

What you need to know about remote patient monitoring

A summary of the key data we know so far, brought together by Clinitouch's lead Health Economist.





16

Wed
NOV

Blood Pressure Reading

Systolic

137

MMHG

Pulse

64

BPM

Diastolic

71

MMHG

Cuff

61

● Device connected

At a glance

From a clinician, patient and health system perspective, this document aims to compile key challenges within the healthcare landscape, and how remote patient monitoring (RPM) technology can help to solve them.

It is not a revelation that there is a worldwide capacity crunch when it comes to healthcare. RPM can help to shift patient care from hospitals or clinics and into people's place of residence. This can free up critical clinical resources to be used for people who really need to be in hospital.

We have an ageing population so it begs the question of 'is the growing use of tech going to suit everyone, in every country?'. The answer, as with most things, is probably not. However, there is research to show that older generations are continuing to adopt technology. For countries that may have less access to technology, it is crucial to ensure there are alternatives put in place.

Healthcare is expensive – and that's across the world. Coupled with our ageing population and prevalence of chronic conditions, it is vital that funds are freed up to be able to spend elsewhere. RPM technology can help to do this.

While this document covers recent research, the uptake of RPM technology has increased massively over the last few years, with huge forecasts for continued growth. As healthcare at home is adopted, clinical, patient and health system outcomes will need to be continually monitored so we can really see how these innovations are making a difference.



Jim Swift, Health Economist

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An introduction to remote patient monitoring

1

RPM involves using digital health technology to monitor people's health from anywhere. It helps to provide better care outside of hospitals and clinics, while freeing up critical healthcare resources.

Remote monitoring places information on patient health at clinicians' fingertips, enabling them to act sooner if someone is showing signs of deterioration. Patient questionnaires are often combined with vital sign readings, collected using devices such as blood pressure monitors and pulse oximeters.

While remote monitoring is not new, COVID-19 has brought it to the forefront of healthcare. Demand for virtual alternatives for healthcare grew hugely during the pandemic. Between November 2020 and May 2021, over 78,000 UK patients were supported at home through RPM technologies in the NHS⁽¹⁶⁾. The global RPM devices market

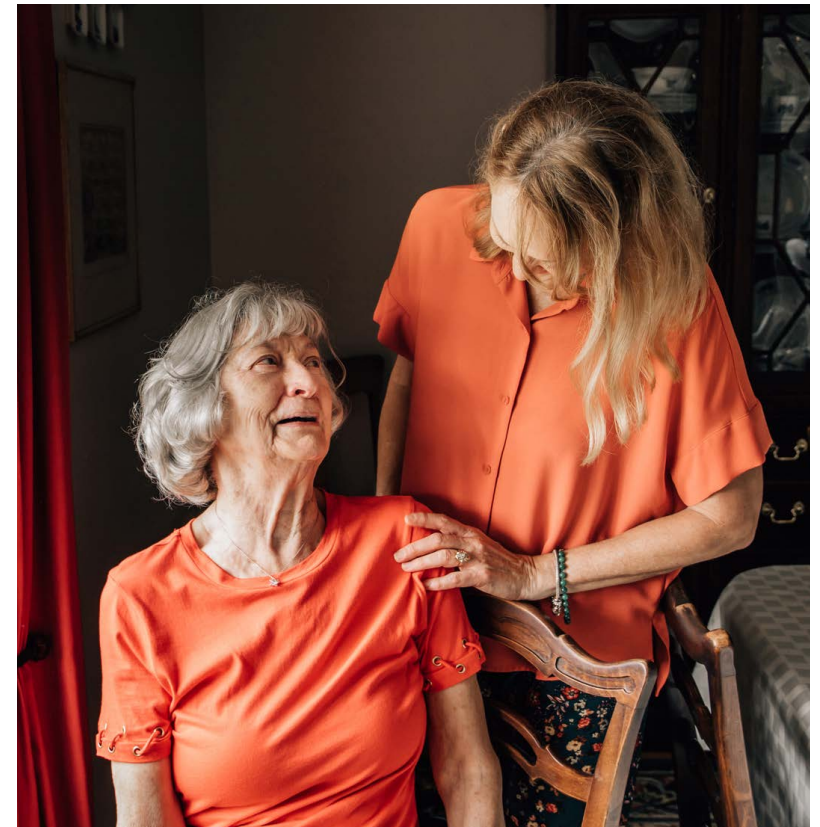
is growing across the world too, projected to reach \$2.114 trillion by 2028⁽¹⁵⁾.

What is 'hospital at home' (also known as virtual ward)?

Virtual wards use RPM technology to offer an alternative to patients who would otherwise need to be in hospital, hence why it's often referred to as 'hospital at home'. Typically used for short-term care, they help to unlock beds by getting patients home quicker, or preventing admission in the first place.

Virtual wards are currently being rolled across the UK for pathways such as COPD, heart failure, frailty and more. The the UK's National Health Service (NHS) is investing up to £450 million over two years, with ambitions to establish 40-50 virtual ward beds per 100k population by December 2023⁽²²⁾.

Utilising digital health technology is a priority for healthcare systems across the globe, but how can remote patient monitoring benefit clinicians, patients, and healthcare systems worldwide?



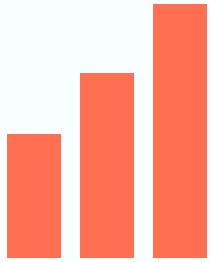
(15) Zion Market Research, 2022. Remote Patient Monitoring Devices Market Size, Share, Segmentation, Trends, Growth Opportunities, and Forecast 2030.

(16) NHS England, 2023. Supporting care with remote monitoring.

(22) NHS England, 2022. What do you know about virtual wards?

Remote patient monitoring - key data

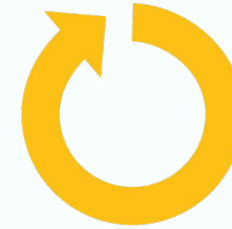
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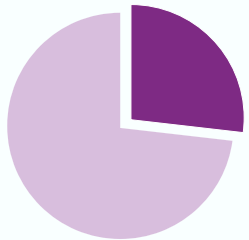
Home Healthcare market is estimated to be worth **\$226bn in 2022**, reaching **\$340.2bn by 2027**⁽²⁵⁾



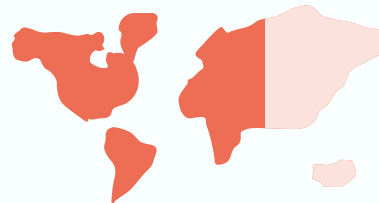
485,000 people supported at home with digital home care and RPM tech (UK) between Nov 2020 and Jan 2023⁽¹⁶⁾



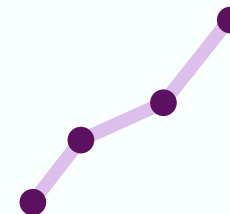
93% of physicians felt digital health tools are an advantage for patient care in 2022⁽²⁶⁾



Estimated that **26.2% of the US population** will use RPM tools by 2025⁽²⁷⁾



64.4% (5.16bn) of the global population are internet users⁽¹⁹⁾



The global RPM devices market is predicted to **grow to around \$2.114bn USD** by 2028⁽¹⁵⁾

(15) Zion Market Research, 2022. Remote Patient Monitoring Devices Market Size, Share, Segmentation, Trends, Growth Opportunities, and Forecast 2030.

(16) NHS England, 2023. Supporting care with remote monitoring.

(19) Datareportal, 2023. Digital 2023: Global Overview Report.

(25) MarketsandMarkets, 2022. Home Healthcare Market by Product.

(26) AMA, 2022. AMA digital health care 2022 study findings.

(27) Insider Intelligence, 2023. The technology, devices, and benefits of remote patient monitoring in the healthcare industry.

Clinical outcomes

3

Hospital capacity has become a global issue and RPM technology is helping to solve it.

In NHS England, hospital bed numbers have been falling steadily over the past three decades. According to The King's Fund, between 1987/88 and 2019/20, the total number of NHS hospital beds fell by 53%⁽¹⁾.

Beds available in public, private, general, and specialised hospitals and rehabilitation centres have also fallen across the globe. For example the number of hospital beds in Italy dropped from 8.9 per 1,000 people in 1960 to 3.14 in 2018. While Singapore's beds decreased from 4.39 in 1960 to 2.49 in 2017⁽²⁾.

Our ageing population, combined with fewer hospital beds, adds up to a capacity crunch that is affecting healthcare systems across the globe.

(1) NHS hospital bed numbers: past, present, future. The King's Fund, 2021.

(2) Hospital beds per 1,000 people, 1960 to 2019. Our World in Data.

(3) Swift, J. et al, 2022. 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), pp.7-15.

(11) Ghosh, S. et al. (2018) "A cost saving intervention for patients with severe breathlessness," British Journal of Healthcare Management, 24(11), pp. 526-529

Supporting earlier discharge

With the support of remote monitoring tech, patients can be discharged from hospital sooner to recover at home. This has been proven to free up hospital beds so clinicians can care for patients in the right place for them. Through a COVID-19 NHS virtual ward evaluation, the average length of bed days decreased from 5.5 to 3.3 once the virtual ward was implemented, helping to reduce bed days by 40.3%⁽³⁾.

Reducing hospital admissions

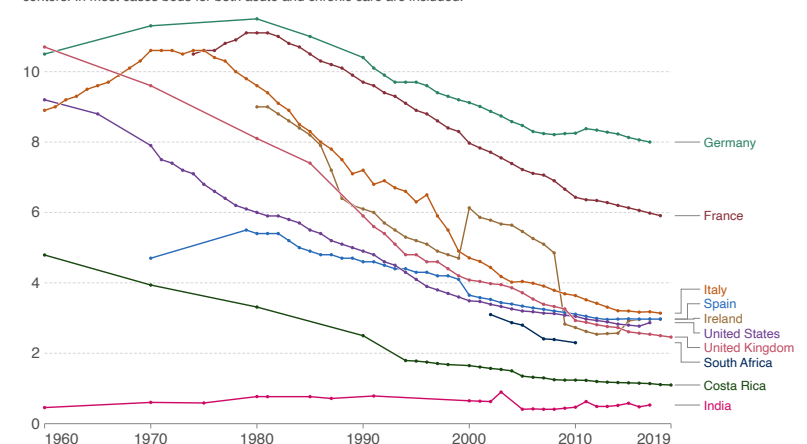
Through RPM, healthcare teams can spot signs of deterioration early on and act swiftly, helping to reduce hospital admissions and re-admissions. In a study assessing the impact of remote monitoring technology on admission rates for people with chronic obstructive pulmonary disease (COPD), all cause admissions were reduced by 63.6%⁽¹¹⁾.

“While the COVID-19 pandemic has added huge challenges for healthcare systems, hospital capacity has been a growing issue for over half a century. Proactively improving out-of-hospital care is key to ensure improved hospital flow in an acute setting.”

Health Economist, Clinitouch

Hospital beds per 1,000 people, 1960 to 2019

Hospital beds include inpatient beds available in public, private, general, and specialized hospitals and rehabilitation centers. In most cases beds for both acute and chronic care are included.



Source: World Health Organization via the World Bank

OurWorldInData.org/health-meta • CC BY

(2)

Clinical outcomes

Shifting patient care from hospitals and clinics to the patient's home means hospital beds are freed up for patients who really need them. Through remote monitoring platforms, clinical teams can easily see which patients need urgent care, allowing them to prioritise and manage their caseloads more effectively.

“Virtual wards have given us the chance to **advance our own specialist skills to make sure that the patients have the extra community support to be able to safely recover at home.”**

Specialist Pneumonia Intervention Nurse Lead, NHS

“Using this technology will benefit patients, **free up clinician time, and help us to reduce the COVID-19 backlogs.”**

Locality Director, NHS England



(3) Swift, J. et al, 2022. 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), pp.7-15.

(4) Ghosh S, O'Kelly N, Roberts EJ et al. 2016. Combined interventions for COPD admissions within an urban setting. BJHCM: 2016;3:122-131.

(17) NHS England. 2022. Remote monitoring for patients with chronic conditions in the Midlands.



144.2 bed days saved when using Clinitouch for a COVID-19 virtual ward⁽³⁾



67.5% reduction in unscheduled hospital admissions when using Clinitouch to remotely monitor COPD patients⁽⁴⁾



40.3% reduction in the average length of stay when using Clinitouch for a COVID-19 virtual ward⁽³⁾



50% reduction in re-admissions for COVID-19 patients when discharged with Clinitouch⁽¹⁷⁾

Patient outcomes

5

While digital health technology is always evolving, considering inclusivity and connectivity is key. Understandably, there are concerns around whether older people can use the technology. However, research shows that technology adoption for more senior age groups is growing year on year.

According to PEW Research Center, the number of over 65s in the US who have a smart phone has grown from 13% in 2012 to 61% in 2021⁽⁵⁾. For those aged 55–64 in the UK, smartphone users grew 81% from 2012 to 2021⁽⁶⁾. It is predicted that in 2027, 7.7 billion people will have a smartphone subscription worldwide⁽¹⁸⁾. RPM technology is already being used globally to help patients of all ages. For example, the oldest user to have used RPM tech, Clinitouch, is 105.

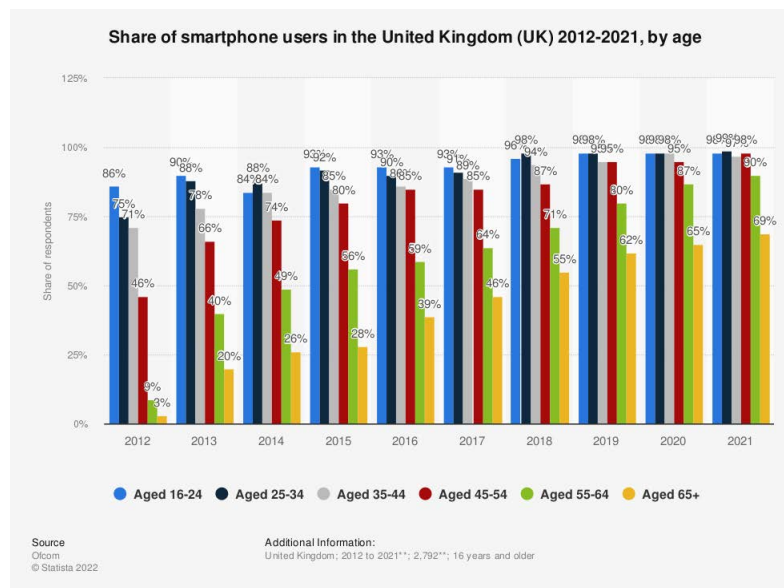
While implementing RPM into developed countries can be simple, it is key to consider countries with less

access to tech. For instance, as of January 2023, the percentage of northern European internet users was 97.4%, whereas internet adoption was only 23.1% in eastern Africa⁽¹⁹⁾. In these scenarios, adaptations need to be made. For instance, doing health readings manually due to the cost and complexities of Bluetooth devices. It is also likely that offline mode may be needed, since access to a consistent and reliable internet connection can be a challenge in developing countries.

However, there is an appetite for this technology. A survey conducted by Spirit Health (UK) showed 53% would prefer to have their health monitored from home rather than hospital. 75% of people aged 55+ would also choose healthcare at home if it meant leaving hospital sooner. 56% of people would also encourage a family member or loved one to use the tech to avoid an unnecessary stay in hospital⁽⁹⁾.

“When I was asked whether I would want to go on the virtual ward and be remotely monitored using Clinitouch, I thought I would give it a go. Initially it looked a bit technical but the healthcare team explained it to me so well and **once I was set up, it was easy.”**

Andrew, pneumonia virtual ward patient



(6)

(5) Share of those 65 and older who are tech users has grown in the past decade. Pew Research Centre, 2021.

(6) Share of smartphone users in the United Kingdom (UK) 2012–2021, by age. Statista, 2021.

(9) Spirit Health, 2022. Survey: How do patients really feel about a virtual ward?

(18) Statista, 2022. Number of smartphone subscriptions worldwide from 2016 to 2021, with forecasts from 2022 to 2027.

(19) Datareportal, 2023. Digital 2023: Global Overview Report.

Patient outcomes

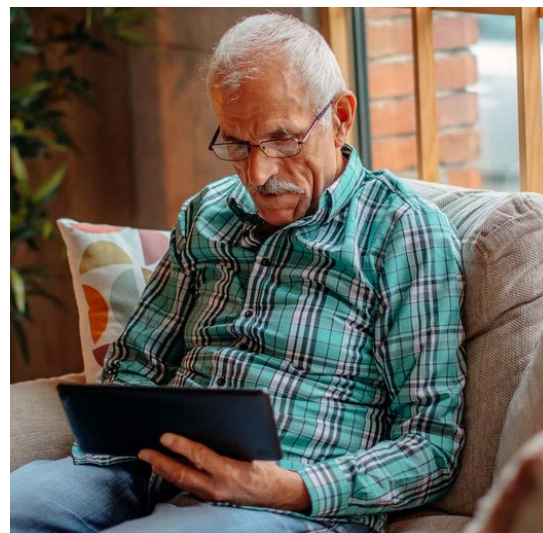
While the idea of using remote monitoring tech can be daunting, patients have found that the platform is simple to use. It gives patients the reassurance that someone is checking on their recovery and will spot any deterioration early. This is all while the patients can enjoy their home comforts, such as their own food, or seeing family and friends without visitation restrictions.

“I think it’s absolutely amazing. I didn’t know whether I could do it because I’m 67, I’m not computer savvy. But I’ve not had any mistakes. So if I can do it, most people can do it.”

Christine, COPD virtual ward patient

“In my opinion it could not be made any simpler, it is like switching on a TV and simply choosing a channel. I found the whole experience brilliant and reassuring.”

Madhu, pneumonia virtual ward patient



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90% of patients said Clinitouch helped them to self-manage their condition for COPD & heart failure⁽⁷⁾



92% recommendation percentage for Clinitouch using the NHS Friends and Family test⁽⁷⁾



65% of patients said that Clinitouch helped them to not need to visit their general practitioner (GP)⁽⁸⁾



56% would encourage a family member or loved one to use digital health tech to avoid an unnecessary stay in hospital⁽⁹⁾

(7) Service evaluation for COPD and Heart Failure patients using CliniTouch Vie in Leicestershire, April – November 2020

(8) Virtual Community Ward deployment within Leicestershire Partnership NHS Trust, 12 Week evaluation report. September 2020

(9) Spirit Health, 2022. Survey: How do patients really feel about a virtual ward?

Healthcare system outcomes

7

Chronic diseases, such as cardiovascular disease, cancers, long term respiratory diseases and diabetes, kill 41 million people each year⁽²⁰⁾.

This is equivalent to 74% of deaths globally, with 77% of those deaths in low- and middle-income countries⁽²⁰⁾. For example in India, it's estimated that 66% of total deaths in 2020 were caused by long term conditions⁽²⁸⁾.

In a 2023 study, it was found that 81.1% of China's population aged 60+ had a chronic disease, representing 179.9 million people⁽¹²⁾. In 2019, roughly 16.2% of Qatar's population also had one or more of the main four chronic conditions listed above⁽²⁹⁾.

In the UK, 70% of each health and social care pound is spent on supporting people with long term conditions⁽¹³⁾. People with chronic illnesses also account for 50% of all GP appointments and 70% of hospital beds in the UK⁽¹³⁾.

In addition to our ageing society, the prevalence of chronic conditions adds huge financial strain on healthcare systems globally. However RPM technology is helping to save money in healthcare systems. For example, in an evaluation of using RPM for COPD patients, remotely monitoring them from their place of residence led to gross savings of £5,444.22 per patient. This takes into account changes to length of stay and the cost of a day in a respiratory ward^(3,4,33).

(3) Swift, J. et al, 2022. 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), pp.7-15.

(4) Ghosh S, O'Kelly N, Roberts EJ et al. 2016. Combined interventions for COPD admissions within an urban setting. BJHCM: 2016;3:122-131.

(12) Binbin Su, et al. 2023. Chronic Disease in China: Geographic and Socioeconomic Determinants Among Persons Aged 60 and Older, Journal of the American Medical Directors Association, Volume 24, Issue 2, Pages 206-212.e5, ISSN 1525-8610.

(13) Making the case for the personalised approach. NHS England, 2018.

(14) Office for Budget Responsibility. 2016. Fiscal sustainability analytical paper: Fiscal sustainability and public spending on Health.

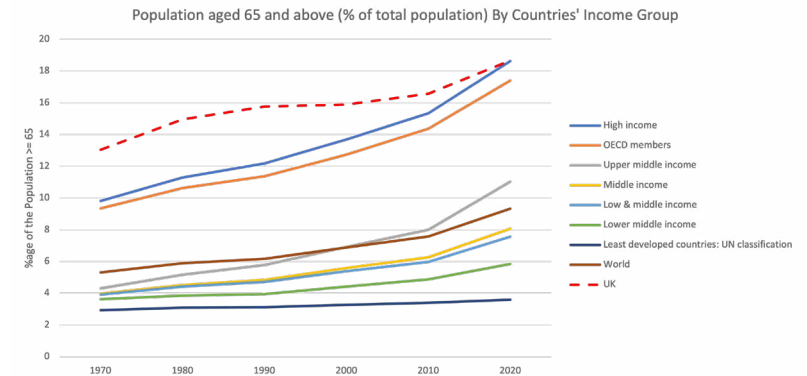
(20) World Health Organisation, 2022. Noncommunicable diseases.

(21) The World Bank, 2022. World Development Indicators. Population aged 65 and above (% of total population).

(28) The World Bank. 2020. Cause of death, by non-communicable diseases (% of total) - India.

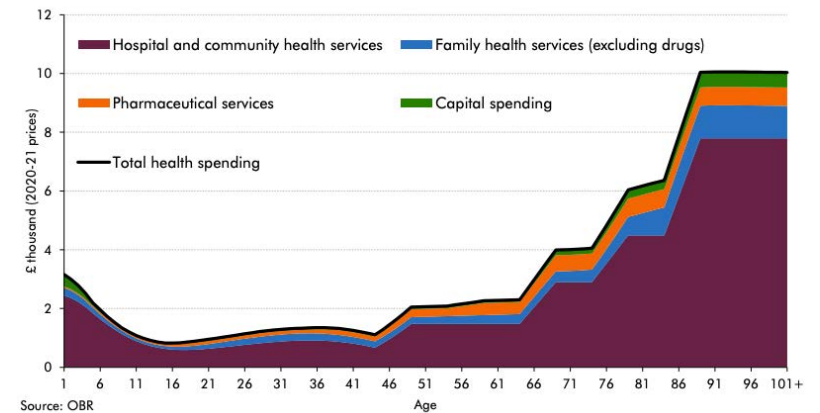
(29) Syed MA, Alnuaimi AS, Zainel AJ, et al. Prevalence of non-communicable diseases by age, gender and nationality in publicly funded primary care settings in Qatar. BMJ Nutrition, Prevention & Health 2019;2:doi: 10.1136/bmjnp-2018-000014.

(33) Data on File. Spirit Health. SSB. anonymised COPD admissions data England 2019-20. 2022.



(21)

Chart 2.3: Representative profile for health spending



Source: OBR

(14)

Healthcare system outcomes

The number of people aged 80 or over is projected to triple, from 143 million in 2019 to 426 million in 2050⁽²³⁾.

Globally, the population is ageing. People aged 65 and over is growing faster than all other age groups. By 2050, one in four persons living in Europe and Northern America could be aged 65 or over⁽²³⁾. Similarly in Japan, 28.2% of the total population are over 65⁽³¹⁾.

The rising costs of healthcare, an ageing population and a global shortage of healthcare professionals means resources are stretched. RPM offers an opportunity to improve healthcare for patients, better engage with them and increase the efficiency of health systems while reducing health care costs. This can help to free up critical funds to use elsewhere.

“If you can save money on one aspect of healthcare, it frees up money to spend elsewhere, it’s as simple as that. With the challenges of healthcare inflation and our ageing society, we need to find ways to reduce costs. This is crucial for every healthcare system, not just in the UK.”

Health Economist, Clinitouch



(4) Ghosh S, O’Kelly N, Roberts EJ et al. 2016. Combined interventions for COPD admissions within an urban setting. BJHCM: 2016;3:122–131.

(11) Ghosh, S. et al. (2018) “A cost saving intervention for patients with severe breathlessness,” British Journal of Healthcare Management, 24(11), pp. 526–527

(23) United Nations. Trends in Population Ageing.

(31) PRB. Countries With the Oldest Populations in the World.



£117,500 net savings to the NHS over 12 months when using Clinitouch⁽⁴⁾



£2,213 savings per avoided hospital admission for COPD patients when using Clinitouch⁽⁴⁾



£64,519 total savings when using Clinitouch to remotely monitor patients with COPD⁽¹¹⁾



£347.62 savings realised when using a ‘bed’ in a virtual ward compared to a bed in a hospital respiratory ward⁽⁴⁾

What is Clinitouch?

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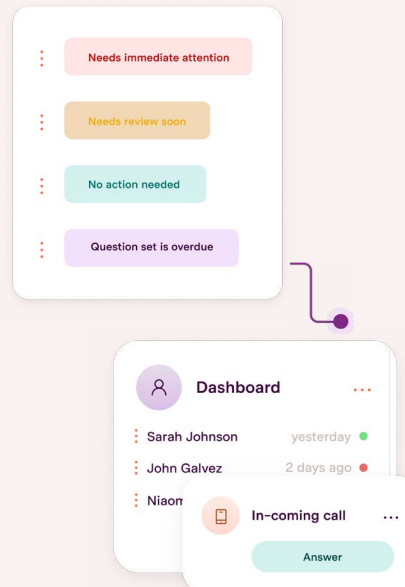
What does Clinitouch do?

Clinitouch connects patients with their clinical team from anywhere, so that their health can be proactively monitored at home or in the community. Our straightforward technology helps to provide better care outside of hospitals and clinics, while freeing up critical clinical resources.



How does Clinitouch work?

Patient App	A safe and user-friendly space, where patients answer predefined questions and submit health readings
Clinitouch Platform	Our smart algorithms convert patients' answers and health metrics into an easy red, amber or green rating for patients
Clinical Dashboard	A go-to hub to give your team a quick look at patients, to rapidly assess where and when intervention is needed



“We know that our tech can help to reduce hospital admissions, re-admissions and length of stay. Surging caseloads, staff shortages and rising demand for services means **we need smarter solutions that deliver care.”**

However it's important to understand that it's not just about implementing a digital tool. You need to embed it in the best place within the pathway to improve access to the health services that patients need more quickly.”



Dr Noel O'Kelly
Medical Director & Co-Founder, Clinitouch

As seen in **NHS^x**

Developing virtual wards to manage long term conditions across the Midlands, UK.

Project overview

NHSX funding supported the rapid development of RPM technologies for three conditions: heart failure, COPD and COVID-19.

Patients across Leicestershire were supported using a new platform (Clinitouch), where clinical teams were able to collect and analyse patient data to remotely monitor their health. The RPM technology also connected the clinicians and patients through assessments via video calls and in-app messaging for advice and support.

Implementation and impact

Over 1,000 patients were supported across four pathways. Implementation was supported by robust governance and clinical leadership. Digital champions also helped to guide the

project. RPM technology helped to reduce pressure on hospital services and also assisted in identifying undiagnosed conditions.

Key lessons

Successfully deploying healthcare at home is a learning process. The team outlined four key lessons learnt from their experiences.

Firstly, engaging patients on their own terms is crucial, enhancing the patient-clinician relationship. It is also important to create services that meet the diverse population's needs, closing the health gap. Digital support post-discharge is another factor to consider, helping patients to self-manage. Finally, it is vital to apply these learnings and take them forward and apply them to see a wider service change.



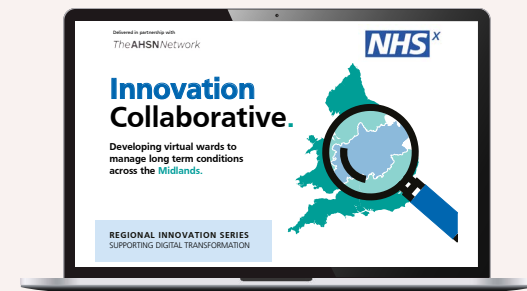
1000+ patients supported across four pathways (1 April 2020 – 20 May 2021)⁽²⁴⁾



288 hospital bed days saved between start of Jan and end of April 2021⁽²⁴⁾



50% reduction in readmissions rate for patients on a COVID virtual ward (2 Nov 2020 – 20 May 2021)⁽²⁴⁾



⁽²⁴⁾ NHSX. 2022. Innovative Collaborative. Developing virtual wards to manage long term conditions across the Midlands.



Interested in learning more about how
Clinitouch and remote patient monitoring
could help in your local health system?
We'd love to hear from you.

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