per 100,000 people in England. So far, every integrated care board in England has introduced virtual wards. Further aims of this programme include improving patient choice and experience, avoiding risks associated with inpatients stays and improving hospital flow by reducing lengths of stay and freeing up beds.
In this working paper, the IAU analyses aggregate national data on virtual wards to describe what virtual wards currently look like across England and discuss the effects of virtual wards on patients, staff and hospital capacity, as well as the gaps in the evidence.

Listening to the system - implementing virtual wards
NICE, November 2023
Virtual wards (also known as hospital at home) provide hospital level care and monitoring outside of a hospital setting. They are a great way for patients to get the care they need at home, in a safe and familiar environment.
Although we are seeing many areas embrace virtual wards, we know that there is still some scepticism among clinicians – and in some places they are not being utilised as much as they could.

The RCP view: Hospital at Home and virtual wards
Royal College of Physicians, November 2023
The terms 'virtual ward' and 'Hospital at Home' are often used interchangeably. In the current context, they describe coordinated healthcare for an acute health condition that can be managed in the patient's home, which may traditionally have been managed in hospital. Virtual wards originally described preventive care for people at risk of hospital admission.

Virtual wards and Hospital at Home have been provided in some local healthcare systems in the UK for many years, and in some places for decades. There are multiple formats.

Paediatric virtual wards - position statement
Royal College of Paediatrics and Child Health, October 2023
Paediatric virtual wards can enable children with a range of acute health needs to be cared for at home, in a more familiar and comfortable environment. This could be particularly valuable for children with ongoing health needs or high care demand who may otherwise be in and out of hospital. There is also some emerging evidence that virtual ward programmes can reduce the length of stay and likelihood of readmission. This position statement summarises our position on this.

How do the public and NHS staff feel about virtual wards?
The Health Foundation, July 2023
So how do NHS staff and the UK general public feel about the use of virtual wards? To understand this, in March 2023 we commissioned a survey of 7,100 nationally representative members of the public (age 16 years and older) and 1,251 NHS staff members to find out how supportive they are of virtual wards and what they think is important for making sure they work well.

Realising the potential of virtual wards
NHS Confederation, May 2023
In March 2025, NIHR Evidence held a webinar showcasing research on 2 home-based alternatives to hospital care from 3 evidence reviews: admission avoidance hospital at home and virtual wards for people with frailty.

Roundtable: How can virtual wards be scaled up?
HSJ Guides, April 2023

NHS England views the scaling-up of virtual wards as a crucial strategy for expanding hospital capacity and supporting patient recovery. As a result, NHS trusts have been set the ambitious target of having fully-developed virtual wards in place by the end of 2023 that provide a combined total of 40-50 virtual beds per 100,000 population. The scale of this target is considerable. In March, NHSE announced that 100,000 patients had been treated in virtual wards over the previous 12 months. It also reported that 340 virtual ward programmes are now operating across England, providing a combined total of 7,653 virtual beds. This leaves a deficit of some 16,347 beds that need to be created by the end of the year to meet NHSE's national target.

Virtual wards: the lessons so far and future priorities
Nuffield Trust, March 2023
The expansion of virtual wards – which help patients to manage their health and care at home – is considered an important component of NHS planning for next winter. Following discussions with members of BT's clinical advisory board and drawing on wider evidence and the latest policy developments, Rachel Hutchings and Nigel Edwards discuss the priority areas where further development and action could help improve virtual wards' effectiveness.

Virtual wards and Covid-19: an explainer
Nuffield Trust, March 2023
Virtual wards are remote services which help patients to manage their health and care at home. Patients and carers are asked to take health readings (e.g. blood oxygen levels, blood pressure, temperature) in a location convenient for them, such as their home. They can submit these to health care providers either via telephone or digitally (e.g. using an app). The readings may then be reviewed and responded to by professionals elsewhere, or patients may be asked to seek further help, for example if their readings are of particular concern. Remote monitoring models

have been previously used for a range of chronic health conditions (e.g. Peretz and others, 2018; Castelyn and others, 2021; Jonker and others, 2021).

Delivery plan for recovering urgent and emergency care services
NHS England, January 2023
To support recovery, this plan sets out a number of ambitions, including:
- Patients being seen more quickly in emergency departments: with the ambition to improve to 76% of patients being admitted, transferred or discharged within four hours by March 2024, with further improvement in 2024/25.
- Ambulances getting to patients quicker: with improved ambulance response times for Category 2 incidents to 30 minutes on average over 2023/24, with further improvement in 2024/25 towards pre-pandemic levels.

NHS England has engaged with a wide range of stakeholders to develop the plan, and it draws on a diverse range of opinion and experience, as well as views of patients and users.
The Department of Health and Social Care, who produced the content on actions being taken in social care, have led on engagement with the sector.
See also NHS Providers briefing of this document

Bringing hospital care home: Virtual Wards and Hospital at Home for older people
British Geriatrics Society, August 2022
This document summarises the current landscape of Virtual Wards from the perspective of healthcare for older people, and provides advice to BGS members looking to set up such services for older people living with frailty.

Building upon services to provide the right care for people through virtual wards
Queen's Nursing Institute, June 2022
In this blog, Sam Sherrington, National Deputy Director, Community Nursing at NHS England and NHS Improvement, and Zoe Harris, Senior Delivery Manager for the Digital Care Models Team at NHS England and NHS Improvement explore the important role that community nursing plays in getting virtual wards 'right' for the people we care for, and their families.

Virtual Wards
Institute of Health & Social Care Management, March 2022
The NHS went into the Corona Virus pandemic with fewer staff per head of population and fewer beds, than most similar healthcare systems across Europe and OECD countries. Emerging from the pandemic and faced with an overwhelming number of patients on waiting lists, the NHS is turning to efficiency gains and innovative treatment options.

No place like home: using virtual wards and 'hospital at home' services to tackle the pressures on urgent and emergency care
Royal College of Physicians, January 2022
What will help to relieve the pressure on hospitals?
> Investment in virtual wards, 'hospital at home' services and social care teams
> A sustainable health and social care workforce.
> A cross-government strategy on health inequalities.

Integration and innovation in action: virtual care
NHS Confederation, December 2021
An in-depth look at how NHS organisations are using virtual care to improve outcomes for patients and local communities.

Virtual ward care: breaking the 19th century mould
NHS Confederation, 14 December 2021

Embracing the virtual revolution would be the first real change in hospital care for over a century, but are we ready to shift the locus of care?

[Virtual wards: caring for Covid-19 patients at home could save lives](#)
Nuffield Trust, December 2020
Cecilia Vindrola-Padros, Naomi Fulop and Trish Greenhalgh describe the importance of oximeters and how they could save lives during the Covid-19 pandemic. This article was originally published in The Conversation on 6 November.

[Remote home monitoring (virtual wards) during the Covid-19 pandemic](#)
University of Birmingham, October 2020
Despite previous research on the use of remote home monitoring models for other health conditions, there is a paucity of evidence on the implementation of models for remote home monitoring during the COVID-19 pandemic.

Guidance

[Supporting the health and care system to implement virtual wards](#)
NICE, updated 2025
Our aim is to ensure that we focus on what matters most to the health and care system. Our early discussions with health and care professionals, about their experience whilst implementing virtual wards, have highlighted the challenges, benefits and considerations of implementing this new model of care. Our discussions are ongoing, but take a look at what we've found to date.

[GIRFT's virtual wards guidance updated to reflect new NHSE operational framework](#)
Getting it Right First Time, September 2024
Getting It Right First Time (GIRFT) and NHSE's Virtual Ward programme first developed its easy-read guidance for clinicians looking to maximise their use of virtual wards in 2023, focusing on frailty and services for those with acute respiratory infections. A section on virtual ward care for patients with heart failure was added later that year.
See also: [New summary guide supports NHS ambition to increase the use of virtual wards](#)

[Virtual wards operational framework](#)
NHS England, August 2024
NHS England's national guidance refers to these types of services as 'virtual wards', but local services can decide if they wish to be known as a 'virtual ward' or a 'hospital at home' (HaH) service.

[Hospital at Home Toolkit](#)
Healthcare Improvement Scotland, no date
This toolkit was created as part of that work, providing a range of tools and resources to support areas to implement and expand Hospital at Home services.

[Interim Professional Standards for Hospital at Home](#)
Royal Pharmaceutical Society, September 2023
These eight standards support the audit and benchmark of good practices in Hospital at Home pharmacy services across the UK. This practical framework can be used by multidisciplinary teams across all sectors to improve established Hospital at Home pharmacy services.

[Supporting clinical leadership in virtual wards – a guide for integrated care system clinical leaders](#)

NHS England , February 2023
[The NHS Long Term Plan](#) and the changing commissioning architecture gives us the opportunity to use collective resources within an integrated care system (ICS) to develop a service that supports people to remain independent, safe and in their own homes for as long as possible. Development of services including virtual wards should be a continuum of care through collaboration, supporting both a proactive and reactive approach to delivering care in a joined-up way. We also have the opportunity through using population health intelligence, personalised care and digital inclusion to ensure that the outcomes for patients reduce health inequalities and do not widen them.

[Guidance on Pharmacy Services and Medicines Use within Virtual Wards including Hospital at Home](#)
NHS, September 2022
This guidance is for organisations establishing or maintaining virtual wards (including Hospital at Home). 1 It is intended to support organisations and NHS colleagues when considering service design, development and delivery of virtual wards in relation to pharmacy teams and medicines use. Case studies of pharmacy practice are included within the main text and in Appendix 3 to support local service development and implementation in the context of virtual wards, as well as broader virtual care showcasing safe, timely and effective medicines use in this setting

[Guidance note: Acute respiratory infection virtual ward](#)
NHS England, December 2021
Virtual ward pathway for acute respiratory infection virtual ward.

[A guide to setting up technology-enabled virtual wards](#)
NHS England – Transformation Directorate, December 2021

Virtual wards should be technology-enabled to maximise the opportunity they offer for both patients, carers and staff. Technology-enablement means the management of patients via a digital platform. In a technology-enabled model, patients measure agreed vital signs and enter data into an app or website. In some cases, they wear a device that continuously monitors and reports vital signs.

[Supporting patients and bed capacity through virtual wards and Covid Oximetry @home](#)
NHS England, December 2021
Letter asking all integrated care systems (ICSs) seek to put in place comprehensive coverage of COVID Oximetry @home (CO@h) and COVID Virtual Ward (CVW) pathways to meet potential demand.

[Guidance note: Frailty virtual ward (Hospital at Homes for those living with frailty)](#)
NHS England, December 2021
Virtual ward pathway for frailty virtual wards otherwise known as Hospital at Home.

[Covid virtual ward (secondary care)](#)
Wessex Academic Health Science Network (Programme: Covid Oximetry), January 2021
The Covid Virtual Ward model is a secondary care led initiative to support early and safe discharge (step down) for Covid patients. It has already been implemented in some - but not all - parts of the country where it is having an impact in reducing emergency admissions (Greater Manchester, Liverpool, Tees, North London, Berkshire, Hampshire, West Herts); and builds on the [Covid Oximetry @home model](#) previously approved by the National Incident and Response Board (NIRB), and now implemented by all CCGs.

Case Studies

[Managing heart failure at home: a remote monitoring pilot project in a community heart failure service](#)
British Journal of Cardiac Nursing 20(2), February 2025
The service described in this study took part in NHS England's 'managing heart failure @home' initiative, with a pilot project that implemented remote monitoring for patients with heart failure.
The project aimed to improve quality of life, promote self-management and facilitate recognition of deteriorating symptoms. This study described and evaluated the 6-month pilot project.

[Embedding virtual wards across England](#)
Respiratory Futures and British Thoracic Society, no date
Respiratory Futures spoke to Dr Sarah Sibley, Consultant Chest Physician and Community Respiratory Clinical Lead in Cheshire and Merseyside, about her experience of setting up virtual wards. Among her many roles, Dr Sibley is the Integrated Care Lead for the British Thoracic Society and the Virtual Ward Clinical lead for NHSE North West.

[Supporting early discharge from hospital through a trust-led virtual ward | NHS Confederation](#)
NHS Confederation, July 2023
Insights on how the Wandsworth and Merton hospital at home team set up one of the first community trust-led virtual wards in the country.

[Case study: urgent community response, virtual ward and care home teams work together to enable people to stay at home – Cheshire West](#)
NHS England, May 2023
In Cheshire West, the Hospital at Home team provide an integrated urgent community response service (UCR) and a frailty virtual ward for people living in care homes. When a resident requires urgent care they get fast access to a range of health and social care professionals within 2 hours through the UCR team. If they require ongoing monitoring and/or further treatment, they receive care through the frailty virtual ward.

[Working together on South West London's 'virtual ward' reduces length of stay in hospital and eases winter pressures](#)
NHS England, no date
"The virtual ward has kept me at home, able to cope and nursed me back to health. I think it's a wonderful service." This is the view of 89-year-old virtual ward patient 'Sheila' of the service in Sutton in South West London. Partnership working on a 'virtual ward', with capacity of up to 100 virtual beds, is reducing unnecessary hospital admissions and reducing the amount of time patients have to stay in hospital by two to three days, easing the pressure on the whole system.

[Impact of Virtual Wards](#)
Access, 14 April 2023
Virtual wards are a new implemented care programme, acting as an extension of the hospital ward, but what impact do these virtual wards have? What are the benefits to patients? Are virtual wards financially viable?
It is important to assess the services provided in healthcare to ensure they are performing properly, within the realms of a budget and providing the excellent care required. Dissecting a virtual ward is no different and standards must be met, otherwise patients risk suffering.

1. [An Economic Evaluation of a virtual Covid Ward in Leicester, Leicestershire, and Rutland](#)
2. [An Economic Assessment of the South Eastern Trust Virtual Ward](#) (Ulster and Bangor)
3. [Rapid Evaluation of the Virtual Ward at Croydon NHS](#)
4. [Review of Gateshead virtual ward](#)

5. The virtual diabetes hospital
6. Virtual Wards: First-of-kind case study on heart failure
7. Hospital at Home is a good option for older people
8. Virtual Ward case study for Mersey Care magazine
9. East Sussex Heart Failure Patients Endorse Virtual Wards Trial
10. East Sussex heart failure patients endorse virtual wards trial

'Virtual wards' help patients to recover at home
University College London Hospitals NHS FT, 13 April 2023
The UCLH@Home service is helping patients like 80-year-old Margaret Stone to continue their recovery in their own home under the care of their hospital team.

People to benefit from NHS@Home Virtual Wards service
HealthWatch Wiltshire, 9 March 2023
People living in Bath and North East Somerset, Swindon and Wiltshire are now able to receive acute clinical care from the comfort of their own home while helping to relieve pressures on local services.

Providing rapid care to people in their own home rather than going to hospital, through a frailty virtual ward in Leeds
NHS England, March 2023
This virtual ward in Leeds supports up to 37 patients per day and provides co-ordinated rapid care to people aged over 65 with moderate to severe frailty in their own homes. As of March 2023, they have saved over 21,500 bed days since launching the pilot virtual ward in November 2019.

Supporting people living with frailty in Hull and East Riding
NHS England

In Hull and East Riding, the team working as part of City Health Care Partnership CIC are at the beginning of their frailty ward journey. Their aim is to implement a safe and effective virtual ward, enabling them to care for people in the place they call home. This requires integrating acute frailty emergency department teams, intermediate care, urgent care, specialist community frailty team and other providers, including Primary Care Networks.

Virtual wards empower the people we care for in east Kent
NHS England
Our frailty Hospital at Home virtual ward was set up in response to COVID-19, to help people living with frailty avoid going to hospital. The ward is run by Kent Community Health NHS Foundation Trust (KCHFT) Community Frailty Team, in an area with a population of 500,000, which includes 275 care homes and more than 6,000 care home residents. As a coastal area which has traditionally attracted retirees, we provide services in locations with a higher frailty need than much of the UK.

Helping people with acute respiratory infections to return home earlier through a virtual ward in Wigan
NHS England, February 2023
In Wigan, a virtual ward supports people experiencing acute respiratory infections (ARI) in their own homes. We spoke to Wrightington, Wigan and Leigh Teaching Hospitals NHS Foundation Trust (WWL) about how the virtual ward works.

The Royal Berkshire NHS Foundation Trust outpatient services transformation programme to improve quality and effectiveness of patient care
Future Healthcare Journal, November 2022
The Royal Berkshire NHS Foundation Trust outpatient services transformation programme is a strategic change programme delivered as a collaborative approach through the Berkshire

West Integrated Care Partnership. The main aim of redesign is to improve capacity in clinics and improve patient experience.

[Virtual wards service extended, enabling more patients to be treated at home](#)
NHS Leicester, Leicestershire and Rutland, 27 October 2022
A new virtual wards service, which enables patients to receive treatment at home instead of in hospital, is being extended to support patients with a wider range of health conditions. A collaborative of local organisations have worked together to put the service in place, including the Leicester, Leicestershire and Rutland Integrated Care Board (LLR ICB), University Hospitals of Leicester NHS Trust, Leicestershire Partnership NHS Trust, DHU Healthcare and LOROS, together with technology providers Spirit Health and Dignio.

['Smart' tech to change the way patients are monitored](#)
Oxford Health NHS Foundation Trust, 9 August 2022
Oxford Health is trialling the use of smart monitors known as 'wearables' with some of its Hospital@Home patients so that clinicians can check vital signs remotely, enabling them to act if a condition deteriorates.

[Managing heart failure @home: an opportunity for excellence](#)
NHS England Blog, 19 July 2022
Following a successful launch event for professionals on the 18 July, National Clinical Director Nick Linker outlines an innovative approach supporting people to manage heart failure at home, using remote monitoring and self-management tools. Living with heart failure is becoming increasingly common due to our ageing population and improving medical care. In 2018, 920,000 people were living with heart failure in the UK, with around 200,000 new diagnoses made annually. People living with heart failure require significant input from NHS services. Caring for heart failure patients accounts for 2% of the total NHS budget and for 5% of all emergency hospital admissions in the UK.

[Caring for people with acute respiratory infections at home, through a virtual ward in Wolverhampton](#)
NHS England, July 2022
Our ARI virtual ward supports people at home, instead of being admitted into hospital. The virtual ward originally started as an oximetry at home monitoring service. This quickly developed into a COVID virtual ward, supporting people who were still very unwell but could continue their treatment and recovery at home. We are now evolving into an integrated respiratory service, which supports patients at home with COVID, COPD, asthma, oxygen weaning, and acute respiratory infections, such as pneumonia.

[More support for surgery patients on virtual wards](#)
Barts Health NHS Trust, 13 June 2022
Londoners waiting for heart surgery are to get more support thanks to a virtual ward created by a Barts Health consultant. The number of people waiting for procedures has increased during the pandemic.
The technology allows NHS clinicians to monitor patients at home, give advice on how to prepare for surgery and spot those who may need to be treated sooner. It's the brainchild of consultant cardiologist Dr Debashish Das and has been rolled out to eight specialist heart centres in the capital, including at St Bartholomew's Hospital. Patients using the system will answer questionnaires and submit data such as blood pressure to a virtual ward monitored by hospital clinicians.

[Case study: Providing rapid care to people in their own home rather going to hospital, through a frailty virtual ward in Leeds](#)
NHS England, March 2022

This case studies describes how the virtual ward in Leeds supports up to 40 patients per day and provides co-ordinated rapid care to people aged over 70 with moderate to severe frailty in their own homes.
Together, they have saved nearly 10,000 bed days since launching the pilot virtual ward in November 2019.

Trial of wearable health technology for cancer patients opens
Manchester University NHS Foundation Trust , 26 January 2022
A new trial opens in Greater Manchester today which is to test cutting-edge wearable technologies involving patients who have received cancer treatment. The commercially-available health sensors and devices produce a digital fingerprint of vital signs that could allow doctors to assess the progress of their patients.

Reducing conveyances of older patients in South Warwickshire
NHS Confederation, 11 January 2022
Clinicians wanted to test the feasibility of avoiding conveyances where possible and using virtual wards to keep people at home.

Video: Virtual wards enabled by technology: hospital-level care for people in their own home
NHS England YouTube, 2022
Virtual wards allow patients to receive care, monitoring and treatment, enabled by technology, in their own home, rather than going to hospital. Support may also involve face-to-face care from multi-disciplinary teams based in the community. This film is about the virtual ward at Norfolk and Norwich University Hospitals NHS Foundation Trust. The NHS is expanding the availability of virtual wards across England.

Rapid evaluation of Croydon Virtual Ward
Health Innovation Network South London, December 2021
This rapid evaluation aims to give quick and early messages around the impact of a technology-enabled virtual ward. It looks at patients that were admitted to the Croydon Health Services virtual ward which used the Current Health hub to continuously monitor the health of patients that were acutely unwell and identify any health deterioration. The evaluation explores a series of questions: 1. Who are the patients being admitted to the virtual ward? 2. What factors are essential to make the model effective? 3. Did patients find using the technology acceptable? 4. What is the patient experience of the service? 5. How did the service impact on healthcare utilisation? 6. Did the service deliver any cost savings? 7. What were the patient outcomes?

P19 COVID Virtual Ward and Emergency Department discharges: clinical outcomes and recommendations following COVID pandemic phase 2 Abstract all available
Thorax 76(Suppl 2), 2021
Introduction In wave 2 of the pandemic, the Virtual COVID Ward (VCW) was expanded to include Emergency Department (ED) as well as ward discharges with COVID pneumonitis. Outcomes of ED COVID patients have been reviewed and key recommendations drawn to inform practice in endemic phase COVID.

S57 The development and implementation of a virtual discharge ward for patients with COVID-19 pneumonia: data on the first 300 patients Abstract all available
Thorax 76(Suppl 1), 2021
Introduction: There is little described in the current COVID-19 literature about the outcomes of patients discharged from hospital following COVID-19 pneumonia. We describe the rapid establishment of a 'virtual ward' (VW) for follow-up of patients with a suspected or confirmed diagnosis of COVID-19 pneumonia or pneumonitis upon hospital discharge, characteristics and outcomes for the first 300 patient referrals.

OP339 Virtual COVID Ward: The Use Of Telehealth In The Emergency Response To COVID-19 Abstract all available
Technology Assessment in Health Care, 2021
Introduction: With unprecedented times, comes accelerated change. Hospitals in our region have begun to facilitate safe discharge for COVID-19 patients in the form of "The virtual COVID ward". This has enabled patients to be monitored safely in the community using pulse oximetry, Florence (a telehealth mobile app) and remote consultations. Our objective is to expand upon this model by providing home oxygen therapy for these patients facilitated by telemedicine.

NNUH Virtual Ward helps patients recover at home
Norfolk and Norwich University Hospitals NHS FT, March 2021
The NNUH Virtual Ward has launched to enable patients to continue their recovery from Covid-19 at home while being carefully monitored remotely.
The Virtual Ward builds on remote monitoring that is already in place and, in a phased roll out, will provide a safe and effective monitoring and follow-up service for up to 40 patients and the potential to help other patient groups.

There are some case studies on the FutureNHS Discharge and Community Services Group (free NHS Futures log in required and request to join the group)
- Royal Cornwall Hospitals Virtual Ward
- Leeds Frailty Virtual Ward

O-14 Creation of a virtual ward: a response to Covid-19 Abstract all available
BMJ Supportive & Palliative Care 11(2), 2020
Background With a second wave of COVID-19 peaking in mid-December 2020, one hospice closed its inpatient unit to allow clinical staff to be utilised to greater effect in the community. This approach had been used during the first wave of the pandemic,

with good effect, allowing more referrals and more patients to be cared for in their place of choice. However, for a very small number of complex patients, the lack of inpatient facilities had proved problematic. To avoid this consequence during the second wave, a new plan to open a virtual ward, staffed by some of the inpatient team, was devised. Aim To ensure that dying patients with complex needs were given equitable and appropriate care whilst the inpatient unit was closed.

Slough Covid-19 Virtual Ward Patient Stories
NHS England and Frimley Health and Care, 2020
Two case studies collected by the Slough COVID-19 pilot team, focusing on black and minority ethnic patients. The studies emphasise the importance of appropriate training and information delivery to patients, regular telephone consultations with clinicians, ensuring that information is available in different languages, and home visits where possible.

Providing rapid care to people in their own home rather than going to hospital, through a frailty virtual ward in Leeds
NHS England
This virtual ward in Leeds supports up to 37 patients per day and provides co-ordinated rapid care to people aged over 65 with moderate to severe frailty in their own homes.
As of March 2023, they have saved over 21,500 bed days since launching the pilot virtual ward in November 2019.

Wearable sensor trialled for remote Covid-19 monitoring
Imperial College London, April 2020
Wearable technology to remotely detect signs that a patient's condition is worsening is being trialled to support the ongoing COVID-19 response. Led by Imperial College London, in partnership with NHS organisations in northwest London, the sensor is being used to monitor people in quarantine at a special

NHS facility near Heathrow airport, for example travellers from abroad or those wishing to travel to return home.

[Remote monitoring for patients with chronic conditions in the Midlands](#)
NHS England – Transformation Directorate
Across Leicester, Leicestershire and Rutland the COVID-19 pandemic has driven forward a rapid expansion of remote monitoring schemes which is allowing clinical teams to keep track of patients with chronic conditions safely and in the comfort of their own home.
It forms part of a wider plan to improve digital health services for people with long term conditions, aiming to reduce the pressure on hospital services and improve outcomes by detecting and addressing signs of deteriorating health earlier among recently discharged and chronically ill patients.

[Supporting care with remote monitoring](#)
NHS England Transformation Directorate
The NHS continues to work on delivering more care to people in their homes.
NHSX is working with all 7 NHS regions in England to scale digitally enabled healthcare at home for people with long term conditions. This includes both physical and mental health, for people for whom home is a care home, and for acute COVID-19.

- [Remote ECG monitoring to support mental health patients in the North East and Yorkshire - Technology for the NHS - NHS Transformation Directorate](#) – North East and Yorkshire
- [Remote monitoring for care home residents across London - Technology for the NHS - NHS Transformation Directorate](#) – London
- [Remote monitoring technologies for heart failure, COPD and Covid-19](#) – Midlands

- [Managing long term conditions remotely in the North West](#) – North West
- [Developing a digitally-enabled remote oximetry service across the South East](#) – South East
- [Improving the health and wellbeing of people with learning disabilities in the South West](#) – South West
- [The role of remote monitoring in the future of the NHS](#) – South East London

[Tech-enabled virtual wards: relieving pressure on the NHS while caring for patients at home](#)
NHS England – Transformation Directorate
Early on during the first wave of the pandemic, NHSX supported a pilot that gave COVID-19 patients a pulse oximeter and an app. This meant they could leave hospital early, or avoid admission altogether.

[Virtual wards](#)
Sussex Health & Care
Virtual wards allow patients to get the care they need at home safely and conveniently, rather than being in hospital. Includes video examples from Hailsham and Eastbourne.

In the News

[Hospitals are urged to increase use of virtual wards to cut admissions](#)
BMJ, 17 May 2024
NHS England has set out its latest plans to slash waiting times in urgent and emergency care with an expansion of virtual wards, giving GPs the ability to directly refer patients to same day emergency care, while offering financial incentives to hospitals to cut 12 hour emergency waits.

Virtual wards: no place like home?
The Health Foundation, 14 March 2024
Virtual wards, also known as Hospital at Home, treat patients in their own homes who would traditionally be cared for in hospital. Their rapid rollout by NHS England has led to lots of discussion – heralded as both a potential solution for the capacity pressures on the NHS and cautioned against due to a lack evidence about their effectiveness.
The current 11,635 virtual ward 'beds' across England represent a huge investment of funding, staff and other resources during a time of unprecedented pressures on the NHS. With an initial allocation of £450m over 2 years, it's not a surprise many have been asking – do virtual wards actually work?

NHS: Virtual wards allow patients to receive care at home
BBC, 11 March 2024
More than 800 hospital patients are being cared for in virtual wards across Kent, Sussex and Surrey.
Virtual wards - also known as Hospital at Home - allow patients to get the care they need at home safely and conveniently.
The NHS has a UK target of 40-50 virtual ward beds per 100,000 people, which would mean more than 50,000 admissions a month.

'One part of the solution': how virtual NHS wards are now a reality
The Guardian, 7 February 2024
Harold Chugg spent much of early 2023 in a hospital bed because of worsening heart failure. During his most recent admission in June, the 75-year-old received several blood transfusions, which led to fluid accumulating in his lungs and tissues.
Ordinarily, he would have remained in hospital for further days or weeks while the medical team got his fluid retention under

control. But Harold was offered an alternative: admission to a virtual ward where he would be closely monitored in the comfort of his own home.

Virtual wards: Staffing gaps threaten national plan, warn leaders
BMJ, 25 May 2023
An initiative to provide care for patients in "virtual wards" such as their own homes rather than in NHS settings in England is at risk because of staff shortages, according to health leaders.

The government intends to expand virtual ward numbers and the conditions they monitor with a national ambition for the NHS to have 40 to 50 virtual ward beds per 100 000 population by December this year, scaling up capacity ahead of next winter to around 10 000 beds by this autumn.

But in an analysis the NHS Confederation, which represents NHS organisations, said that this "innovative" model was being "severely hampered" by a lack of clinical staff available to run it.

BT launches virtual ward programme to help transform UK health services
BT, 25 April 2023
- New programme spans product and partnerships to support the NHS and other healthcare providers with tech to help manage patient care
- Programme launch sees BT partner with leading healthcare technology specialists to offer virtual wards and virtual care solutions for the NHS
- Partner solutions available now include an integrated care app for clinicians, AI remote monitoring and an online patient consultation platform

World-leading NHS virtual wards treat 100,000 patients in a year
NHS England, 11 March 2023

More than 100,000 patients have been treated in NHS virtual wards in the last year, with 16,000 patients treated in January alone. Virtual wards allow patients to get hospital-level care at home safely and in familiar surroundings, helping speed up their recovery while freeing up hospital beds for patients that need them most.

Virtual wards: tech matters, but so do people
Health Tech World, 8 December 2022
Emily Wells is the first Chief Nursing Information Officer to be appointed by Norfolk and Norwich University Hospitals NHS Foundation Trust. Here, she outlines her thoughts on how to develop a successful virtual ward, drawing on her Trust's experience of working on new care pathways with HomeLink Healthcare.

Debate: Virtual Wards
National Health Executive, 20 September 2022
The National Health Executive hosted a debate, during the NHE365 Digital Healthcare virtual event, discussing about how the NHS has had to provide care to more than 600,000 patients in hospital with COVID from the very start of the pandemic. The virtual ward project is designing to act as a solution to allow more beds in the hospital to become available by managing and monitoring patients from the comfort of their own home. Using remote technologies, patients will be able to access health care through means of mobile IT and report any issues to clinicians.

Virtual wards, real world benefits
Microsoft, 30 June 2022
Sometimes it takes a crisis to fully grasp an opportunity. Virtual wards were invented in the early 2000's by Dr Geraint Lewis, now Director of Population Health at Microsoft. Despite that, it's only in the last few years that they have taken the NHS by storm. Virtual wards help reduce hospital admissions, keep patients

safer, and discharge them earlier in collaboration with social care where appropriate.

'Patients at risk' from 'hastily rolled out virtual wards'
HSJ, 7 January 2022
NHS England's plans to rapidly expand virtual wards are being 'hastily rolled out' and could put patients at risk while taking up significant staffing capacity, leading clinicians have warned.
The Society for Acute Medicine and the Royal College of Physicians are among those who have raised concerns to HSJ about the huge increase in the use of the virtual wards model, under which patients are discharged home and given oximeters that fit on their finger so they can be remotely monitored by clinical staff.

Networks

Virtual Wards (also known as Hospital at Home)
NHS Elect
Join our 12 month Virtual Wards Network and we'll guide you through every step. We've already supported many trusts and clinical teams to effectively maximise their virtual wards – so we can help you ensure yours is optimised too.

Join the NHSFutures virtual wards space

eLearning

Urgent Community Response and Virtual Ward Capabilities Framework eLearning 2023
NHS England and eLearning for Healthcare
This Virtual Ward and Urgent Community Response course is an interactive eLearning resource for health and care workforces

providing out of hospital services. This is aligned to the NHS England Virtual Ward and Urgent Community Response Capabilities Framework which aims to support the development of workforce capabilities and career pathways for staff in community-based careers.

Virtual wards enabled by technology
NHS England and eLearning for Healthcare
The virtual wards (VW) enabled by technology elearning session provides an overview of learning for registered clinicians working on a VW. It also includes links to national guidance and clinical pathway resources. VWs allow patients to receive the care they need in their own home, safely and conveniently rather than in hospital. VWs also provide integrated care systems with an opportunity to narrow the gap between demand and capacity for secondary care beds, by providing an alternative to admission or early discharge. A VW supports a person who would otherwise be in a physical hospital bed, to get the acute care, remote monitoring and treatment they need in their own home. There are different VW models, and their emphasis on technology varies in line with patient needs and preferences.

Frailty
NHS England and eLearning for Healthcare
The London Clinical Network for Frailty in collaboration with Imperial College Healthcare NHS Trust and Wessex Academic Health Science Network have developed this elearning programme which aims to standardise training and knowledge of frailty as a complex multi-system, long term condition. This education programme is compliant with the 'Frailty, A framework of core capabilities' (2018) and has been funded through Health Education England's Urgent and Emergency Care Workforce Collaborative for London.

The Star for workforce redesign

More resources and tools are available in the Star

Statistics

You can find relevant statistics on the Health and Care Statistics Landscape

National Data Programme

Workforce, Training and Education staff can look at the National Data Warehouse (NDL) SharePoint site to find out more about datasets and Tableau products.

Published Peer Reviewed Research

2025

Practitioners' perspectives on implementation of acute virtual wards: A scoping review
PLoS One, 2025
Virtual wards provide a promising alternative to traditional 'bedded care' by facilitating early discharges and delivering acute care at home. They focus specifically on patients needing acute care, which would traditionally necessitate an in-hospital stay. Understanding practitioners' beliefs and attitudes is crucial for successful implementation and operation of Virtual wards. This scoping review explores practitioners' perspectives on the implementation of virtual wards.

[Delivering safe, person-centred care for acutely unwell older people on virtual wards](#) Abstract only*
Nursing Older People, 2025
A virtual ward can provide hospital-level care for older people in their usual place of residence during an episode of acute illness. Care on a virtual ward may be delivered through a mix of in-person home visits, telephone or video calls and remote monitoring. This model of care can prevent unnecessary inpatient admissions, which in turn can prevent the development of associated complications in this patient population, such as deconditioning, delirium and hospital-acquired infections. However, there are barriers to the use of virtual wards in the care of older people. This article provides an overview of technology-enabled virtual wards and discusses some of the barriers to their use in older people's care as well as ways in which these can be addressed. The author also considers how nurses can help ensure that the care provided to an older person admitted to a virtual ward is person-centred and safe.

[Virtual hospitals: The future of the healthcare system? An expert consensus](#) Abstract only*
Journal of Telemedicine and Telecare 31(1), 2025
Today, social and healthcare systems at a global level are facing constant challenges dictated by an increasing mismatch between the demand for care services and the supply of human and economic resources. Such a situation has been exacerbated in the past two years by the Covid-19 pandemic. This has led to an increase in the leverage of digitalisation, which has proved to be a crucial tool for the development and application of new organisational models at both hospital and territorial levels, thus addressing the various criticalities already present in the system. In this sense, the Virtual Hospital has emerged as a potential model for increasing effectiveness and efficiency in delivering sociomedical services. Starting from these premises, an EFTE

(estimate, feedback, talk, estimate) approach was used to acquire an expert consensus within a multidisciplinary panel of academics and healthcare managers of the Veneto Region in Italy. This article reports the expert opinion on the possible application of the Virtual Hospital model in the national context, starting from the existing international evidence and good practices, highlighting the potential advantages and barriers to its implementation. Furthermore, the article analyses the most relevant areas of investment for the development of intangible assets and the acquisition of tangible assets necessary for its implementation.

[Census growth and challenges of a novel Hospital at Home program: A retrospective cohort study](#)
Journal of the American Geriatrics Society 73(3), 2025
Hospital at Home (HaH) is a growing care model requiring significant investments. Critical to starting a program is estimating census and enrollments. The objective of this study was to compare expected versus actual consults, enrollments, and barriers in a novel HaH program.

[Virtual nursing care and hospital avoidance: a scoping review protocol](#) Abstract only*
JBI Evidence Synthesis, 2025
This scoping review will describe the extent and range of the literature on virtual care technologies in the delivery of nursing care for the purpose of hospitalization avoidance. There has been a recent and rapid uptake of virtual care technologies in nursing to help reduce the burden on hospitals and to provide care for people in place. The nursing workforce must be supported to use new technologies and adopt new working methods in the delivery of care. There is a need to understand and explore how virtual care technologies can be used by nurses

to provide high-quality care through synthesis of the available literature.

[Mapping the landscape of Hospital at home (HaH) care: a validated taxonomy for HaH care model classification](#)
BMC Health Services Research 25(1), 2025
Hospital at home (HaH) care models have gained significant attention due to their potential to reduce healthcare costs, improve patient satisfaction, and lower readmission rates. However, the lack of a standardized classification system has hindered systematic evaluation and comparison of these models. Taxonomies serve as classification systems that simplify complexity and enhance understanding within a specific domain. This paper introduces a comprehensive taxonomy of HaH care models, aiming to categorize and compare the various ways HaH services are delivered as an alternative to traditional hospital care.

[Device based monitoring in digital care and its impact on hospital service use](#)
NPJ Digital Medicine 8(1), 2025
This systematic review examines four themes of device-based remote monitoring (DRM): technology, patient monitoring and support, integration of DRM into clinical care, and patient engagement, and their impact on hospital service use. We included randomized controlled trials (RCTs) until 2024 comparing hospital service use in DRM with usual care. Hospital service use decreased in DRM in 72% of the 116 included RCTs. Non-implantable devices were most commonly used to measure data, but showed a lower decrease in hospital service use than implanted or mobile devices (69% vs 89% and 76%). Providing 24/7 support for patients led to a decrease (81% of the studies). DRM replacing usual care, involving designated healthcare providers, and patient-performed data transmission led to a greater decrease in hospital service use. DRM has the potential

to further reduce hospital service use with additional factors such as sufficient support, automated processes, and optimized care redesign.

[Patient and care team perspectives on an app to support Hospital at Home admission decision making](#) Abstract only*
Journal of Hospital Medicine 20(1), 2025
Hospital at Home (HaH) programs are used throughout the United States and are beneficial in both providing patients care in environments most comfortable to them and freeing up inpatient beds. Better informing patients about HaH programs, while promoting shared decision-making (SDM), should be prioritized by health systems. SDM apps may promote increased patient agency and understanding of complex HaH care decisions. We previously developed, usability tested, and refined a HaH SDM app.OBJECTIVESTo evaluate the utility of SDM apps in assisting pneumonia patients with HaH admission.

[A descriptive report on the impact of pharmacy workflows in the operational success of hospital at home implementation at a county academic hospital system](#)
Exploratory Research in Clinical and Social Pharmacy 17, 2025
The hospital at home (HaH) model has become more prevalent in the American healthcare system due to its ability to decrease acute care costs and readmission risk. Recent publications have provided guidance on optimizing medication management and patient safety by leveraging clinical pharmacy services. There is limited data on pharmacoeconomic impact of HaH implementation, specifically in underinsured patients. Objectives To describe the development of HaH-related pharmacy workflows and evaluate the operational success of the program in an underinsured patient population.

[Validation of a Multi-Channel Ambient Sensor to Measure Vital Signs in Patients Within the Ward and at Home](#)

Sensors 25(4), 2025
Hospitalised, unwell patients have vital signs such as heart rate (HR), oxygen saturation (SpO2) and temperature measured multiple times a day to detect clinical deterioration and monitor health trajectories. Advancements in contact-free (ambient) sensors (AS) to measure vital signs can help mitigate risks due to skin injury and infection transmission seen in conventional hospital equipment. This prospective, observational clinical study aims to validate vital sign measurements from a multi-channel AS compared to conventional equipment in three cohorts: patients in a hospital ward, patients at home within a Hospital-at-Home service, and healthy volunteers.

Why is implementing remote monitoring in virtual wards (Hospital at Home) for people living with frailty so hard? Qualitative interview study
Age and Ageing 54(1), 2025
There is relatively low uptake of remote monitoring on frailty virtual wards (Hospital at Home) compared to virtual wards caring for people with other medical conditions. However, reasons for low uptake are poorly understood. OBJECTIVES To explore the views and experiences of frailty virtual wards stakeholders involved in implementing remote monitoring.

Exploring patient, informal caregiver and nurse experiences with home-based hospital-level care for decompensated heart failure: a mixed-methods study
European Journal of Cardiovascular Nursing, 2025
Hospitals are encouraged to provide care closer to patients' homes. This study investigates how patients, informal caregivers and nurses experience home-based hospital-level care for decompensated heart failure.

A service evaluation of the North East Essex Diabetes Service (NEEDS)
Journal of Interprofessional Care 39(2), 2025
Improving outcomes and the integration of diabetes care for adults is a National Health Service ambition. In north east Essex, United Kingdom, an innovative interprofessional community-based diabetes service (North East Essex Diabetes Service (NEEDS)) was developed to provide a single point of access and continuity of care across an integrated, interprofessional care pathway. The aim was to evaluate how NEEDS was embedded into Primary Care, and gain insight into how it works from the perspective of staff delivering the service and from those receiving care. A mixed methods approach was used. Retrospective data from GP surgeries involved in NEEDS were analyzed. Online surveys (n = 21) and focus groups (workforce n = 23; service users n = 6) were conducted. A clear pathway of diabetes care across an integrated, interprofessional care system was demonstrated. Standard care processes and patient outcomes were higher than those recorded for other GP surgeries across England. Service users reported that they received support with more control over their care. The workforce reported a reduction in bureaucracy, blurring of professional boundaries, and thus autonomy to develop the service. The "virtual ward" provided a true interprofessional team approach. Patients and the workforce reported feeling empowered, demonstrating a holistic high-quality approach to patient care.

Savings Through Telemedicine: Initial Data From a Hospital-at-Home Program
Value in Health Regional Issues 45, 2025
We aimed to estimate travel-related time and cost savings from the use of telemedicine for an inpatient hospital-at-home program.

The Next Step in Hospital-at-Home Care Could Be Virtual
Abstract only*

JAMA 333(2), 2025
This Medical News article discusses a virtual home-based acute care model at LA General called Safer@Home.

[Plain language summary about the use and difficulties of medicines given as an injection in Hospital-at-Home](#)
Postgraduate Medicine 137(1), 2025
This is a summary of an article originally published in the American Journal of Health-System Pharmacy. Hospital-at-Home (HaH) involves giving hospital-type care to patients at home. At home, patients often need injections. Injections can be given under the skin or into the muscle or vein with a needle. An injection could be given quickly or over longer periods of time. Patients, caregivers, doctors, nurses, pharmacists, and other healthcare staff face many problems in managing such injections in HaH.

[Cost Analysis of Oncological Outpatient Neurosurgery Under General Anesthesia with Hospital-At-Home-Based Postoperative Care](#)
World Neurosurgery 193, 2025
This study evaluates the efficiency and cost-effectiveness of an oncological outpatient neurosurgery protocol using enhanced recovery after surgery principles in a European healthcare setting. Additionally, it assesses the impact of incorporating hospital at home (HaH) for perioperative follow-up on program efficiency and costs.

[A 2-Year Retrospective Clinical Evaluation of a Novel Virtual Ward Model](#)
Journal of Primary Care & Community Health 16, 2025
OBJECTIVE The Wrightington, Wigan, and Leigh NHS Teaching Hospitals Foundation Trust (WWL) developed a novel virtual ward (VW) service that integrated with community and primary care, supported healthcare throughout a patient's journey, and

had a clinical workflow that could step-up or step-down care as needed. We described their VW and evaluated clinical outcomes, adherence, safety, and patient satisfaction.

[Economic evaluation of the Liverpool heart failure virtual ward model](#)
European Heart Journal Quality of Care & Clinical Outcomes 11(2), 2025
BACKGROUND A virtual ward (VW) supports patients who would otherwise need hospitalization by providing acute care, remote monitoring, investigations, and treatment at home. By March 2024, the VW programme had treated 10 950 patients across six speciality VWs, including heart failure (HF). This evaluation presents the economic assessment of the Liverpool HF VW.

[Virtual Monitoring Technician Performance in High-Fidelity Simulations of Remote Patient Monitoring: An Exploratory Study](#)
Journal of the Society for Simulation in Healthcare, 2025
INTRODUCTION Virtual Monitor Technicians (VMTs) are crucial in remotely monitoring inpatient telemetry. However, little is known about VMT workload and intratask performance changes, and their potential impact on patient safety. This exploratory study used a high-fidelity simulation aimed to evaluate VMTs' workload and performance changes over time in telemetry monitoring and identify future research directions for performance improvement.

[The role of virtual wards in maternity in the United Kingdom](#)
European Journal of Obstetrics, Gynecology, and Reproductive Biology 305, 2025
Virtual wards are an initiative which aims to provide hospital care from the comfort of the patient's own home. Monitoring and additional services, such as intravenous drugs and fluids and blood tests can be undertaken through this system. Although

virtual wards have been used in the UK since 2005 in specialties such as General Medicine, General Surgery and Paediatrics, their use in maternity has been more limited. This article aims to review their current use in the UK and beyond as well as to discuss some of the advantages and challenges they may pose to a maternity population.

Safety and Cost-Effectiveness of Hospital at Home in Patients with COVID-19
Southern Medical Journal 118(3), 2025
OBJECTIVES The coronavirus disease 2019 (COVID-19) pandemic significantly affected the capacity of health systems across the United States. Although not widely used before the pandemic, the hospital-at-home (HaH) model emerged as a potential strategy to alleviate hospital burden by providing hospital-level care in the home setting. This study aims to evaluate the safety, clinical effectiveness, and cost-efficiency of a HaH program for patients with COVID-19, comparing these outcomes with those of traditional in-hospital care.

Supporting older people through Hospital at Home care: a systematic review of patient, carer and healthcare professionals' perspectives
Age and Ageing 54(2), 2025
INTRODUCTION Hospital at Home provides hospital-level type care at home, both remote and face-to-face by a multidisciplinary team of healthcare professionals. In practice, various different models are employed, but we do not know what older people, their family carers (carers) and healthcare professionals think of what works best for them. This review aimed to describe the various Hospital at Home models and synthesise literature exploring patient, carer and staff perspectives of Hospital at Home care for older people.

Cancer care delivery during the Paris 2024 Olympic and Paralympic games: lessons from a crisis-driven Hospital at Home program
Frontiers in Medicine 12, 2025
Introduction The Paris 2024 Olympic and Paralympic Games posed logistical challenges for healthcare delivery, particularly for maintaining home-based cancer treatments amidst road closures and 15 million visitors. The Hospital at Home (HaH) program of Greater Paris University Hospitals (AP-HP) implemented innovative strategies to ensure uninterrupted care during this period.

Collaboration between professionals in primary and secondary healthcare services about hospital-at-home for children: A focus group study from the perspectives of stakeholders
Journal of Interprofessional Care , 2025
Collaboration among healthcare providers is regarded as a promising method to improve care quality and patient outcomes with limited human and financial resources. In Norway, "hospital-at-home" refers to care given by teams from the hospital pediatric wards who provide treatment and care in the family's home. When children need home visits multiple times daily, the hospital-at-home often reaches out to municipality healthcare providers, asking them to share this task. We aimed to explore the collaboration between stakeholders to gain knowledge on matters concerning the transfer of pediatric competence between hospital and home-based care, and to gain insight into how to set up the service for children in the future.

2024

Inpatient-level care at home delivered by virtual wards and hospital at home: a systematic review and meta-analysis of complex interventions and their components

BMC Medicine 22, 2024
Technology-enabled inpatient-level care at home services, such as virtual wards and hospital at home, are being rapidly implemented. This is the first systematic review to link the components of these service delivery innovations to evidence of effectiveness to explore implications for practice and research.

Virtual wards: benefits, challenges and required skills | Nursing Times Full text available with NHS OpenAthens account*
Nursing Times, 2024
Virtual wards have benefits for both nursing staff and patients, although nurses need to make key considerations about their own practice when providing care in this context. Virtual wards provide system-wide opportunities that could help shape the workforce. This article identifies their benefits and challenges, as well as their impact on practice.

Hospital at Home Program for the Treatment of Pediatric Osteoarticular Infections Abstract only*
Hospital Pediatrics 14(2), 2024
OBJECTIVES Hospital at home (HAH) replaces acute inpatient hospital care for selected patients by providing care in their homes. We sought to describe the characteristics, management, and complications of patients with osteoarticular infections (OAIs) treated in an HAH program and its economic impact.

The future of hospital at home: a qualitative interview study of healthcare staff Abstract only*
European Geriatric Medicine 15(4), 2024
Hospital at Home (HaH) services are expanding to provide acute multidisciplinary care in an individual's home. In this pilot study, we interviewed HaH staff to understand challenges and opportunities for service development.

Fighting the Same Battles on a New Battleground: Embedding

Technologies in a Virtual Care Environment
Studies in Health Technology and Informatics 310, 2024

The pandemic necessitated the rapid design, development and implementation of technologies to allow remote monitoring of COVID-19 patients at home. This study aimed to explore the environmental barriers and facilitators to the successful development and implementation of virtual care technologies in this fast-paced context. We interviewed eight staff at a virtual hospital in Australia. We found key facilitators to be a learning organizational culture and strong leadership support. Barriers included interoperability issues, legislative constraints and unrealistic clinician expectations. Also, we found that a combination of hot-desking and the lack of single sign on in the virtual care environment, was reported to create additional work for staff. Overall, despite this unique context, our findings are consistent with prior work examining design and implementation of healthcare technologies. The fast pace and high-pressure environment appeared to magnify previously reported barriers, but also cultivate and foster a learning culture.

Virtual Home Care for Patients With Acute Illness
JAMA Network Open 7(11), 2024
Importance Recent evolutions in clinical care and remote monitoring suggest that some acute illnesses no longer require intravenous therapy and inpatient hospitalization.ObjectiveTo describe outcomes of patients receiving care in a new, outpatient, virtual, home-based acute care model called Safer@Home.

Hospital at home: Opportunity knocks or opportunity costs?
The Journal of the Royal College of Physicians of Edinburgh 54(1), 2024Hospitals are amazing places. Whether big or small, shiny or otherwise, hospitals provide rapid and urgent access to multi-professional healthcare specialists, diagnostics, treatments

and interventions. But hospitals are inherently dangerous places – filled with iatrogenic risks and over-filled with patients, such that they are bursting at the seams. Imagine if we could look after people in their own homes instead? With Hospital at Home (H@H), perhaps we can

[Soft Skills: The Work of Communication and Persuasion Among Nurse Navigators in Hospital at Home Programs](#) Abstract only*
The Journal of Nursing Administration 54(4), 2024
OBJECTIVE To assess the role of soft skills in the work of Hospital at Home (HaH) nurse navigators. BACKGROUNDIn HaH programs that employ them, nurse navigators are often responsible for identifying, assessing, referring, and educating potential HaH patients. The experiences of these navigators have gone understudied.

[The Essentials for Implementing and Operating Hospital at Home: Lessons Learned from UK Health Care Professionals](#)
Journal of the American Medical Directors Association 25(2), 2024
Hospital at Home (HaH) is an innovative approach to providing acute and subacute care in the patient's (care) home, with the dual purpose of increasing bed capacity and providing patients with high-quality, person-centered care and the option to remain at home.[1] HaH services treat people with a wide range of conditions in a variety of contexts. Nevertheless, a common feature is the acuity and the complexity of the patient's condition—often associated with older age and frailty. A growing body of evidence supports its clinical effectiveness and safety,[2-7] cost-saving and wider system value,[3,8] and patient and carer benefits.[2,3,9] However, a paucity of research addresses how to implement HaH services.

[An integrated understanding of the impact of hospital at home: a mixed-methods study to articulate and test a programme theory](#)

BMC Health Services Research 24(1), 2024
BACKGROUND Hospital at Home (HaH) provides intensive, hospital-level care in patients' homes for acute conditions that would normally require hospitalisation, using multidisciplinary teams. As a programme of complex medical-social interventions, a HaH programme theory has not been fully articulated although implicit in the structures, functions, and activities of the existing HaH services. We aimed to unearth the tacit theory from international evidence and test the soundness of it by studying UK HaH services.

[Hospital At Home: TEAM Mindset for Success](#)
Journal of Brown Hospital Medicine 3(3), 2024
Acute Care hospital at home is a new concept in healthcare delivery. Physicians and leaders in healthcare delivery striving to optimize patient care must adopt the TEAM (Teamwork, Encouragement, Acknowledgement, Motivation) mindset to ensure teams' successes.

[Preparing for Hospital at Home: A Review of the Current Landscape of Training Practices](#)
Studies in Health Technology and Informatics 321, 2024
Hospital at Home (HaH) is a model of care that provides hospital-level care in the patient's home, requiring a unique set of competencies and skills from both multidisciplinary care teams and informal caregivers. These skills are often different from those required in traditional hospital settings. The aim of this paper is to consolidate the information of HaH-related education and training to support the development of standardized curricula to ensure safe hospitalization at home.

[Admission avoidance hospital at home](#)
The Cochrane Database of Systematic Reviews 3, 2024
BACKGROUND Admission avoidance hospital at home provides active treatment by healthcare professionals in the patient's

home for a condition that would otherwise require acute hospital inpatient care, and always for a limited time period. This is the fourth update of this review. OBJECTIVES To determine the effectiveness and cost of managing patients with admission avoidance hospital at home compared with inpatient hospital care.

Barriers to hospital-at-home acceptance: a systematic review of reasons for patient refusal
mHealth 10, 2024
Background Hospital-at-home (H@H) models have gained recognition as a safe and potentially cost-effective solution for the current rising global healthcare needs. However, despite these models' potential, their adoption has been limited partly due to patients refusing care at home. This systematic review analyses the reasons behind their refusal.

Capacity Planning of Virtual Wards for Frail and Elderly Patients
Healthcare 12(5), 2024
This paper investigates the planning of virtual ward (VW) capacity including the remote monitoring of frail and elderly patients. The main objective is to optimize VW hub locations across a region in the United Kingdom. Furthermore, assigning the optimal number of clinicians to different regions needs to be considered. We develop a mathematical model that minimizes the setup and travel costs of VW hubs and staff. Our experimental analysis evaluates different levels of demand considering postcode areas within different Trusts, also known as Health Boards, in the National Health Service (NHS). Furthermore, our experiments provide insights into how many hub locations should be deployed and staffed. This can be used to individually find the number of remote monitors and clinicians for each facility as well as the system overall.

Hospital Staff Perspectives on the Drivers and Challenges in

Implementing a Virtual Rehabilitation Ward: Qualitative Study
JMIR Aging 7, 2024
Background Over the past decade, the adoption of virtual wards has surged. Virtual wards aim to prevent unnecessary hospital admissions, expedite home discharge, and enhance patient satisfaction, which are particularly beneficial for the older adult population who faces risks associated with hospitalization. Consequently, substantial investments are being made in virtual rehabilitation wards (VRWs), despite evidence of varying levels of success in their implementation. However, the facilitators and barriers experienced by virtual ward staff for the rapid implementation of these innovative care models remain poorly understood .Objective This paper presents insights from hospital staff working on an Australian VRW in response to the growing demand for programs aimed at preventing hospital admissions. We explore staff's perspectives on the facilitators and barriers of the VRW, shedding light on service setup and delivery.

From challenges to opportunities: Digital transformation in hospital-at-home care
International Journal of Medical Informatics 192, 2024
BACKGROUND Digital transformation is an ongoing sosio-technological process that can create opportunities in the health sector. However, the current landscape of digital transformation in hospital-at-home care is unknown. AIM To describe healthcare providers' perspectives of digital transformation in hospital-at-home care.

Virtual Hospitals and Patient Experience: Protocol for a Mixed Methods Observational Study
JMIR Research Protocols 13, 2024
BACKGROUND Virtual care is increasingly incorporated within routine health care settings to improve patient experience and access to care. A patient's experience encompasses all the interactions an individual has with the health care system. This

includes a greater emphasis on actively involving carers in the decisions and activities surrounding a patient's health care. OBJECTIVE This study aimed to investigate the variety of health care delivery challenges encountered in a virtual hospital and explore potential ways to improve the patient experience.

Length of stay and economic sustainability of virtual ward care in a medium-sized hospital of the UK: a retrospective longitudinal study
BMJ Open 14(1), 2024
OBJECTIVE To evaluate the length of stay difference and its economic implications between hospital patients and virtual ward patients.

The experiences of hospital staff with decision-making concerning patient enrolment in hospital at home services: A complex and dynamic process
PloS One 19(9), 2025
BACKGROUND Hospital at home care services offer a potential solution to the problem of strain on hospital beds while simultaneously enhancing patient outcomes. Nevertheless, implementation of the hospital at home care model is associated with several challenges. One such barrier involves patient enrolment, particularly during the initial stage of service operation. Due to their frontline experience, healthcare professionals possess valuable insights that can help us understand and address this challenge. This study aimed to explore the experiences of hospital staff in the decision-making process concerning patient enrolment in hospital at home.

Implementation of Sweden's first digi-physical hospital-at-home care model for high-acuity patients Abstract only*
Journal of Telemedicine and Telecare, 2024
AIM To evaluate Sweden's first implementation of a 24/7 high-acuity virtual in-patient ward through a digi-physical in-patient

care (DPIPC) program, a hospital-at-home care model combining a virtual hospital-based medical command centre and in-person ambulating medical services functioning as an extension of the Department of Medicine at a secondary-level hospital in Stockholm.

Incorporating patient, caregiver, and provider perspectives in the co-design of an app to guide Hospital at Home admission decisions: a qualitative analysis
JAMIA Open 7(3), 2024
Objective Hospital at Home (HaH) programs currently lack decision support tools to help efficiently navigate the complex decision-making process surrounding HaH as a care option. We assessed user needs and perspectives to guide early prototyping and co-creation of 4PACS (Partnering Patients and Providers for Personalized Acute Care Selection), a decision support app to help patients make an informed decision when presented with discrete hospitalization options.

Developing the future research agenda for the health and social care workforce in the United Kingdom: Findings from a national forum for policymakers and researchers
The International Journal of Health Planning and Management 39(3), 202
There is a gap between healthcare workforce research and decision-making in policy and practice. This matters more than ever given the urgent staffing crisis. As a national research network, we held the first ever United Kingdom (UK) forum on healthcare workforce evidence in March 2023. This paper summarises outputs of the event including an emerging UK healthcare workforce agenda and actions to build research capacity and bridge the gap between academics and decisionmakers. The forum brought together over 80 clinical and system leaders, policymakers and regulators with workforce researchers. Fifteen sessions convened by leading experts

combined knowledge exchange with deliberative dialogue over 2 days. Topics ranged from workforce analytics, forecasting, international migration to interprofessional working. In the small groups that were convened, important gaps were identified in both the existing research body and uptake of evidence already available. There had not been enough high quality evaluations of recent workforce initiatives implemented at pace, from virtual wards to e-rostering. The pandemic had accelerated many changes in skillmix and professional roles with little learning from other countries and systems. Existing research was often small-scale or focused on individual, rather than organisational solutions in areas such as staff wellbeing.

Hospital at home worldwide: Program and clinician characteristics from the World Hospital at Home Congress survey
Journal of the American Geriatrics Society 72(12), 2024
BACKGROUND Hospital at home (HaH) delivers hospital-level care to acutely ill patients at home as a substitute for brick-and-mortar hospital care. The clinician and program characteristics of HaH programs worldwide are relatively unknown. We sought to describe the world's HaH clinicians and their programs' characteristics.

Early discharge hospital at home as alternative to routine hospital care for older people: a systematic review and meta-analysis
BMC Medicine 22(1), 2024
BACKGROUND The global population of adults aged 60 and above surpassed 1 billion in 2020, constituting 13.5% of the global populace. Projections indicate a rise to 2.1 billion by 2050. While Hospital-at-Home (HaH) programs have emerged as a promising alternative to traditional routine hospital care, showing initial benefits in metrics such as lower mortality rates, reduced readmission rates, shorter treatment durations, and improved

mental and functional status among older individuals, the robustness and magnitude of these effects relative to conventional hospital settings call for further validation through a comprehensive meta-analysis.

The Views and Experiences of Integrated Care System Commissioners About the Adoption and Implementation of Virtual Wards in England: Qualitative Exploration Study
Journal of Medical Internet Research 26, 2024
BACKGROUND Virtual wards (VWs) are being introduced within the National Health Service (NHS) in England as a new way of delivering care to patients who would otherwise be hospitalized. Using digital technologies, patients can receive acute care, remote monitoring, and treatment in their homes. Integrated care system commissioners are employees involved in the planning of, agreeing to, and monitoring of services within NHS England and have an important role in the adoption and implementation of VWs in clinical practice. OBJECTIVE This study aims to develop an understanding of the acceptability and feasibility of adopting and implementing VWs in England from integrated care system commissioners' perspectives, including the identification of barriers and facilitators to implementation.

Hospital at Home - an emerging opportunity for internal medicine trainees
Future Healthcare Journal 11(4), 2024
Hospital at Home (HAH) is growing at pace in the UK and is an acute clinical service that takes staff, equipment, technologies, medication and skills usually provided in hospitals and delivers that hospital care to selected people in their homes or in nursing homes. Services are as yet mostly excluded from doctors' core training rotations. In parallel, non-traditional training pathways are being created to allow doctors to meet competencies outside of higher specialty training programmes. Evaluation of working in HAH as part of a locally designed internal medicine equivalence

programme was undertaken, with specific focus on whether internal medicine curriculum competencies could be obtained. HAH provides valid internal medicine training, offering unique opportunities in clinical decision making, risk management, multidisciplinary team working, palliative medicine, and core internal and geriatric medicine. Reduced exposure to specific procedural skills and resuscitation in HAH can be mitigated across a balanced training programme. As HAH services develop, inclusion of HAH within internal medicine training programmes is recommended, alongside further research into their potential as a training environment.

[Virtual Healthcare Revolution: Understanding Nurse Competencies and Roles](#)
SAGE Open Nursing 10, 2024
Introduction Digital healthcare, especially virtual health, has changed nurses' jobs and skills. In the evolving healthcare landscape, nurses healthcare landscape is increasingly required to have diverse competencies to navigate the world of virtual health effectively. Objective This study aims to qualitatively explore the role of nurses in virtual health and the competencies required to work in virtual health in Saudi Arabia, with a specific focus on SEHA virtual hospital.

[Dimensions and components of hospital-at-home care: a systematic review](#)
BMC Health Services Research 24(1), 2024
BACKGROUND AND AIM Hospital-at-home (HaH) care is known as a healthcare delivery approach providing acute care services at home as an alternative to traditional hospital care. This study aimed to explore the dimensions and components of HaH care.

[Insights from a single centre implementation of a digitally-enabled atrial fibrillation virtual ward](#)
PLOS Digital Health 3(3), 2024

Atrial fibrillation (AF) is the most prevalent cardiac arrhythmia and poses a significant public health burden. Virtual wards are a novel approach utilising digital solutions to provide hospital-level care remotely; their rollout has become a key priority for the UK National Health Service to expand acute care capacity. We devised and implemented a digitally-enabled AF virtual ward to monitor patients being established onto medical therapy following an AF diagnosis or an AF-related hospitalisation.

[Making a case for outpatient parenteral antimicrobial therapy (OPAT)](#)
The Journal of Antimicrobial Chemotherapy 79(8), 2024
In the wake of the COVID-19 pandemic, and its negative impact on both acute and elective care and decline in available inpatient resources, there is an imperative to maximize safe and effective alternatives to inpatient hospital care. Properly governed outpatient parenteral antimicrobial therapy (OPAT) services embed the principles of antimicrobial stewardship (AMS) (including use of early oral therapy) and support admission avoidance and early discharge for a growing range of patient groups with complex infections through well-organized multidisciplinary team working. Expansion of OPAT aligns with the UK's national strategy to deliver care closer to home and cost-effectively maximize use of inpatient resources. OPAT serves as an exemplar to other ambulatory services and presents opportunities for developing and assuring AMS strategies within the rapidly developing hospital-at-home and virtual ward environments.

[Hospital at Home programs: Decentralized inpatient care but centralized laboratory testing?](#) Abstract only*
Clinical Biochemistry 129, 2024
The Hospital at Home (HaH) program has experienced accelerated growth in major Canadian provinces, driven in part by technological advancements and evolving patient needs

during the COVID-19 pandemic. As an increasing number of hospitals pilot or implement these innovative programs, substantial resources have been allocated to support clinical teams. However, it is crucial to note that the vital roles played by clinical laboratories remain insufficiently acknowledged. This mini review aims to shed light on the diverse functions of clinical laboratories, spanning the preanalytical, analytical, and post-analytical phases within the HaH program context. Additionally, the review will explore recent advancements in clinical testing and the potential benefits of integrating new technologies into the HaH framework.

[Effectiveness and Safety of Postoperative Hospital at Home for Surgical Patients: A Cohort Study](#)
Annals of Surgery 279(5), 2024
OBJECTIVE To determine the feasibility and effectiveness of a Hospital at Home (HaH) enabled early transfer pathways for surgical patients. BACKGROUNDHaH serves as a safe alternative to traditional hospitalization by providing acute care to patients in their homes through a comprehensive range of hospital-level interventions. To our knowledge, no studies have been published to date reporting a large cohort of early home-transferred patients after surgery through a HaH unit

[The Transformative Power of Virtual Hospitals for Revolutionising Healthcare Delivery](#)
Public Health Reviews 45, 2024
Objectives: The objective of this narrative review is to explore the advantages and limitations of VHs in delivering healthcare, including access to specialized professionals, streamlined communication, efficient scheduling, integration of electronic health records, ongoing monitoring, and support, transcending geographical boundaries, and resource optimization.

[Factors influencing the implementation of early discharge hospital at home and admission avoidance hospital at home: a qualitative evidence synthesis](#)
The Cochrane Database of Systematic Reviews 3, 2024
BACKGROUND Worldwide there is an increasing demand for Hospital at Home as an alternative to hospital admission. Although there is a growing evidence base on the effectiveness and cost-effectiveness of Hospital at Home, health service managers, health professionals and policy makers require evidence on how to implement and sustain these services on a wider scale. OBJECTIVES(1) To identify, appraise and synthesise qualitative research evidence on the factors that influence the implementation of Admission Avoidance Hospital at Home and Early Discharge Hospital at Home, from the perspective of multiple stakeholders, including policy makers, health service managers, health professionals, patients and patients' caregivers. (2) To explore how our synthesis findings relate to, and help to explain, the findings of the Cochrane intervention reviews of Admission Avoidance Hospital at Home and Early Discharge Hospital at Home services.

[Hospital at home - developing a simulation induction programme for junior doctors](#)
Clinical Medicine (London, England) 24(6), 2024
Hospital at Home (HaH) provides hospital-level care within patients' homes. With services expanding, a London HaH service embedded new junior doctor posts. Currently, gaps exist in the under- and postgraduate curriculum to develop clinical skills required to deliver care in this context. HaH simulation (HaH-SIM) was developed, through a multi-cycle QIP, to improve early-career doctors' confidence in providing care in this unfamiliar environment. Surveys before and after HaH-SIM assessed confidence in practical, clinical and communication skills; ranked concerns; rated sessions and gained qualitative feedback. 41 doctors participated over 2 years. It currently

includes six low-fidelity stations and three high-fidelity stations. Confidence improved, particularly in managing end of life, decision-making around hospital admission and administering intravenous medications/fluids. High-fidelity scenarios, practical skills and prescribing stations were most highly rated. As HaH services expand, HaH-SIM is a feasible, effective and transferable way of improving early-career doctors' confidence and skills to provide care in patients' homes.

Virtual wards for people with frailty: what works, for whom, how and why-a rapid realist review
Age and Ageing, 2024
BACKGROUND Virtual wards (VWs) deliver multidisciplinary care at home to people with frailty who are at high risk of a crisis or in crisis, aiming to mitigate the risk of acute hospital admission. Different VW models exist, and evidence of effectiveness is inconsistent .AIMWe conducted a rapid realist review to identify different VW models and to develop explanations for how and why VWs could deliver effective frailty management.

An overview of Hospital-at-home versus other models of care
Journal of General and Family Medicine 26(1), 2024
Despite being increasingly adopted in various regions, the model of Hospital-at-home can still appear to be confusing to many healthcare workers. The authors examined and summarized the existing concepts and implementations of Hospital-at-home. How Hospital-at-home contrasts to traditional inpatient models were outlined.

2023

Virtual Acute Psychiatric Ward: Evaluation of Outcomes and Cost Savings
Psychiatric Services (Washington, D.C.) 74(10), 2023

OBJECTIVE The COVID-19 pandemic motivated rapid expansion of virtual care. In Winnipeg, Canada, the authors launched a virtual psychiatric acute care ward (vWARD) to divert patients from hospitalization through daily remote treatment by a psychiatry team using telephone or videoconferencing. This study examined vWARD patient characteristics, predictors of transfer to a hospital, use of acute care postdischarge, and costs of the vWARD compared with in-person hospitalization.

Evaluation of a remote monitoring service for patients with COVID-19 discharged from University College London Hospital
PloS One 18(7), 2023
INTRODUCTION In May 2020 a virtual ward for COVID-19 patients seen at University College London Hospital (UCLH) was established. The aim of this study was to see if specific factors can be used to predict the risk of deterioration and need for Emergency Department (ED) reattendance or admission.

A rapid mixed-methods evaluation of remote home monitoring models during the COVID-19 pandemic in England
Health and Social Care Delivery Research 11(13), 2023
Background Remote home monitoring services were developed and implemented for patients with COVID-19 during the pandemic. Patients monitored blood oxygen saturation and other readings (e.g. temperature) at home and were escalated as necessary. Objective To evaluate effectiveness, costs, implementation, and staff and patient experiences (including disparities and mode) of COVID-19 remote home monitoring services in England during the COVID-19 pandemic (waves 1 and 2).

The importance of a comprehensive geriatric assessment for older people admitted onto a virtual ward
British Journal of Nursing (Mark Allen Publishing) 32(18), 2023
A comprehensive geriatric assessment (CGA) provides a holistic

assessment for the frail and older person. The CGA considers physical and mental conditions as well as function, environmental and a person's social circumstances. Virtual wards are a new concept within the NHS, and use of virtual wards during the COVID-19 pandemic reduced hospital admissions by 50%. The British Geriatrics Society has set clear guidelines on how virtual wards should be developed within integrated care services via multidisciplinary community rapid response teams to improve patient outcomes. This article considers a logical approach to assessing suitability for admission onto a virtual ward for a patient who required hospital-at-home services. It does this through the use of a theoretical patient case study, in this case involving delirium and urinary tract infection. Frailty and frailty scoring tools are discussed, as are the advantages and disadvantages of a CGA, considering a clear progression through the five domains. It shows how conducting a CGA allows for the development of a problem list to help prioritise the patient's problems and plan accordingly. A critical review of the literature around virtual wards, hospital-at-home services and admission avoidance identified that community rapid response teams were the logical choice to provide a multidisciplinary holistic approach to the older person admitted onto a virtual ward.

COVID-19 Patients' Medication Management during Transition of Care from Hospital to Virtual Care: A Cross-Sectional Survey and Audit
Pharmacy 11(5), 2023
BACKGROUND Virtual models of care were implemented to ease hospital bed pressure during COVID-19. We evaluated the medication management of COVID-19 patients transferred to virtual models of care.

Medication management of COVID-19 patients during transition to virtual models of care: a qualitative study

INTRODUCTION Expansion of hospital service models was one of the strategies implemented to manage the COVID-19 pandemic through virtual models of care. COVID-19 patients were hospital inpatients transferred to virtual wards and managed outside the hospital. Pharmacists had to provide distance medication management and support services. Virtual care patient support incorporated telehealth consultations by doctors, pharmacists and nurses. This study explored hospital clinicians' experiences and perspectives on medication management and safety issues of the COVID-19 patients transferred from inpatient units (IPUs) to virtual models of care at the time of transfer.

Hospital at Home as a Novel Care Strategy for Worsening Heart Failure
JACC.Heart Failure 11(10), 2023
Hospital at home (HaH), a care model designed to deliver inpatient-level care in the patient home, represents a significant opportunity to improve the management of worsening heart failure (WHF). For decades, the mechanics of clinical care delivery for heart failure (HF) have remained largely unchanged, with WHF generally treated by 1 of 2 possible pathways: inpatient hospitalization with intravenous (IV) diuretics, or continued outpatient management with intensification of oral therapies. This dichotomous approach of hospital *or* home has forced a wide spectrum of disease severity and care needs into a rigid paradigm, limiting care to these 2 traditional care settings. For the right patient, HaH offers the potential opportunity to bridge the advantages of both the hospital *and* the home in an innovative, equitable, value-driven, and patient-centered care model.

Pathways to interoperable electronic patient records in health and social care, Part 2: introduction for commissioners, chief clinical information officers and senior medical and social care

leaders involved in health IT commissioning and strategy
Future Healthcare Journal 10(3), 2023
Since the start of the 2020 Coronavirus 2019 (COVID-19) pandemic, new models of care have rapidly emerged in both health and social care in the UK. The sharing of structured and unstructured data across care organisations has become increasingly important, especially in transfer of care situations and other services, such as hospital at home. At the same time synchronous and asynchronous communication between professionals, patients and their carers, which integrates with patients' records, is optimising care pathways, improving access to care and enhancing self-management of care, particularly for people with long-term conditions. Interoperability and integration of healthcare records is a complex undertaking with various technical, regulatory and organisational challenges. It requires a long-term commitment, collaboration, and investment for all stakeholders to create a comprehensive, interoperable health and social care information ecosystem across the UK. Engaged understanding of these building blocks by clinical and social care leaders will help ensure today's solutions do not become tomorrow's problems.

Digitally enabled acute care for atrial fibrillation: conception, feasibility and early outcomes of an AF virtual ward
Open Heart 10(1), 2023
BACKGROUND Atrial fibrillation (AF) represents a growing healthcare challenge, mainly driven by acute hospitalisations. Virtual wards could be the way forward to manage acute AF patients through remote monitoring, especially with the rise in global access to digital telecommunication and the growing acceptance of telemedicine post-COVID-19.

Enhanced recovery and same-day discharge after brain tumor surgery under general anesthesia: initial experience with Hospital-at-Home-based postoperative follow-up

Neurosurgical Focus 55(6), 2023
OBJECTIVE The objective of this study was to describe the outcomes of outpatient oncological neurosurgery (OON) in a European clinical setting and to compare them with the conventional inpatient protocol.

The Complexity of Transferring Remote Monitoring and Virtual Care Technology Between Countries: Lessons From an International Workshop
Journal of Medical Internet Research 25, 2023
International deployment of remote monitoring and virtual care (RMVC) technologies would efficiently harness their positive impact on outcomes. Since Canada and the United Kingdom have similar populations, health care systems, and digital health landscapes, transferring digital health innovations between them should be relatively straightforward. Yet examples of successful attempts are scarce. In a workshop, we identified 6 differences that may complicate RMVC transfer between Canada and the United Kingdom and provided recommendations for addressing them.

Patient and Clinician Perceptions of the Pulse Oximeter in a Remote Monitoring Setting for COVID-19: Qualitative Study
Journal of Medical Internet Research 25, 2023
BACKGROUND As a response to the COVID-19 pandemic, the Sydney Local Health District in New South Wales, Australia, launched the rpavirtual program, the first full-scale virtual hospital in Australia, to remotely monitor and follow up stable patients with COVID-19. As part of the intervention, a pulse oximeter wearable device was delivered to patients to monitor their oxygen saturation levels, a critical indicator of COVID-19 patient deterioration. Understanding users' perceptions toward the device is fundamental to assessing its usability and acceptability and contributing to the effectiveness of the intervention, but no research to date has explored the user

experience of the pulse oximeter for remote monitoring in this setting. OBJECTIVEThis study aimed to explore the use, performance, and acceptability of the pulse oximeter by clinicians and patients in rpavirtual during COVID-19.

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Systematic literature review on the effectiveness and safety of paediatric hospital-at-home care as a substitute for hospital care
Abstract only*
European Journal of Pediatrics 182(6), April 2023
The hospital landscape is shifting to new care models to meet current challenges in demand, technology, available budgets and staffing. These challenges also apply to the paediatric population, leading to a reduction in paediatric hospital beds and occupancy rates. Paediatric hospital-at-home (HAH) care is used to substitute hospital care in an attempt to bring hospital services closer to children's homes. In addition, these models attempt to avoid fragmentation of care between hospitals and the community. An important prerequisite for this paediatric HAH care is that it is safe and at least as effective as standard hospital care. The aim of this systematic review is to analyse the evidence on the impact of paediatric HAH care on hospital utilisation, patient outcomes and costs.

Digital Health Technologies for Post-Discharge Care after Heart Failure Hospitalisation to Relieve Symptoms and Improve

[Clinical Outcomes](#)
Journal of Clinical Medicine 12(6), March 2023
The prevention of recurrent heart failure (HF) hospitalisations is of particular importance, as each such successive event may increase the risk of death. Effective care planning during the vulnerable phase after discharge is crucial for symptom control and improving patient prognosis. Many clinical trials have focused on telemedicine interventions in HF, with varying effects on the primary endpoints. However, the evidence of the effectiveness of telemedicine solutions in cardiology is growing. The scope of this review is to present complementary telemedicine modalities that can support outpatient care of patients recently hospitalised due to worsening HF.

[COVID-19 (Omicron strain) hospital admissions from a virtual ward - who required further care?](#)
Influenza and Other Respiratory Viruses 17(3), March 2023
The COVID-19 virtual ward was created to provide care for people at home with COVID-19. Given this was a new model of care, little was known about the clinical characteristics and outcomes of patients requiring admission to hospital from the virtual ward platform. The aims were to characterise hospital admission volume, patient epidemiology, clinical characteristics, and outcome from a virtual ward in the setting of an Omicron (BA.1, BA.2) outbreak.

[Opinion: Virtual wards – urgent care policy must follow the evidence](#)
BMJ 380, 17 February 2023
Virtual wards must not distract from the urgent need for long term workforce, clinical, and capacity plans, write Dan Lasserson and Tim Cooksley

["I don't know how we would have coped without it." Understanding the Importance of a Virtual Hospital Visiting](#)

[Program During the COVID-19 Pandemic](#)
Journal of Patient Experience 10, February 2023
As the COVID-19 pandemic reached Canada in full strength, the concept of allowing visiting to patients became an impossibility in most healthcare organizations. In March 2020, hospitals across Canada made the decision to close to visitors. This was a complicated decision which left admitted patients with very little option for connecting with family and friends other than through the telephone. In response, North York General Hospital launched a virtual family visiting (VFV) program across all inpatient units. Here we report the findings of a qualitative study of the program informed by an interpretive descriptive approach.

[Digital health as an enabler for hospital@home: A rising trend or just a vision?](#)
Frontiers in Public Health 11, February 2023
This study aims to identify the current state of implementation of emerging concepts into the hospital@home research and models of care; to identify strengths and weaknesses, opportunities, and threats associated with the models of care; and to suggest a research agenda.

[Digital Health and Machine Learning Technologies for Blood Glucose Monitoring and Management of Gestational Diabetes](#)
IEEE Reviews in Biomedical Engineering, February 2023
Abstract: Innovations in digital health and machine learning are changing the path of clinical health and care. People from different geographical locations and cultural backgrounds can benefit from the mobility of wearable devices and smartphones to monitor their health ubiquitously. This paper focuses on reviewing the digital health and machine learning technologies used in gestational diabetes - a subtype of diabetes that occurs during pregnancy. This paper reviews sensor technologies used in blood glucose monitoring devices, digital health innovations and machine learning models for gestational diabetes monitoring

and management, in clinical and commercial settings, and discusses future directions.

Digital health and technologies Abstract only*
British Journal of Community Nursing 28(3), February 2023
Abstract: Digital health was given impetus by the COVID-19 pandemic and demonstrated its potential for the delivery of safe care in the community. Remote monitoring and virtual wards are becoming mainstreamed across the UK. Artificial intelligence (AI) software has the potential to transform healthcare delivery but its trustworthiness is a key challenge. Positive staff attitudes towards digital health and new ways of working require staff education and engagement. Continued attention is required to meet the needs of those without access to digital technology and its use.

Virtual wards: a rapid evidence synthesis and implications for the care of older people
Age and Ageing 52(1), January 2023
Virtual wards are being rapidly developed within the National Health Service in the UK, and frailty is one of the first clinical pathways. Virtual wards for older people and existing hospital at home services are closely related.

Interprofessional collaboration in a community virtual ward: A focus group study
Scandinavian Journal of Caring Sciences 37(3), January 2023
The aim of the study was to explore healthcare professionals' experiences of interprofessional collaboration in care for patients with multimorbidity in a community virtual ward in the Norwegian context.

Patient satisfaction with a virtual multidisciplinary team balance clinic: a pilot study Abstract only*
British Journal of Healthcare Management 29(1), January 2023

Background/Aims: The COVID-19 pandemic led to many services being conducted remotely, including ear, nose and throat services. Although much in-person activity has now resumed, some services are still being provided remotely. This pilot study explored patients' satisfaction with the virtual multidisciplinary team balance clinics established at the authors' practice, looking at the feasibility of continuing this model of service delivery in the future.

Comprehensive Geriatric Hospital at Home: Adaptation to Referral and Case-Mix Changes During the COVID-19 Pandemic
Journal of the American Medical Directors Association 24(1), January 2023
OBJECTIVES: To describe the evolution of a Hospital at Home (HAH) based on comprehensive geriatric assessment (CGA), including its adaptability to changing case-mixes and pathways during the COVID-19 pandemic.

Clinical Outcomes of a Newly Instituted Hospital at Home Program During the COVID19 Pandemic Abstract only*
2023
Annals of Family Medicine 21, 2023
Abstract: Context: The COVID19 pandemic stressed U.S. health systems beyond their capacity and created worsening clinical outcomes. Hospital a Home (HaH) programs were utilized infrequently prior to pandemic. The Acute Care at Home Waiver was introduced in 2020 to facilitate the creation of HaH programs with a goal of promoting treatment in the home setting. A potential alternative approach to creating rapid inpatient level health system capacity is providing hospital-level care at home to substitute for inpatient hospitalization. The overall impact on clinical outcomes of a HaH program in patients with COVID19 is not well understood. Objective: To compare clinical outcomes of a HaH program versus usual hospital care for patients admitted for COVID19.

[Expansion of patient eligibility for virtual glaucoma clinics: a long-term strategy to increase the capacity of high-quality glaucoma care](#) Full text available with NHS OpenAthens account*
Ophthalmology 107(1), 2023
Aims The virtual glaucoma clinic (VGC) is a well-established diagnostic pathway for delivery of glaucoma care. Current UK national guidance recommends VGCs for patients with ocular hypertension, glaucoma suspects or early glaucoma. This study evaluates whether expanded eligibility criteria, including other glaucoma phenotypes and disease stages, can deliver safe and effective care with a positive patient experience.

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Scandinavian Journal of Caring Sciences 37(3), 2023
Abstract: Background: The problem of a lack of nurses is expected to worsen in the future. With an ever-increasing number of elderly patients with multimorbidity and a shortage of healthcare professionals, primary care must innovatively organise their services to offer more sustainable healthcare services. Organising healthcare services in a community virtual ward has been found to improve the quality of life for vulnerable elderly populations. Aim(s): The aim of the study was to explore healthcare professionals' experiences of interprofessional collaboration in care for patients with multimorbidity in a community virtual ward in the Norwegian context.

[Technologies for monitoring activities of daily living in older adults: a systematic review](#) Abstract only*
Disability and Rehabilitation: Assistive Technology 19(4), 2023
Abstract: PURPOSE: As the older adult population rise globally, technologies to monitoring activities of daily living (ADL) may have a role in supporting aging in place for older adults. The objective of this systematic literature review was to study the scope, diversity and readiness of technologies developed to monitor ADL in older adults.

[Hospital at home: A change in the course of care](#) Abstract only*
Journal of the American Association of Nurse Practitioners 35

(3), March 2023
Acute care services in the United States are largely delivered in the hospital setting. Since the recent pandemic, acute care services in the hospital have become overwhelmed. An elderly population with comorbidities and lack of hospital capacity is leading to a "hospital without walls" approach to acute care. Hospital at Home (HaH) is a paradigm shift in the standard way to administer acute care. Model development coupled with innovations in telehealth and remote patient monitoring has led to HaH being considered a viable alternative to admitting patients to the hospital. Robust evidence suggests that HaH interventions are a new option for providers to assess, treat, and monitor patients. Outcomes equivalent to in-patient stays with no mortality difference makes this model a viable option for patient care outside of the hospital. An overall reduction in cost compared with an in-patient stay may be an economically viable option for overwhelmed hospital systems looking to care for their surrounding population. In this brief, we review some of the existing evidence and the growth of the HaH concept, and what it means for members of the interdisciplinary care team.

Hospital at home: emergence of a high-value model of care delivery
The Egyptian Journal of Internal Medicine 35(1), March 2023
With increasing healthcare demands for acute illness in patients especially in the times of pandemic, healthcare organizations require modern solutions. Hospital at home (HaH) is one such tool that has the potential to solve these problems without compromising the care of the patients., Main body: Hospitals have been the conventional setting for managing acute sickness patients; however, it could be a very challenging environment for a few patients, especially for the older population who are highly susceptible to hospital-acquired infections. Health care in a hospital setting can also be very expensive, as it often involves a lot of healthcare professionals providing care. HaH service can

provide the same quality of care expected in traditional settings., Conclusions: The median length of stay and the rate of readmissions were lower in people under HaH care. Compared with patients in a hospital setting, patients in HaH had better clinical outcomes. HaH unit provides an integrated, flexible, easy-to-scale platform that can be cost-effectively adapted to high-demand situations.

Technology-enabled virtual ward for COVID management of the elderly and immunocompromised in Singapore: a descriptive cohort
BMC Infectious Diseases 23(1), February 2023
Abstract: BACKGROUND: To address the hospital bed demand for Delta and Omicron surges in Singapore, the National University Health System (NUHS) developed a COVID Virtual Ward to relieve bed pressures on its three acute hospitals-National University Hospital, Ng Teng Fong General Hospital, Alexandra Hospital. To serve a multilingual population, the COVID Virtual Ward featuring protocolized teleconsultation of high-risk patients, use of a vital signs chatbot, supplemented by home visits where necessary. This study aims to evaluate the safety, outcomes and utilisation of the Virtual Ward as a scalable response to COVID-19 surges.

Virtual hospital-level care-feasibility, acceptability, safety and impact of a pilot Hospital-In-The-Home model for COVID-19 infection
Frontiers in Digital Health 5, 2023
Abstract: Background: Hospital-in-the-Home (HITH) delivers hospital level care to patients in the comfort of their own home. Traditionally HITH involves clinicians travelling to patients' homes. We designed and implemented a virtual model of care leveraging a combination of virtual health modalities for children with COVID-19 in response to rising patient numbers, infection risk and pressures on protective equipment. In contrast to other

models for COVID-19 infection in Australia at the time, our HITH service catered only for children who were unwell enough to meet criteria for hospitalisation (ie bed-replacement)., Aims: To measure the feasibility, acceptability, safety and impact of a virtual model of care for managing children with COVID-19 infection requiring hospital-level care.

Use of an open-source electronic health record to establish a "virtual hospital": A tale of two curricula
International Journal of Medical Informatics 169, 2023
Abstract: Background: The electronic health record (EHR) is central to medical informatics. Its use is also recognized as an important skill for future clinicians. Typically, medical students' first exposure to an EHR is when they start their clinical internships, and medical informatics students may or may not get experience with an EHR before graduation. We describe the process of implementing an open-source EHR in two curricula: Medicine and Medical informatics. For medical students, the primary goals were to allow students to practice analyzing information from the EHR, creating therapeutic plans, and communicating with their colleagues via the EHR before they start their first clinical rotations. For medical informatics students, the primary goal was to give students hands-on experience with creating decision support in an EHR.

Virtual wards: a rapid evidence synthesis and implications for the care of older people
Age and Ageing 52(1), January 2023
Abstract: BACKGROUND: Virtual wards are being rapidly developed within the National Health Service in the UK, and frailty is one of the first clinical pathways. Virtual wards for older people and existing hospital at home services are closely related., METHODS: In March 2022, we searched Medline, CINAHL, the Cochrane Database of Systematic Reviews and medRxiv for evidence syntheses which addressed clinical-

effectiveness, cost-effectiveness, barriers and facilitators, or staff, patient or carer experience for virtual wards, hospital at home or remote monitoring alternatives to inpatient care.

Severity of illness and risk of mortality in Mayo Clinic's virtual hybrid advanced care at home program: a retrospective cohort study
BMC Health Services Research 23(1), 2023
Background: In July 2020, Mayo Clinic launched Advanced Care at Home (ACH), a high-acuity virtual hybrid hospital-at-home model (HaH) of care at Mayo Clinic Florida and Northwest Wisconsin, an urban destination medical center and a rural community practice respectively. This study aims to describe demographic characteristics of ACH patients as well as their acuity of illness using severity of illness (SOI) and risk of mortality (ROM), to illustrate the complexity of patients in the program, taking into account the different diagnostic related groups.

Virtual wards and hospital at home services Abstract only*
Cancer Nursing Practice 22(2), 2023
As the boundaries between acute and community care change, new opportunities will arise for nurses. Virtual wards are expanding in many parts of the UK, with the aim of allowing patients to get the care they need at home, rather than in hospital.

Outcomes in novel hospital-at-home model for patients with COVID-19: a multicentre retrospective cohort study
Family Practice, 2023
Abstract: BACKGROUND: Hospital-at-home (HaH) care has been proposed as an alternative to inpatient care for patients with coronavirus disease (COVID-19). Previous reports were hospital-led and involved patients triaged at the hospitals. To

reduce the burden on hospitals, we constructed a novel HaH care model organized by a team of local primary care clinics.

The Next Frontier of Remote Patient Monitoring: Hospital at Home
Journal of Medical Internet Research 25, 2023
Abstract: Remote patient monitoring (RPM) has shown promise in aiding safe and efficient remote care for chronic conditions; however, its use remains more limited within the hospital at home (HaH) model of care despite a significant opportunity to increase patient eligibility, improve safety, and decrease costs. HaH could achieve these goals by further adopting the 3 primary modalities of RPM (ie, vital sign, continuous single-lead electrocardiogram, and fall monitoring). With only 2 in-person vital sign checks required per day, HaH patient eligibility is currently often limited to lower-acuity cases. The use of vital sign RPM within HaH could better match the standard clinical practice of vital sign checks every 4-8 hours and enable safe care for appropriate moderate-acuity medical and surgical floor-level patients not traditionally enrolled in HaH. Robust, efficient collection of more frequent vital signs via RPM could expand patient eligibility for HaH and create a digital health safety net that enables high quality care. Similarly, our experience at Massachusetts General Hospital has demonstrated that appropriate use of continuous single-lead electrocardiogram RPM can also expand HaH enrollment, particularly for patients with acute decompensated heart failure. Through increasing enrollment of patients in HaH, RPM stands to enable more patients to reap the potential safety benefits of home hospitalization, including decreased rates of delirium and hospital-acquired infections, and better avoid aspects of posthospital syndrome. Furthermore, instituting fall detection RPM allows care teams to further HaH patient safety during their episode of acute care and develop enhanced mitigation strategies to avoid falls post home hospitalization. RPM also has the potential to assist HaH in achieving greater economies of scale and decreasing direct variable costs. By expanding HaH eligibility, RPM could enable HaH programs, which have traditionally operated under capacity, to care for a larger census and decrease allocated fixed costs per hospitalization. Additionally, RPM for HaH could further optimize hybrid in-home and remote nurse or physician evaluations, decreasing costs on a per-episode basis by up to an estimated 3.5%. Overall, RPM holds great promise to increase patient eligibility and patient safety while decreasing costs. However, it is in its infancy in achieving its potential to advance the HaH model of care; further research and experience that inform operational and technical as well as policy considerations are needed.

A whole healthcare system mortality review of the second wave COVID-19 pandemic response, were lessons learned? Abstract only*
Acute Medicine 22(1), 2023
Abstract: We previously reported a study of features of emergency healthcare response to COVID-19 that could be modified to mitigate against future excess deaths. Here we determined what themes persisted in later waves. This was an expert panel review of all components of care delivered to COVID-19 patients who died (primary and secondary care, community services, NHS 111 and 999, COVID oximetry at home, virtual wards). 174 deaths were included. 5% were deemed >50% avoidable, 75% included avoidability themes. Contact with primary care remains mostly via telephone, creating diagnostic risk. Patient decision to avoid healthcare contact was common. Recommendations include: better utilisation of home monitoring in future pandemics; improved avoidance of nosocomial spread; patients be encouraged to seek medical advice earlier.

2022

[Successful implementation of round-the-clock care in a virtual ward during the COVID-19 pandemic](#) Abstract only*
British Journal of Nursing 31(20), November 2022
The COVID-19 pandemic led to unprecedented demand on NHS infrastructure. Virtual wards (VW) were created in response, using technology to monitor patients remotely. Their implementation required new systems of staffing, escalation, risk management and information governance. The Norfolk and Norwich University Hospitals Foundation Trust offered an example of a highly successful VW. It cared for 852 patients in its first year of operation, providing 24/7 nursing cover, supported by pharmacists and junior doctors, daily consultant-led ward rounds and virtual visits. The remote care platform collected continuous vital sign observations and generated custom alarms. The care team triaged, then escalated to nurse-specialists or consultants as required. Patients reported increased confidence and relief at earlier discharge. Staff highlighted the benefits of working from home, even if isolating or shielding. Challenges included developing awareness of the new service, overcoming concerns around increased workload and transitioning from emergency to long-term funding. The ward subsequently expanded from COVID-19 to nine other use cases.

[Lessons learnt for digital inclusion in underserved communities from implementing a covid virtual ward](#)
PLOS Digital Health 1(11), November 2022
Abstract: The factors associated with digital exclusion in the covid virtual ward population at a North West London teaching hospital were assessed in this study. Patients discharged from the covid virtual ward were contacted to give their feedback on their experience. Questions were tailored to whether or not the patient used the Huma app during their time on the virtual ward and were subsequently divided into 'app user' and 'non-app user'

cohorts. The non-app user population accounted for 31.5% of the total patients referred to the virtual ward. Four major themes drove digital exclusion in this group: language barriers, access, inadequate information/training, and poor IT skills. In conclusion, incorporating additional languages and improving hospital-setting demonstration and information provision to patients prior to discharge were highlighted as key factors for reducing digital exclusion in the covid virtual ward patients.

[Overcoming adversity: Building a remote interdisciplinary neurorehabilitation service during the COVID-19 pandemic](#)
Future Healthcare Journal 9(3), November 2022
Background: The COVID-19 pandemic necessitated rapid change in neurorehabilitation delivery at the Defence Medical Rehabilitation Centre (DMRC), with a reduction in inpatient capacity., Aims and method: An interdisciplinary remote working group developed a novel neurorehabilitation telerehabilitation (TR) model. The plan, do, study, act (PDSA) model was used to develop and monitor activity in the changing pandemic context and to identify clinical outputs, key themes and learning points.

[The virtual wards aiming to ease hospital pressures](#)
BMJ 378, July 2022
Health services in England have been tasked with treating more patients at home, to cope with growing demand for beds—Jo Best asks how this will work

[Palliative care virtual ward: early evaluation of a novel model of care to support patients with complex symptom management known to a UK tertiary hospital specialist palliative care team](#)
Future Healthcare Journal, July 2022
Introduction: This study aims to evaluate the pilot phase of a palliative care virtual ward (VW), believed to the first of its kind in the UK, to assess for safety, suitability, effectiveness and ability

to reduce length of hospitalisation for patients managed by a specialist palliative care (SPC) team in a tertiary hospital setting.

Remote care and triage of obstetric patients with COVID-19 in the community: operational considerations
BMC Pregnancy and Childbirth 22(550), July 2022
Background: During the SARS-CoV-2 (COVID-19) pandemic, routine antenatal care was disrupted, and pregnant women positive for COVID-19 were at increased risk of caesarean section, intensive care admission or neonatal unit admission for their baby. Virtual care and telehealth can reduce barriers to care and improve maternity outcomes, and adoption has been encouraged by health authorities in the United Kingdom. Methods: Norfolk and Norwich University Hospitals Trust deployed a flexible maternity virtual ward (MVW) service using the Current Health platform to care for pregnant women during the pandemic. Patients were monitored either intermittently with finger pulse oximetry or continuously with a wearable device. We outline the MVW technology, intervention and staffing model, triage criteria and patient feedback, as an example of an operational model for other institutions. Results: Between October 2021 and February 2022, 429 patients were referred, of which 228 were admitted to the MVW. Total bed-days was 1,182, mean length of stay was 6 days (SD 2.3, range 1–14 days). Fifteen (6.6%) required hospital admission and one (0.4%) critical care. There were no deaths. Feedback alluded to feelings of increased safety, comfort, and ease with the technology. Conclusions: The MVW offered a safety net to pregnant women positive for COVID-19. It provided reassurance for staff, while relieving pressures on infrastructure. When setting up similar services in future, attention should be given to identifying clinical champions, triage criteria, technology and alarm selection, and establishing flexible escalation pathways that can adapt to changing patterns of disease.

The impact of post-hospital remote monitoring of COVID-19 patients using pulse oximetry: A national observational study using hospital activity data
eClinical Medicine 48, June 2022
Background: There was a national roll out of 'COVID Virtual Wards' (CVW) during England's second COVID-19 wave (Autumn 2020 – Spring 2021). These services used remote pulse oximetry monitoring for COVID-19 patients following discharge from hospital. A key aim was to enable rapid detection of patient deterioration. It was anticipated that the services would support early discharge, reducing pressure on beds. This study is an evaluation of the impact of the CVW services on hospital activity.

Comparison of the Characteristics and Outcomes of COVID-19 Patients Treated by a Hospital-at-Home Service in Japan during the Alpha and Delta Waves
Journal of Clinical Medicine 11(11), June 2022
Abstract: Coronavirus infections occurred in repeated waves caused by different variants of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), with the number of patients increasing during each wave. A private after-hours house-call (AHHC) service provides hospital-at-home (HaH) services to patients in Japan requiring oxygen when hospital beds are in short supply. This retrospective study aimed to compare the characteristics of COVID-19 patients treated by the AHHC service during the COVID-19 waves caused by the Alpha (March-June 2021) and Delta (July-December 2021) SARS-CoV-2 variants.

Piloting 'Virtual Ward': a novel platform for delivering medical student education by residents
BMC Medical Education 22(1), May 2022
BACKGROUND: Clinical experiences lie at the heart of undergraduate medical education (UGME). COVID-19 related

disruptions in Medical Education impacted medical students substantially. As educators, efforts directed at developing new mediums to educate our medical students in the face of these new limitations were vital. The Virtual Ward (VW) pilot was an inaugural resident-driven, virtual educational opportunity aimed at supplement the learning of core internal medicine skills for undergraduate medical students.

[Factors associated with the workload of health professionals in hospital at home: a systematic review](#)
BMC Health Services Research 22(1), May 2022
Background: Understanding the factors related to workload, could help hospital at home (HaH) managers to make decisions on the most appropriate and efficient use of the HaH services. Published studies on this topic are scarce, so we have conducted a systematic review to identify such factors according to published evidence.

["Virtual ward" community outreach support for COVID-19-positive hemodialysis patients may delay but not prevent subsequent admission to hospital: A single-center retrospective case-control pilot study](#)
Hemodialysis International 26(2), April 2022
SARS-CoV-19 (COVID-19) has rapidly spread to become a global crisis since December 2019, disproportionately affecting haemodialysis (HD) cohorts who are unable to shield and frequently possess multiple risk factors for poorer outcome, including advanced age and multiple comorbidities (1,2). We and others have previously reported that regular screening of HD cohorts can detect asymptomatic infection and facilitate early cohorting away from noninfected patients (3,4). However, interventions to prevent subsequent deterioration and admission in COVID-19- positive HD cohorts are lacking. Interventions to reduce admission rates and to shorten admission length are desirable from a health service perspective to reduce pressure

on inpatient beds; from a patient perspective shortened or avoided admission reduces the risk of deconditioning. HD cohorts are particularly at risk of this, due to the high prevalence of pre-existing co-morbidities such as sarcopenia, diabetes and cardiovascular disease (5). A 'virtual ward' monitoring model was initiated at a large teaching hospital in the United Kingdom in November 2020 for all nasopharyngeal polymerase chain reaction (PCR) swab confirmed COVID-19 positive patients felt to be at risk of deterioration but not requiring admission (ambulant) at time of diagnosis. Symptomatic and asymptomatic COVIDpositive patients receiving in-centre HD were provided with written information, an oxygen saturation probe and daily contact with an outreach nurse along with weekly remote assessment by a multidisciplinary team of nephrologists, microbiologists, nurses and acute physicians. Outreach nurses undertook face-to-face review of patients in the community if required. Transfer to hospital for medical assessment was triggered by a fall in oxygen saturation to below 94% or a new clinical concern.

[Effectiveness and safety of pulse oximetry in remote patient monitoring of patients with Covid-19: a systematic review](#)
The Lancet Digital Health 4(4), April 2022
The COVID-19 pandemic has led health systems to increase the use of tools for monitoring and triaging patients remotely. In this systematic review, we aim to assess the effectiveness and safety of pulse oximetry in remote patient monitoring (RPM) of patients at home with COVID-19.

[The Rapid Development of Virtual Care Tools in Response to COVID-19: Case Studies in Three Australian Health Services](#)
JMIR Publications 6(4), April 2022
Background: News of the impact of COVID-19 around the world delivered a brief opportunity for Australian health services to plan new ways of delivering care to large numbers of people while

maintaining staff safety through greater physical separation. The rapid pivot to telemedicine and virtual care provided immediate and longer term benefits; however, such rapid-cycle development also created risks. Objective: The aim of this study was to understand the sociotechnical aspects of the rapid-cycle development of seven different COVID-19 virtual care tools, and to identify enablers, barriers, and risks at three health services in Victoria, Australia.

[Remote patient monitoring identified the need for triage in patients with acute Covid-19 infection](#) Abstract only*
Telemedicine and eHealth 28(4), April 2022
Introduction: Telehealth was frequently used in the provision of care and remote patient monitoring (RPM) during the COVID-19 pandemic. The Precision Recovery Program (PRP) remotely monitored and supported patients with COVID-19 in their home environment. Materials and Methods: This was a single-center retrospective cohort study reviewing data acquired from the PRP clinical initiative. Results: Of the 679 patients enrolled in the PRP, 156 patients were screened by a clinician following a deterioration in symptoms and vital signs on a total of 240 occasions, and included in the analyses. Of these 240 occasions, 162 (67%) were escalated to the PRP physician. Thirty-six patients were referred to emergency department, with 12 (7%) admitted to the hospital. The most common risk factors coinciding with hospital admissions were cardiac (67%), age >65 (42%), obesity (25%), and pulmonary (17%). The most common symptoms reported that triggered a screening event were dyspnea/tachypnea (27%), chest pain (14%), and gastrointestinal issues (8%). Vital signs that commonly triggered a screening event were pulse oximetry (15%), heart rate (11%), and temperature (9%). Discussion: Common factors (risk factors, vital signs, and symptoms) among patients requiring screening, triage, and hospitalization were identified, providing clinicians with further information to support decision making when utilizing

RPM in this cohort. Conclusion: A clinician-led RPM program for patients with acute COVID-19 infection provided supportive care and screening for deterioration. Similar models should be considered for implementation in COVID-19 cohorts and other conditions at risk of rapid clinical deterioration in the home setting.

[Hospital at home for acute medical illness: The 21st century acute medical unit for a changing population](#)
Journal of Internal Medicine 291(4), April 2022
Recent trends across Europe show a year-on-year increase in the number of patients with acute medical illnesses presenting to hospitals, yet there are no plans for a substantial expansion in acute hospital infrastructure or staffing to address demand. Strategies to meet increasing demand need to consider the fact that there is limited capacity in acute hospitals and focus on new care models in both hospital and community settings. Increasing the efficiency of acute hospital provision by reducing the length of stay entails supporting acute ambulatory care, where patients receive daily acute care interventions but do not stay overnight in the hospitals. This approach may entail daily transfer between home and an acute setting for ongoing treatment, which is unsuitable for some patients living with frailty. Acute hospital at home (HaH) is a care model which, thanks to advances in point of care diagnostic capability, can provide a credible model of acute medical assessment and treatment without the need for hospital transfer. Investment and training to support scaling up of HaH are key strategic aims for integrated healthcare systems.

[Overall patient experience with a virtual hybrid hospital at home program](#)
SAGE Open Medicine, April 2022
Abstract: Objectives: Traditional hospital at home models often have high patient experience scores. The purpose of this study is

to look at the patient experience of a new virtual hybrid model of hospital at home called Advanced Care at Home.

The impact of remote home monitoring of people with COVID-19 using pulse oximetry: A national population and observational study
eClinical Medicine 45, March 2022
Background: Remote home monitoring of people testing positive for COVID-19 using pulse oximetry was implemented across England during the Winter of 2020/21 to identify falling blood oxygen saturation levels at an early stage. This was hypothesised to enable earlier hospital admission, reduce the need for intensive care and improve survival. This study is an evaluation of the clinical effectiveness of the pre-hospital monitoring programme, COVID oximetry @home (CO@h).

Hospital at Home for Elderly COVID-19 Patients: A Preliminary Report with 100 Patients
Journal of Clinical Medicine 11(7), March 2022
Abstract: Hospital-at-home (HaH) care is useful for patients with COVID-19 and an alternative strategy when hospital capacity is under pressure due to patient surges. However, the efficacy and safety of HaH in elderly patients with COVID-19 remain unknown. In Kyoto city, we conducted a retrospective medical record review of HaH care focused on elderly COVID-19 patients from 4 February to 25 June 2021. Eligible patients were (1) COVID-19 patients aged >=70 years and those who lived with them or (2) COVID-19 patients aged <70 years with special circumstances and those who lived with them. During the study period, 100 patients received HaH care. Their median age was 76 years (interquartile range 56-83), and 65% were over 70 years. Among 100 patients, 36 (36%) had hypoxia (oxygen saturation <= 92%), 21 (21%) received steroid medication, and 34 (34%) received intravenous fluids. Although 22 patients were admitted to the hospital and 3 patients died there, no patients

died during HaH care. HaH care may be safe and effective in elderly patients with COVID-19. Our study shows that HaH provides an alternative strategy for treating COVID-19 patients and can reduce the healthcare burden at hospitals.

Virtual Wards: A Rapid Adaptation to Clinical Attachments in MBChB During the COVID-19 Pandemic Abstract only*
Advances in Experimental Medicine and Biology
Abstract: When the COVID-19 pandemic suddenly prevented medical students from attending their clinical attachments, the faculty involved in the third year of medical school (MBChB3) at the University of Glasgow created Virtual Wards. The focus of the Virtual Wards was to continue teaching of clinical reasoning remotely whilst COVID-19 restrictions were in place. Virtual Wards were mapped to the common and important presentations and conditions and provided opportunity for history-taking, clinical examination skills, requesting investigations, interpreting results, diagnosis and management. The Virtual Wards were successful, and further wards were developed the following academic year for MBChB4 students. This chapter describes the theoretical underpinnings of the Virtual Wards and the technological considerations, followed by a description of the Wards themselves. We then analyse an evaluation of the Virtual Wards and provide both a faculty and student perspective. Throughout the chapter, we provide tips for educators developing Virtual Ward environments.

Comparative Effectiveness of an Automated Text Messaging Service for Monitoring COVID-19 at Home
Annals of International Medicine 175(2), February 2022
Background: Although most patients with SARS-CoV-2 infection can be safely managed at home, the need for hospitalization can arise suddenly. Objective: To determine whether enrollment in an automated remote monitoring service for community-dwelling adults with COVID-19 at home ("COVID Watch") was associated with improved mortality.

[Association of Race and Neighborhood Disadvantage with Patient Engagement in a Home-Based COVID-19 Remote Monitoring Program](#)
Journal of General Internal Medicine 37, January 2022
Background: COVID-positive outpatients may benefit from remote monitoring, but such a program often relies on smartphone apps. This may introduce racial and socio-economic barriers to participation. Offering multiple methods for participation may address these barriers. Objectives: (1) To examine associations of race and neighborhood disadvantage with patient retention in a monitoring program offering two participation methods. (2) To measure the association of the program with emergency department visits and hospital admissions.

[Using virtual wards and long-term conditions management network to improve practice and performance](#)
BMJ Open Quality 11(4), 2022
England has more than 15 million people and counting with long-term conditions who have the greatest healthcare needs of the population accounting for 50% of all General Practitioner (GP) appointments and 70% of all bed days. Digital technology has the potential to transform care through empowering patients, establishing more robust therapeutic relationships as well as supporting stronger teamworking across boundaries and enabling creation of communities and networks to support patients. There is some hesitancy in National Health Service to adopt digital innovation, but the pandemic has transformed use of remote monitoring in a matter of weeks. The pandemic has highlighted how collaboration and digital technology innovation can radically transform health and care services at pace when people are provided with the space and support to be innovative. Nurse and clinical leaders with digital knowledge are key in engaging nurses who need to be at the heart of technological

developments and implementation to make sure changes facilitate, enhance patient care and improve clinical practice. This project aimed to create a forum that offered time, space and opportunities to innovate; share learning; and develop cross boundary relationships for project teams implementing technology-enabled remote monitoring or virtual ward solutions. Florence Nightingale Foundation scholar and NHSX Digital Health team ran the forum using community of practice principles. Qualitative data were used to measure any potential value created. Forum members reported increase in their personal knowledge as they managed to learn from others. An online platform created as an extension to the forum enabled members to continue networking and access resources. The forum provided space for relationships to get stronger. This enabled innovation that changed practice and performance around increased uptake of tech-enabled remote monitoring solutions by patients as well as indirect health outcomes. Further work is required to collate quantitative data to confirm these claims from the forum members.

[A Covid -19 Virtual Ward Model: A Preliminary Retrospective Clinical Evaluation From a UK District General Hospital](#)
Journal of Primary Care & Community Health, 2022
Objective: This study aims to evaluate the safety, utilization, ability to reduce length of hospitalization and overall outcomes of a COVID-19 virtual ward providing ongoing treatment at home.
[Covid-19 Oximetry @home: evaluation of patient outcomes](#)
BMJ Open Quality 11(1), 2022
Background COVID-19 has placed unprecedented demands on hospitals. A clinical service, COVID-19 Oximetry @home (CO@h) was launched in November 2020 to support remote monitoring of COVID-19 patients in the community. Remote monitoring through CO@h aims to identify early patient deterioration and provide timely escalation for cases of silent hypoxia, while reducing the burden on secondary care.

Methods We conducted a retrospective service evaluation of COVID-19 patients onboarded to CO@h from November 2020 to March 2021 in the North Hampshire (UK) community led service (a collaboration of 15 General Practitioner (GP) practices covering 230 000 people). We have compared outcomes for patients admitted to Basingstoke and North Hampshire Hospital who were CO@h patients (COVID-19 patients with home monitoring of oxygen saturation (SpO2; n=115), with non-CO@h patients (those directly admitted without being monitored by CO@h (n=633)). Crude and adjusted OR analysis was performed to evaluate the effects of CO@h on patient outcomes of 30-day mortality, Intensive care unit (ICU) admission and hospital length of stay greater than 3, 7, 14 and 28 days. Results Adjusted ORs for CO@h show an association with a reduction for several adverse patient outcome: 30-day hospital mortality (p<0.001, OR 0.21, 95% CI 0.08 to 0.47), hospital length of stay larger than 3 days (p<0.05, OR 0.62, 95% CI 0.39 to 1.00), 7 days (p<0.001, OR 0.35, 95% CI 0.22 to 0.54), 14 days (p<0.001, OR 0.22 95% CI, 0.11 to 0.41), and 28 days (p<0.05, OR 0.21, 95% CI 0.05 to 0.59). No significant reduction ICU admission was observed (p>0.05, OR 0.43, 95% CI 0.15 to 1.04). Within 30 days of hospital admission, there were no hospital readmissions for those on the CO@h service as opposed to 8.7% readmissions for those not on the service. Conclusions We have demonstrated a significant association between CO@h and better patient outcomes; most notably a reduction in the odds of hospital lengths of stays longer than 7, 14 and 28 days and 30-day hospital mortality.

Population-level impact of a pulse oximetry remote monitoring programme on mortality and healthcare utilisation in the people with COVID-19 in England: a national analysis using a stepped wedge design
Emergency Medicine Journal 39(8), 2022

Background: To identify the population-level impact of a national pulse oximetry remote monitoring programme for COVID-19 (COVID Oximetry @home (CO@h)) in England on mortality and health service use.

Home Monitoring Programs for Patients Testing Positive for SARS-CoV-2: An Integrative Literature Review
Applied Clinical Informatics 13(1), 2022
The aim of this study is to provide an integrative review of peer-reviewed literature on different RPM programs that were implemented for SARS-CoV-2 positive patients including their strengths and challenges.

How safe is virtual healthcare?
International Journal for Quality in Health Care 34(2), 2022
Background: Undeniable opportunities are posed by virtual models of care that address long-standing health system sustainability challenges and improve access. Virtual models of care describe preventive, diagnostic and treatment practices without face-to-face contact with healthcare providers. Common forms of virtual care that have rapidly progressed due to the coronavirus disease 2019 (COVID-19) pandemic include health provision via telephone or video-conferencing software, the use of wearable monitoring devices, digitized health information and remote (in-home) monitoring [1]. Virtual care has created healthcare contexts with further complexity as a result of novel care settings and technological systems that require different models and processes of care [2]. There may also be greater presence of family members, members of the public and technical support staff during healthcare encounters. These components collectively create highly unpredictable care environments. We examine the key risk areas of virtual healthcare for patient safety based on emerging evidence. Evaluations of virtual models deployed internationally indicate that their key risks relate to retaining the confidentiality of highly

personal or sensitive information and ensuring equitable access to services with the necessary supports. Such risks are particularly pertinent to individuals who experience existing health inequities; those with complex health and social needs, low health literacy or from low-income backgrounds [3, 4]. Whilst there has been much scrutiny of the safety features of digital health tools [5], exploration of patient safety in virtual healthcare through an equity lens is needed to ensure quality.

Remote COVID-19 patient monitoring system: a qualitative evaluation
BMJ Open 12(5), 2022
Background: Many COVID-19 patients are discharged home from hospital with instructions to self-isolate. This reduces the burden on potentially overwhelmed hospitals. The Royal Melbourne Hospital (RMH) Home Monitoring Programme (HMP) is a model of care for COVID-19 patients which chiefly tracks pulse oximetry and body temperature readings. Objective: To evaluate the feasibility and acceptability of the HMP from a patient perspective.

Exploring the impact of pulse oximeter selection within the COVID-19 home-use pulse oximetry pathways
BMJ Open Respiratory Research 9(1), 2022
Background: During the COVID-19 pandemic, portable pulse oximeters were issued to some patients to permit home monitoring and alleviate pressure on inpatient wards. Concerns were raised about the accuracy of these devices in some patient groups. This study was conducted in response to these concerns. Objectives: To evaluate the performance characteristics of five portable pulse oximeters and their suitability for deployment on home-use pulse oximetry pathways created during the COVID-19 pandemic. This study considered the effects of different device models and patient characteristics

on pulse oximeter accuracy, false negative and false positive rate.

Budget impact analysis of providing hospital inpatient care at home virtually, starting with two specific surgical patient groups
BMJ Open 12(8), 2022
Objective: To determine the budget impact of virtual care. Methods: We conducted a budget impact analysis of virtual care from the perspective of a large teaching hospital in the Netherlands. Virtual care included remote monitoring of vital signs and three daily remote contacts. Net budget impact over 5 years and net costs per patient per day (costs/patient/day) were calculated for different scenarios: implementation in one ward, in two different wards, in the entire hospital, and in multiple hospitals. Sensitivity analyses included best-case and worst-case scenarios, and reducing the frequency of daily remote contacts. Results: Net budget impact over 5 years was €2 090 000 for implementation in one ward, €410 000 for two wards and €−6 206 000 for the entire hospital. Costs/patient/day in the first year were €303 for implementation in one ward, €94 for two wards and €11 for the entire hospital, decreasing in subsequent years to a mean of €259 (SD=€72), €17 (SD=€10) and €−55 (SD=€44), respectively. Projecting implementation in every Dutch hospital resulted in a net budget impact over 5 years of €−445 698 500. For this scenario, costs/patient/day decreased to €−37 in the first year, and to €54 in subsequent years in the base case. Conclusions: With present cost levels, virtual care only saves money if it is deployed at sufficient scale or if it can be designed such that the active involvement of health professionals is minimised. Taking a greenfield approach, involving larger numbers of hospitals, further decreases costs compared with implementing virtual care in one hospital alone.

[Outcomes from a virtual ward delivering oxygen at home for patients recovering from Covid-19: a real world observational study](#)
Clinical Medicine 22(3), 2022
Background There is a lack of data on the safety of providing oxygen at home to stable patients recovering from COVID-19. Methods A retrospective analysis of patients discharged to a COVID-19 virtual ward (CVW) between January 2021 and March 2021 at a UK district general hospital was performed. Patients with improving clinical trajectories and oxygen requirements up to 4 L/minute were eligible. Outcomes measured were 30-day mortality and readmission rate. Results From 02 January 2021 to 16 March 2021 (74 days), 147 patients discharged to the CVW were included: 71 received continuous or ambulatory oxygen, and 76 received pulse oximetry monitoring only. Five patients were readmitted within 30 days and two patients died. There were no significant differences between readmission and mortality rates between those discharged with or without oxygen. Conclusion Provision of oxygen at home for selected patients recovering from COVID-19 is safe with low risk of readmission and death.

2021

[An evaluation of a virtual COVID-19 ward to accelerate the supported discharge of patients from an acute hospital setting](#)
British Journal of Healthcare Management 28(1), November 2021
Background/Aims: In response to high numbers of hospital admissions as a result of COVID-19, a virtual ward was implemented to achieve accelerated discharge from hospital without compromising patient safety. This study assessed the impact of this virtual ward for patients admitted to the acute hospital setting with COVID-19.

[Mobile health technology for remote home monitoring after surgery: a meta-analysis](#)
The British Journal of Surgery 108(11), October 2021
Abstract: BACKGROUND: Mobile health (mHealth) technology has been proposed as a method of improving post-discharge surveillance. Little is known about how mHealth has been used to track patients after surgery and whether its use is associated with differences in postoperative recovery., METHODS: Three databases (PubMed, MEDLINE and the Cochrane Central Registry of Controlled Trials) were searched to identify studies published between January 1999 and February 2021. Mobile health was defined as any smartphone or tablet computer capable of electronically capturing health-related patient information and transmitting these data to the clinical team. Comparable outcomes were pooled via meta-analysis with additional studies compiled via narrative review.

[Blockchain applications in health care for Covid-19 and beyond: a systematic review](#)
The Lancet Digital Health 3(12), October 2021
The COVID-19 pandemic has had a substantial and global impact on health care, and has greatly accelerated the adoption of digital technology. One of these emerging digital technologies, blockchain, has unique characteristics (eg, immutability, decentralisation, and transparency) that can be useful in multiple domains (eg, management of electronic medical records and access rights, and mobile health). We conducted a systematic review of COVID-19-related and non-COVID-19-related applications of blockchain in health care.

[Applying a COVID Virtual Ward model, assessing patient outcomes and staff workload](#) Abstract only*
Acute Medicine 20(4), 2021
A COVID virtual ward (CVW) is recommended by NHS England, but 'usual care' outcomes have not been reported. A

retrospective study of all adults with COVID-19 attending Queen Elizabeth Hospital Birmingham between 01/06/2020-31/01/2021, assessed against CVW criteria and followed for 28 days. Of 2301 COVID-19 patients, 571(25%) would have met CVW criteria. Of these, 325(57%) were discharged after review and 246(43%) admitted. Of admitted patients who met CVW criteria, 81% required hospital-supported therapies; 11% died. Of the 325 discharged, 13% re-presented, 9% with COVID-related symptoms, 2% required intensive care admission, and one died (0.3%). In this comparison, discharging patients without a CVW did not lead to more re-presentations, re-admissions, ITU escalations or deaths compared to published outcomes for hospitals with a CVW.

[Is Comprehensive Geriatric Assessment Admission Avoidance Hospital at Home an Alternative to Hospital Admission for Older Persons? : A Randomized Trial](#)
Annals of Internal Medicine 174(7), July 2021
Background: Delivering hospital-level care with comprehensive geriatric assessment (CGA) in the home is one approach to deal with the increased demand for bed-based hospital care, but clinical effectiveness is uncertain. Objective: To assess the clinical effectiveness of admission avoidance hospital at home (HAH) with CGA for older persons.

[Pre-print - Evaluating discharges and readmissions using a COVID Virtual Ward model: a retrospective data study assessing patient outcomes and the likely staffing commitment](#) ([This article is a preprint and has not been peer-reviewed](#))
MedRxiv, July 2021
Background: COVID-19 has placed a catastrophic burden on acute hospitals. In an attempt to reduce admissions and enable safe early discharge, a COVID virtual ward (CVW) care pathway has been supported by NHS England. This includes discharging people who meet objective criteria based on acuity scores and

oxygen saturations, with pulse oximeters and daily phone calls for up to 14 days. Observational studies have reported the safety of this system, but without describing the outcomes from usual care. Methods: A retrospective study using routinely collected health data from all adults with a confirmed positive severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) swab result between 1st June 2020 and 31st Jan 2021 who attended the Emergency Department or Acute Medical Unit at QEHB, which does not have a CVW service. Criteria for CVW were applied using data from the first 24 hours of presentation to hospital and subsequent health outcomes were included for 28 days, including re-presentation, re-admission, ITU escalation and death.

[Telehealth interventions: remote monitoring and consultations for people with chronic obstructive pulmonary disease (COPD)](#)
Cochrane Database of Systematic Reviews, July 2021
Background: Chronic obstructive pulmonary disease (COPD, including bronchitis and emphysema) is a chronic condition causing shortness of breath, cough, and exacerbations leading to poor health outcomes. Face-to-face visits with health professionals can be hindered by severity of COPD or frailty, and by people living at a distance from their healthcare provider and having limited access to services. Telehealth technologies aimed at providing health care remotely through monitoring and consultations could help to improve health outcomes of people with COPD. Objectives: To assess the effectiveness of telehealth interventions that allow remote monitoring and consultation and multi-component interventions for reducing exacerbations and improving quality of life, while reducing dyspnoea symptoms, hospital service utilisation, and death among people with COPD.

[The Rise of Wearable Devices during the COVID-19 Pandemic: A Systematic Review †](#)
MDPI 21(17), July 2021

The COVID-19 pandemic has wreaked havoc globally and still persists even after a year of its initial outbreak. Several reasons can be considered: people are in close contact with each other, i.e., at a short range (1 m), and the healthcare system is not sufficiently developed or does not have enough facilities to manage and fight the pandemic, even in developed countries such as the USA and the U.K. and countries in Europe. There is a great need in healthcare for remote monitoring of COVID-19 symptoms. In the past year, a number of IoT-based devices and wearables have been introduced by researchers, providing good results in terms of high accuracy in diagnosing patients in the prodromal phase and in monitoring the symptoms of patients, i.e., respiratory rate, heart rate, temperature, etc. In this systematic review, we analyzed these wearables and their need in the healthcare system. The research was conducted using three databases: IEEE Xplore®, Web of Science®, and PubMed Central®, between December 2019 and June 2021. This article was based on the PRISMA guidelines. Initially, 1100 articles were identified while searching the scientific literature regarding this topic. After screening, ultimately, 70 articles were fully evaluated and included in this review. These articles were divided into two categories. The first one belongs to the on-body sensors (wearables), their types and positions, and the use of AI technology with ehealth wearables in different scenarios from screening to contact tracing. In the second category, we discuss the problems and solutions with respect to utilizing these wearables globally. This systematic review provides an extensive overview of wearable systems for the remote management and automated assessment of COVID-19, taking into account the reliability and acceptability of the implemented technologies.

Virtual hospitals: why we need them, how they work and what might come next
Journal of Physiotherapy 67(3), July 2021
Globally, approximately one in three adults suffers from a chronic condition. People with chronic conditions are at higher risk of requiring inpatient admission and increased length of hospital stay;1 however, a significant portion of hospital admissions may be preventable. The Australian Institute of Health and Welfare, for example, reported that in 2017 to 2018, around 748,000 admissions to public and private hospitals were classified as potentially preventable, accounting for 1 in 15 admissions or 2.9 million bed days, and costing over A$2.3 billion.2 In the US, 3.5 million potentially preventable adult inpatient stays accounted for US$33.7 billion in aggregate hospital costs in 2017, representing 12.9% of admissions.3

Comparison of Hospital-at-Home models: a systematic review of reviews
BMJ Open 11(1), 2021
OBJECTIVES To provide an overview of the safety and effectiveness of Hospital-at-Home (HaH) according to programme type (early-supported discharge (ESD) vs admission avoidance (AA)), and identify the model with higher evidence for addressing clinical, length of stay (LOS) and cost outcomes.,

Clinical outcomes of digital sensor alerting systems in remote monitoring: a systematic review and meta-analysis
NPJ Digital Medicine (1), 2021
Advances in digital technologies have allowed remote monitoring and digital alerting systems to gain popularity. Despite this, limited evidence exists to substantiate claims that digital alerting can improve clinical outcomes. The aim of this study was to appraise the evidence on the clinical outcomes of digital alerting systems in remote monitoring through a systematic review and meta-analysis.

Staff views of a hospital at home model implemented in a Scottish care setting
AIMS Public Health 8(3), 2021

PURPOSE: Demographic and financial challenges mean prioritising a shift in healthcare provision from acute to community settings. One well-evidenced model encapsulating this is 'hospital at home', however limited research has examined staffs' views on its implementation, which may inform service development and increase job satisfaction. The aim within was to explore the staff perspective of implementing a 'hospital at home' model in a Scottish care setting which can inform service provision and ultimately increase job satisfaction.

Remote home monitoring (virtual wards) for confirmed or suspected COVID-19 patients: a rapid systematic review
eClinical Medicine 37, June 2021
Background: the aim of this review was to analyze the implementation and impact of remote home monitoring models (virtual wards) for confirmed or suspected COVID-19 patients, identifying their main components, processes of implementation, target patient populations, impact on outcomes, costs and lessons learnt.

Hospital-at-Home Expands Hospital Capacity During COVID-19 Pandemic
Journal of the American Medical Directors Association 22(5), May 2021
Abstract: A Coronavirus Disease 2019 (COVID-19)-specific Hospital-at-Home was implemented in a 400-bed tertiary hospital in Barcelona, Spain. Senior or immune-compromised physicians oversaw patient care. The alternative to inpatient care more than doubled beds available for hospitalization and decreased the risk of transmission among patients and health care professionals. Mild cases from either the emergency department or after hospital discharge were deemed suitable for admission to the Hospital-at-Home. More than half of all patients had pneumonia. Standardized protocols and management criteria were provided. Only 6% of cases required referral for inpatient hospitalization.

These results are promising and may provide valuable insight for centers undertaking Hospital-at-Home initiatives or in the case of new COVID-19 outbreaks.

Pre-print: The implementation of a virtual ward using digital solutions informing community clinicians in early supported discharge of patients with SARS-Cov2 respiratory symptoms from an acute hospital setting (This article is a preprint and has not been peer-reviewed [what does this mean?].)
MedRxiv, April 2021
Objectives: To assess the short run successes and challenges of the implementation of a digitally supported accelerated acute hospital discharge scheme for patients admitted with Covid-19.

A Virtual Ward Model of Care for Patients With COVID-19: Retrospective Single-Center Clinical Study
Journal of Medical Internet Research 23(2), 2021
BACKGROUND: COVID-19 has necessitated the implementation of innovative health care models in preparation for an influx of patients. A virtual ward model delivers clinical care remotely to patients in isolation. We report on an Australian cohort of patients with COVID-19 treated in a virtual ward., OBJECTIVE: The aim of this study was to describe and evaluate the safety and efficacy of a virtual ward model of care for an Australian cohort of patients with COVID-19.

Implementation of a virtual ward as a response to the COVID-19 pandemic
Australian Health Review 45(4), 2021
Objective The aim of this study was to describe and evaluate the implementation of a virtual ward as a COVID-19 hospital avoidance response strategy and identify opportunities for improvement and future applicability.

[The unique role of the social worker within the Hospital at Home care delivery team](#) Abstract only*
Social Work in Health Care 60(4), 2021
Abstract: Hospital at Home (HaH) provides acute, hospital-level care at home and post-discharge follow-up. Through a review of 293 HaH admissions conducted by an urban, multidisciplinary HaH program from 2014 to 2017, we find that the social worker is involved in 71% of admissions and plays a crucial role in pre-emergency department discharge home care and safety screening, home intake, follow-up support, and transition of care to primary care providers and community-based services. We describe the social work activities involved in this model of care and present composite case studies for further illustration.

[Digital Health Technology and Telemedicine-Based Hospital and Home Programs in Pulmonary Medicine During the COVID-19 Pandemic](#) Abstract only*
American Journal of Therapeutics 28(2), 2021
BACKGROUND: The current coronavirus disease 2019 (COVID-19) pandemic has caused a significant strain on medical resources throughout the world. A major shift to telemedicine and mobile health technologies has now taken on an immediate urgency. Newly developed devices designed for home use have facilitated remote monitoring of various physiologic parameters relevant to pulmonary diseases. These devices have also enabled home-based pulmonary rehabilitation programs. In addition, telemedicine and home care services have been leveraged to rapidly develop acute care hospital-at-home programs for the treatment of mild-to-moderate COVID-19 illness., AREAS OF UNCERTAINTY: The benefit of remote monitoring technologies on patient outcomes has not been established in robust trials. Furthermore, the use of these devices, which can increase the burden of care, has not been integrated into current clinical workflows and electronic medical records. Finally, reimbursement for these telemedicine and remote monitoring services is variable.

[Implementation and evaluation of a Covid-19 rapid follow-up service for patients discharged from the emergency department](#)
Clinical Medicine 21(1), January 2021
The COVID-19 pandemic has necessitated rapid adaptation of healthcare providers to new clinical and logistical challenges. Following identification of high levels of emergency department (ED) reattendance among patients with suspected COVID-19 at our centre, we piloted a rapid remote follow-up service for this patient group. We present our service framework and evaluation of our pilot cohort of 192 patients.

[A prospective observational real world feasibility study assessing the role of app-based remote patient monitoring in reducing primary care clinician workload during the COVID pandemic](#)
BMC Family Practice 22(248), 2021
Background: The novel coronavirus disease in 2019 (COVID-19) has placed unprecedented strain on healthcare providers, in particular, primary care services. General practitioners (GP) have to effectively manage patients remotely preserving social distancing. We aim to assess an app-based remote patient monitoring solution in reducing the workload of a clinician and reflect this as time-saved in an economic context. Primary care COVID patients in West London deemed medium risk were recruited into the virtual ward.

[The pilot, proof of concept REMOTE-COVID trial: remote monitoring use in suspected cases of COVID-19 (SARS-CoV 2)](#)
BMC Public Health 21(638), 2021
Background: SARS-CoV-2 has ever-increasing attributed deaths. Vital sign trends are routinely used to monitor patients with changes in these parameters preceding an adverse event. Wearable sensors can measure vital signs continuously and

remotely, outside of hospital facilities, recognising early clinical deterioration. We aim to determine the feasibility & acceptability of remote monitoring systems for quarantined individuals in a hotel suspected of COVID-19.

[Remote management of covid-19 using home pulse oximetry an virtual ward support](#)
BMJ 372, 2021
What you need to know
- Pulse oximeters used at home can detect hypoxia associated with acute covid-19
- Home oximetry requires clinical support, such as regular phone contact from a health professional in a virtual ward setting
- More research is needed to understand the safety and effectiveness of home oximetry and to optimise service models and referral pathways

[Applying a COVID Virtual Ward model, assessing patient outcomes and staff workload](#) Abstract only*
Acute Medicine Journal 20(4), 2021
A COVID virtual ward (CVW) is recommended by NHS England, but 'usual care' outcomes have not been reported. A retrospective study of all adults with COVID-19 attending Queen Elizabeth Hospital Birmingham between 01/06/2020-31/01/2021, assessed against CVW criteria and followed for 28 days. Of 2301 COVID-19 patients, 571(25%) would have met CVW criteria. Of these, 325(57%) were discharged after review and 246(43%) admitted. Of admitted patients who met CVW criteria, 81% required hospital-supported therapies; 11% died. Of the 325 discharged, 13% re-presented, 9% with COVID-related symptoms, 2% required intensive care admission, and one died (0.3%). In this comparison, discharging patients without a CVW did not lead to more re-presentations, re-admissions, ITU

escalations or deaths compared to published outcomes for hospitals with a CVW.

[What next for Covid oximetry and virtual ward?](#)
British Journal of General Practice 71(710), 2021
The recent roll-out of COVID Oximetry and virtual ward services across the NHS in England has occurred at a staggering pace. In February 2021, >27 000 high-risk patients with COVID-19 have been treated at home since the first national standard operating procedure was introduced in November 2020 (further information available from authors).[1] Observational evidence relating to the effectiveness and value of these local services has started to emerge, with larger national evaluations of the service currently ongoing.[2] As services look to become sustainable in the long term and the prevalence of COVID-19 is relatively low, we will soon be presented with an opportunity to decide which elements of these services we wish to amplify and which we should discard. As a result, NHS England is increasingly looking at how it can support automated remote patient monitoring at the patient home through integrated digital platforms for high-prevalence, ambulatory-sensitive conditions such as hypertension, chronic obstructive pulmonary disease (COPD), heart failure, and diabetes. This is moving beyond the usual modes of care delivery such as office-based care for these conditions. This has led to much discussion about whether oximetry and virtual wards should evolve into a single integrated NHS@ home remote patient monitoring service.[3] Here we look at whether the enablers achieved through COVID Oximetry @home and virtual wards will be sufficient to overcome some of the historical barriers to introducing telemonitoring services and achieve a coherent, deliverable vision of NHS@home ([Figure 1](#)).

[Enhancing Safety During a Pandemic Using Virtual Care Remote Monitoring Technologies and UML Modeling](#)
Yearbook of Medical Informatics 30(1), 2021

OBJECTIVES: This paper describes a methodology for gathering requirements and early design of remote monitoring technology (RMT) for enhancing patient safety during pandemics using virtual care technologies. As pandemics such as COrona VIrus Disease (COVID-19) progress there is an increasing need for effective virtual care and RMT to support patient care while they are at home.

[The provision of hospital at home care: Results of a national survey of UK hospitals](#)
International Journal of Clinical Practice 75(12), 2021
BACKGROUND: Hospital at home (HaH) replicates elements of hospital-based care in the community, to facilitate the safe management of a broad spectrum of acute illness in the patient's usual environment. The extent to which this model of care has been adopted in the United Kingdom is unknown.

2020

[Trends beyond the new normal: from remote monitoring to digital connectivity](#)
European Heart Journal Supplements 22, 2020
Abstract: COVID pandemic emergency has forced changes from traditional in-person visits to application of telemedicine in order to overcome the barriers and to deliver care. COVID-19 has accelerated adoption of digital health. During this time, the distance is itself a prevention tool and the use of technology to deliver healthcare services and information has driven the discovery of mobile and connected health services. Health services should to be prepared to integrate the old model of remote monitoring of CIEDs and adopt new digital tools such as mobile Apps and connected sensors.

[Insights From Rapid Deployment of a "Virtual Hospital" as Standard Care During the COVID-19 Pandemic](#)
Annals of Internal Medicine 174(2), November 2020
BACKGROUND: Pandemics disrupt traditional health care operations by overwhelming system resource capacity but also create opportunities for care innovation., OBJECTIVE: To describe the development and rapid deployment of a virtual hospital program, Atrium Health hospital at home (AH-HaH), within a large health care system.

[A novel virtual hospital at home model during the coronavirus disease 2019 (COVID-19) pandemic](#)
Infection Control and Hospital Epidemiology 42(9), August 2020
The COVID-19 pandemic has prompted healthcare systems to rapidly adapt healthcare delivery to accommodate a novel infectious disease while considering infection control practices, hospital capacity, and continued management of other medical conditions. Additionally, the COVID-19 pandemic has disproportionately affected minority communities and those suffering from lower socioeconomic status in the United States; populations that already face worse outcomes in other chronic medical conditions such as hypertension, coronary artery disease, and diabetes.[1]–[3]

[Digital advantage in the COVID-19 response: perspective from Canada's largest integrated digitalized healthcare system](#)
NPJ Digital Medicine 3, 2020
Abstract: The SARS-CoV-2 pandemic has challenged healthcare systems worldwide. Uncertainty of transmission, limitations of physical healthcare system infrastructure and supplies as well as workforce shortages require dynamic adaption of resource deployment to manage rapidly evolving care demands, ideally based on real time data for the entire population. Moreover, shut down of traditional face-to-face care infrastructure requires rapid deployment of virtual health care options to avoid collapse of

health organizations. The Alberta Electronic Health Record Information System is one of the largest population based comprehensive electronic medical record (EMR) installations. Alberta's long standing solid telehealth hardware-, training-, provider remuneration- and legislation infrastructure has enabled quick transition to virtual healthcare. Virtual health services including asynchronous secure clinical communications, real-time virtual care via messaging, telephony or video conferencing (telehealth) and ancillary functions like triage, scheduling, documentation and reporting, the previously established virtual hospital program with home monitoring, virtual health assessments, medication review, education and support for patients and families and coordination between family doctors, specialists and other health team members help to control viral transmission, protect healthcare personnel and save supplies. Moreover, rapid launch of online screening and triage tools to guide testing and isolation, online result sharing, infected patient and contact tracing including a smartphone exposure tracking application (ABTraceTogether), electronic best practice alerts and decision support tools, test and treatment order sets for standardized COVID-19 management, continuous access to population level real-time data to inform healthcare provider, public health and government decisions have become key factors in the management of a global crisis in Alberta.

Triage into the community for Covid-19 (TICC-19) Patients Pathway – Service evaluation of the virtual monitoring of patients with Covid pneumonia
Acute Medicine 19(4), 2020
Introduction: COVID-19 pneumonia presented a unique problem for healthcare systems with the potential to overwhelm hospitals and lead to unnecessary morbidity and mortality. Safe triage and follow up systems are required to manage this unprecedented demand.

In progress

Hospital at home: A systematic review of how medication management is conceptualised, described and implemented in practice—A study protocol
PLoS One, January 2023
Hospital at Home (H@H) is a method of healthcare delivery, where hospital level interventions are conducted in the patient's usual place of residence, offering an alternative to hospital admission. This often includes the ability to perform point of care diagnostics and treat conditions using a range of treatments traditionally associated with hospital admission, including intravenous medicines and oxygen. H@H services have been established worldwide but there is a wide variation in definition and delivery models and currently no documented evidence supporting the delivery of medicines and medicines management within the H@H model. Therefore, this study aims to 1) describe how medication management in H@H is conceptualised, 2) describe and identify key components of medication management in H@H and 3) describe and identify variability in the implementation of medication management services within H@H models.

Competency Frameworks

Introducing the Hospital at Home Knowledge and Skills Development
Introducing the Hospital at Home Knowledge and Skills Development Framework, July 2023
Hospital at Home (H@H) is a short-term, targeted intervention that provides a level of acute hospital care in an individual's own home that is equivalent to that provided within a hospital. Healthcare Improvement Scotland (HIS) has established a programme to support the implementation of H@H, including

work with a mixture of NHS boards and health and social care partnerships.

Virtual Ward and Urgent Community Response Capabilities Framework
Skills for Health and NHS England, October 2022
Background: In response to the pandemic, there has been a period of rapid innovation and transformational change in service delivery. Virtual wards and Urgent Community Response amongst others have formed part of this. Virtual wards should be led by a named registered consultant practitioner i.e., doctor, nurse, allied health professional or primary care GP with knowledge and capability in the relevant specialty or model (frailty and respiratory care).