

# Using pulse oximeters in care homes for residents with COVID-19 and other conditions: a rapid mixed-methods evaluation

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## Scientific summary

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# Scientific summary

## Background

Most residents of care homes in England are aged > 80 years, have multiple long-term health conditions and are affected by physical disability and/or cognitive impairment. These factors explain, in part, the vulnerability to COVID-19 of older people living in care homes. Monitoring and caring for residents with COVID-19 is made difficult by the complexity of care residents require, regional disparities in integrated working with NHS staff and an overstretched workforce. Using pulse oximetry in community settings may help to more accurately predict outcomes for individuals testing positive for COVID-19 with regard to mortality and intensive care unit admission.

Models of care using pulse oximetry with people in their own homes were implemented during the first wave of the pandemic (i.e. from April to September 2020), which led to the national roll-out of COVID Oximetry @home (CO@h) (i.e. a service that involves pulse oximetry and the remote monitoring of patients with COVID-19 symptoms). A mixed-methods evaluation of the CO@h programme has been undertaken.

Little is known about the use of pulse oximetry in care homes. Scoping work indicated that pulse oximeters were routinely used across a range of health-care settings, including care homes, prior to COVID-19 pandemic. The focus of this evaluation is on the use of pulse oximeters in care homes in general. It is to be hoped, with the roll-out of coronavirus vaccination, that the incidence of COVID-19 among care home residents will be low in future. Pulse oximetry may remain valuable, however, for monitoring residents of care homes who do contract COVID-19 or who have other conditions for which hypoxia is a possible consequence (e.g. chronic obstructive pulmonary disease and asthma).

This rapid evaluation examined the views of care home staff to determine how and when pulse oximetry is being used, any facilitators of and barriers to using pulse oximetry, and how the use of pulse oximetry might be best supported by NHS teams. This evaluation should provide insights that are helpful to care home staff who look after residents who are living with a range of long-term health conditions.

## Objectives

This rapid evaluation explored the use of pulse oximetry in managing COVID-19 and other health conditions in a range of care home settings across England.

The rapid evaluation was grounded in the following research questions:

1. When and how is pulse oximetry being employed in care homes for managing the health care of residents with COVID-19 and other health conditions?
  - i. Which care home staff are involved in the set-up, delivery and monitoring of pulse oximetry in care homes?
  - ii. What support are care homes receiving from primary, community and secondary care NHS teams with regard to the use of pulse oximetry, and is that support appropriate? Are there any weaknesses in providing that support that can be rectified?

2. What are the perceived benefits to residents (e.g. health-related outcomes, satisfaction with care received, hospital admission avoidance, impact on perceived anxiety) of using pulse oximetry in their care home?
3. What are the experiences of staff using oximetry in care homes, including barriers and enablers, and lessons learnt?
  - i. What training has care home staff received to deliver pulse oximetry in a range of care home settings?
  - ii. What impact has the use of pulse of oximetry had on the well-being and confidence of care home staff?
  - iii. What are the challenges faced by care home staff in delivering pulse oximetry and associated monitoring?
4. What are the views of senior care home staff and managers on the guidance and resource necessary to support and sustain the use of pulse oximetry in care homes?
5. What are the experiences of the primary, community and secondary care health-care staff involved in supporting the use of pulse oximetry in care homes, including, where relevant, as part of the national CO@h service?

## Methods

The evaluation comprised the following four work packages (WPs).

### *Work package 1: scoping*

Work package 1 included interviews with key NHS leaders, care association directors and care home managers (i.e. key experts), engaging with relevant literature and co-designing the study approach and research questions with members from a User Involvement Group.

### *Work package 2: a national online survey of managers of all care homes in England*

Work package 2 examined the application of pulse oximetry in care homes via a national online survey of managers of all care homes in England. The responses to the survey were analysed, and we tested the findings with members from a User Involvement Group. The survey was piloted with six stakeholders in February 2021, revised and then run in March and April 2021. The survey went to all 15,362 care homes in England then registered with the Care Quality Commission (CQC) (London, UK). The survey was advertised by the Association of Directors of Adult Social Services (London, UK), the CQC, the Care Provider Alliance (London, UK), NHS England and NHS Improvement (NHSE&I) (London, UK), NHSX (London, UK), My Home Life England (London, UK), the National Institute for Health and Care Research (NIHR) Applied Research Collaborations' Care Home Researcher Network and the NIHR ENRICH (Enabling Research in Care Homes) Research Ready Care Home Network (London, UK).

### *Work package 3: qualitative case studies*

Work package 3 involved in-depth interviews with care home managers and staff, and with NHS staff who support care homes, at six purposively selected case study sites, analysis of the data gathered and testing findings with members from a User Involvement Group. The study involved homes providing nursing, residential and learning disability care and differing in size, funding model, level of socioeconomic deprivation of the area served and mechanism for remote monitoring (digital, paper based or both). NIHR-funded ENRICH facilitators approached care homes on the study team's behalf, and the NHSE&I Project Steering Group helped identify care homes administering pulse oximetry via the CO@h programme. Individual interviewees ( $n = 31$ ) were identified and approached through the managers of the care homes. In addition, we interviewed senior managers in the care home sector and related care associations, and senior national policy leads. Data collection was undertaken from March to May 2021. We adopted a pragmatic approach to enable comprehensive analysis within a

short period. The collection and analysis of interview data were completed in parallel. The collection and analysis of interview data were facilitated through the use of rapid assessment procedure sheets, frequent team meetings, a workshop, and systematic categorisation and coding according to an analytical framework based on the Consolidated Framework for Implementation Research.

#### ***Work package 4: synthesis, reporting and dissemination***

In WP4 we shared and discussed the findings generated from data collection in WPs 2 and 3, and developed recommendations for care homes, commissioners, health-care providers and policy-makers.

## **Results**

We received survey responses from 232 (1.5%) of the 15,362 care homes in England and undertook interview-based case studies in six care homes (i.e. two nursing homes and four residential homes), carrying out 31 interviews. Owing to the small sample size, our findings cannot be assumed to be representative of the picture nationally. However, the proportions of residential homes and of smaller care homes (i.e. care homes with fewer than 40 beds) in our sample were close to the national figures. The findings provide valuable insights into use of pulse oximeters in care homes during the COVID-19 pandemic, including interaction between care homes and the NHS.

#### ***Use of pulse oximetry and care pathways in care homes***

The survey of care home managers indicates that pulse oximeters are used routinely in care homes and, in most cases, had been in use before the COVID-19 pandemic. Pulse oximetry is seen as useful for a range of, mainly respiratory, conditions, and not just COVID-19. More than one-quarter of care homes responding to the survey had been using pulse oximeters for 12 months or less. Pulse oximeters were often purchased by the care homes, although a smaller number of care homes had been provided with oximeters by the NHS. Care homes that had used pulse oximetry for 12 months or less were more likely than other care homes to have been provided with the pulse oximeters by the NHS.

Interview and survey responses report pulse oximeters as easy to use and readily accommodated alongside recording of other routine clinical measurements, such as temperature and blood pressure. In general, pulse oximeters were seen as reliable, but some open-text comments in the survey referred to inaccuracies and technical difficulties when using pulse oximeters. None of the case study sites where we interviewed staff reported that a formal maintenance schedule existed for their upkeep. If staff felt that a measurement was erroneous, then they would take another reading using another oximeter or replace the batteries.

As a result of their clinical training, nursing staff in homes had a broad understanding of the clinical value of monitoring oxygen saturation. In the survey, managers reported that a variety of other care home staff received training on all aspects of pulse oximetry usage. Two-thirds of respondents indicated that staff did not require any further training or support in respect to using pulse oximetry. Just under one-third of respondents responded that further training or support for staff may be required. Routine training in the use of pulse oximeters in residential homes was not universal, with interviewed staff describing how they had learned to use pulse oximeters through experience and observing colleagues or visiting clinicians. The need for straightforward messaging and clear guidance about the introduction and application of pulse oximetry in care homes (both nursing and residential) was commented on, with a need for guidance to be co-ordinated across care home policy-makers and disseminated in a manner accessible to care homes.

#### ***Experiences of how pulse oximetry was introduced in care homes and the impact on residents and staff***

The activities associated with pulse oximetry were described as usually not challenging for care home staff. Nevertheless, nearly half (45%, 91 respondents) of survey respondents felt that deciding when to

escalate patients was a challenge (cumulative answer for respondents selecting 'a little', 'somewhat' and 'very' challenging). Thirty-nine per cent ( $n = 77$ ) of respondents found it challenging to monitor patients, and around one-third of respondents found working with other services (34%, 58 respondents), taking pulse oximetry readings (33%, 68 respondents) and using information technology to record pulse oximetry readings (30%, 38 respondents) to be challenging. Most (93%, 180 respondents) care home managers reported having sufficient staff capacity to use pulse oximeters. Most of the survey respondents (i.e. care home managers) did not feel that pulse oximetry affected the workload of either themselves or their staff, although some respondents reported slight increases in either their or their staff's workload. Survey responses were nearly equally divided between reporting no impact on staff stress levels and reporting reduced stress from using pulse oximeters. Most care home managers indicated that pulse oximetry was improving their own job satisfaction and the job satisfaction of their staff (60% of respondents in both cases), with just under one-third of respondents reporting 'no impact'.

Survey respondents and interviewees considered that pulse oximetry was mostly reassuring to residents, or at least did not increase their anxiety; however, in a few cases, patients that they were left more anxious. Nearly all care homes (91%, 166 respondents) indicated that pulse oximeters facilitate timely identification of when a resident's health deteriorates. Half of the respondents (i.e. care home managers) reported that pulse oximetry reduces the frequency of residents attending a hospital's accident and emergency department (50%, 91 respondents) and of being admitted to hospital (46%, 84 respondents). Nearly half of care home managers who responded indicated that pulse oximetry does not change residents' lengths of stay in hospital, and one-third of respondents were unsure about this either way. Nearly all the remaining respondents thought that hospital length of stay was reduced.

Many care home managers, although fewer than half of those responding to the survey, felt adequately supported by the NHS for how to use pulse oximeters, how to communicate readings to the NHS and when and how to escalate cases. A similar number of care home managers responded that they had not received such support from the NHS. However, many care home managers reported that they were already using pulse oximeters before pandemic and staff did not find the pulse oximeters challenging to use. Therefore, it is unclear whether or not support was not received because it was not sought. A minority of care home managers responding to the survey reported receiving some support from the NHS, 'but not enough'. The general support received from NHS partners pre pandemic varied across the case study care home sites. At some sites general practitioners from a single practice visited weekly; at others general practitioners from multiple practices visited only in response to the need of an individual patient. During the COVID-19 pandemic, regular contact with general practitioners was, necessarily, reduced and other models of care evolved. Forty per cent of survey respondents were aware of, and two of our six case study sites were part of, the CO@h care home programme. These sites received pulse oximeters through the NHS, along with instructions on how to use the oximeters and stages of escalation. The support provided by the CO@h programme was considered to be beneficial to care homes that received it, as the CO@h programme provided access to clinicians, facilitated links with other services and gave reassurance to relatives.

## Conclusions

Conducting a survey of, and interviews with, care home managers and staff during a pandemic was challenging, as can be seen in the low response rate. Useful insights have, nevertheless, been obtained. Using pulse oximetry in care homes to detect hypoxia appears, generally, to be beneficial for residents with COVID-19 or other diseases. The low cost of the equipment, the fact that pulse oximetry was frequently reported to have little or no impact on staff workload and stress and the assessment that use of hospital services may have declined, on average, and that residents are usually more reassured than anxious as a result of pulse oximetry, are all supportive of optimism that pulse oximetry in care homes would be found to be clinically effective and cost-effective on further investigation.

The support received by care homes from health professionals in relation to escalation of concerns is vital, and although, in many areas, the support is reported positively and as sufficient, it remains the case that a significant proportion staff in care homes did not feel that they received adequate support. This emphasises the case for initiatives that strengthen collaboration between care homes and primary care. There are also potential benefits of integrated care systems improving individual- and population-level data-sharing between social care and health-care services in relation to care home residents. It would be helpful to provide clearer guidance for all care homes on the deployment of pulse oximeters (building on that developed by the CO@h programme) and to confirm the necessary skills and knowledge for staff. Accessible training packages that are tailored to the care home context and updated in line with changing guidance should also be made available.

Future research should include learning about the experiences of care home residents and their families, practice observations of the use of pulse oximetry, and gaining an NHS perspective about interactions with care home staff. Research to investigate the cost-effectiveness of pulse oximetry in care homes and of the COVID Oximetry @home programme would also be desirable.

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