



Oxford Health
NHS Foundation Trust

A good night's sleep

A new standard for night observations
in Mental Health hospitals

Oxford Health NHS Foundation Trust
with support from

Oxehealth

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Executive Summary

Mental Health staff face a quandary: how can they verify that patients who are alone in their own bedrooms are safe and at the same time foster rest and privacy?

The current standard of care is to risk assess patients and check them in person at frequent intervals. In Mental Health hospitals, these checks are carried out at least every hour. Checks can disturb patients' sleep and privacy, and negatively impact the therapeutic milieu of the ward whilst taking a great deal of staff time and, unfortunately, not preventing all safety incidents.

Oxford Health NHS Foundation Trust conducted a service improvement evaluation on Vaughan Thomas ward, a male acute inpatient ward. The evaluation assessed the use of Oxehealth's Digital Care Assistant to improve patient rest and privacy at night without compromising safety.

The service improvement evaluation demonstrated that a modified protocol significantly improved patient and staff experience with no reduction in safety, whilst leaving the underlying Engagement and Observation policy at night largely unchanged.

Consequently, Oxford Health have now implemented the modified observation protocol into "everyday use" in all patient bedrooms equipped with the Digital Care Assistant.

These results are promising and suggest that the modified protocol can improve patient and staff experience, without compromising safety at night, across a wide range of mental health pathways.

Results:

- Staff can confirm patient safety without disturbing or waking resting patients at night.
- The modified observation protocol is as safe as conventional methods.
- Patients feel they get better sleep and enjoy more privacy.
- Staff feel they disturb patients less whilst being confident that they are safe.
- Staff find the system easy to use and approximately twice as fast as conventional observation methods.

"The findings show that introducing the modified protocol essentially removes the need for staff to routinely wake patients to check they are safe. It greatly improves patients' experience at night."

Professor John Geddes,
Director R&D, Oxford Health
NHS Foundation Trust

The challenge of managing patient safety at night

Patients stay in individual rooms off a corridor for reasons of privacy and dignity. Nurses on wards need to ensure that their patients are safe at night, but they cannot be in the room with them all the time.

The current standard of care is to risk assess patients, then check and document that they are safe in person at frequent intervals. In mental health hospitals, these checks are typically carried out every hour or every 15 minutes.

These in-person checks require staff to clearly see the patient is breathing. At night, this involves observing tiny breathing movements in darkened rooms, when patients are under blankets. To do so, staff typically open up window hatches, shine torches onto patients and enter their rooms.

These safety checks can cause sleep disruption, and appear to stop patients from getting a good night's sleep. Studies have shown that sleep disruptions are associated with negative health outcomes including amplifying symptoms, increasing risk of suicidal ideation, increasing risk of relapse and lowering treatment response.¹

At the same time, the checks can interfere with patient privacy, negatively impacting on the therapeutic relationship between staff and those in their care.

Despite the best efforts of dedicated ward staff following the established observation protocols, incidents on inpatient wards still occur. 91% of inpatient deaths by suicide occur under intermittent rather than constant observations.²

The checks are also highly time-intensive. On many wards, intermittent observations occupy one person's time entirely, taking up at least 20% of the available staff resources. These activities do not make best use of the nursing skillset in mental health, a scarce skillset across the NHS.

Night observations aim to keep patients safe at night.

However, conventional methods can:

- Disturb patients and interrupt their sleep
- Interfere with patient privacy
- Negatively impact the therapeutic milieu of the ward
- Take substantial time for clinical staff to complete

Despite best efforts, incidents still occur in between checks.

The modified protocol for night observations

Oxford Health NHS Foundation Trust developed a modified observation protocol to help staff conduct general and intermittent observations when patients are in their bedrooms at night.³

The modified observation protocol essentially removes the need for staff to enter a room to confirm a resting patient's safety. Clinical judgement is paramount at all times, and staff still remain inquisitive and vigilant when they believe something is "not right", checking patients in person if they feel it is needed.

Oxford Health installed Oxehealth's Digital Care Assistant in the six higher acuity rooms on Vaughan Thomas, a male acute inpatient ward.

Staff use the Digital Care Assistant to help them check on patients in their rooms. Staff visually confirm patient presence and whether they identify any visual cause for concern, and may then obtain a medically-certified pulse and breathing rate - without entering the room or disturbing the patient.⁴

Oxford Health conducted a three phase service improvement project to evaluate the modified observation protocol (see Appendix for service evaluation scope and methodology).

The following sections lay out the 5 principal findings from the service evaluation project.

Oxehealth: Digital Care Assistant

Oxehealth's technology uses an optical sensor to pay attention to a patient in a room. Oxehealth algorithms can see movement in the room, rather like a human eye would. When someone walks into a room, the Digital Care Assistant detects where they are. It provides data to staff on high-risk patient activity and tracks night-time behaviour.

The Digital Care Assistant enables nurses to measure vital signs contact free, without entering a bedroom and disturbing a patient while they sleep, providing a medically accurate pulse rate and breathing rate. Oxehealth's Vital Signs product module is a Class IIa European medical device.⁵ There is no device connected to the patient, and the technology works even in total darkness.

A new standard for night observations in Mental Health hospitals

1. Staff can confirm patient safety without disturbing or waking resting patients

The modified protocol has removed the need for nurses to routinely switch on lights and/or enter rooms, which can disturb and potentially wake patients, to check they are safe at night.

The service improvement evaluation analysed potential patient disturbance from a sample of 275 observations over 22 patient nights (see Appendix; Phase 1b).⁶ Conventional methods would have required a member of staff to observe the patient in person (attending on their room) for every intermittent observation. Each observation risks disturbing patients' sleep.

The modified protocol enabled staff to confirm the patient was safe with no disturbance for 274 out of 275 observations. In these instances, staff found no cause for concern because they were able to clearly see patient movement or obtain a medically accurate pulse or breathing rate in order to confirm patient safety. For the remaining observation, it was clear the patient had just rolled over in bed; vital signs may take 10-20 seconds to acquire after a "major movement" such as rolling over in bed.

"The findings show that introducing the modified protocol essentially removes the need for staff to routinely wake patients to check they are safe. It greatly improves patients' experience at night." Professor John Geddes, Director R&D, Oxford Health NHS Foundation Trust

In all instances, clinical judgement was paramount, and staff remained inquisitive and vigilant with the option to check the patient in person if they believed something was "not right". It is interesting to note that these results were achieved in the highest acuity corridor on the acute adult inpatient ward.

"There's no disturbance to patient sleep when we conduct our observations at night using the Oxehealth system.

You are not making noise by opening the hatch or the door or switching on the light in the patient's room. It is a very efficient system and I feel like it is improving recovery for our patients."

Phillis Gomo, Nurse,
Vaughan Thomas ward

2. The modified protocol is as safe as conventional methods

The modified protocol was found to maintain the same level of patient safety as conventional methods for conducting general and intermittent observations in bedrooms at night.

The service improvement evaluation analysed patient safety from a sample of 52 observations over 6 patient nights (see Appendix; Phase 1a). There was an exact match in the observations taken using both the modified and conventional protocols.

Since introducing the modified observation protocol, there have been more than 5,000 observations taken over more than 300 patient nights (Phase 2). There have been no incidents related to the system in any respect.⁷

“I’m pleased that the system is proved to be safe and effective. The ward and management have been part of developing the new process so we know it works how we want. Nursing procedure has stayed the same and clinical judgement is paramount. It’s nice to see how quickly the team have embraced the system, even staff that had initial scepticism.” Andrew Wood, Research Nurse, Vaughan Thomas ward

The modified observation protocol enables staff to obtain medically-accurate pulse or breathing rate to confirm safety when patients are resting. In the future, staff may find they are able to take better care of patients by getting early evidence of physical health deterioration from the vital sign measurements.

In addition, all staff surveyed felt that the modified protocol reduced verbal and physical aggression from those in their care.

“[A patient] has just fallen asleep and is very aggressive. It’s been really challenging nursing him. If his sleep is disturbed, he’ll be antagonised. We won’t wake him up using Oxehealth.”

– Paul McCann, Deputy
Ward Manager,
Vaughan Thomas ward

More than 5,000 observations have been taken over more than 300 patient nights.⁷

3. Patients feel they get better sleep and enjoy more privacy

Under conventional observation methods, 82% of patients reported that they noticed staff checking on them at night and 73% reported that it directly disturbs their sleep at night.⁸

One patient commented, “[Staff] keep turning the light on and off, it makes it hard to sleep. I feel that my sleep keeps getting interrupted at night.”

Another commented, “The staff were noisy in the corridor, I heard keys all night jangling, the light kept being turned on and off and the shutters kept being opened.”

Patient experience has been positive since introducing the modified observation protocol. All patients reported that they were not disturbed by the physical presence of an optical sensor in their room.

100% of patients surveyed felt safer at night and felt that they slept better, and 86% felt that their privacy at night had improved.⁹

Patients provided qualitative feedback, of which the following comments are representative:

“I slept really well; the sensors are brilliant because they allow me not to be disturbed at night.”

“It was nice to get a good night’s sleep. I sleep better [in the Oxehealth room] than the other room where the lights are turned on and the shutters are opened a lot of the time.”

“I slept fine. I didn’t realise that the sensors would be that helpful [to getting a better night’s sleep].”

Patient survey responses

Conventional protocol⁸



Modified protocol⁹



4. Staff feel they disturb patients less whilst being confident that they are safe

Under conventional observation methods, 88% of staff felt that they disturbed patients during observations at night.¹⁰ All staff felt that conventional observations negatively impact recovery speed and wellbeing of those in their care.

Staff perception of the modified observation protocol is positive: 100% of staff consulted reported that they disturbed patients less at night.¹¹ 80% reported that they felt the modified protocol improves patient privacy and dignity at night.¹²

“The Oxehealth system has been extremely beneficial for promoting patient privacy and dignity and also reducing disturbance at night. It’s been evident through my interactions and conversations with patients - they believe the system reduces their disturbance and have specifically expressed feeling more refreshed having slept throughout the night.” Andrew Wood, Research Nurse, Vaughan Thomas ward

As Carol Gee, Modern Matron on Vaughan Thomas, commented, “Staff have welcomed this change because it’s helping them do their job and means they have more time to spend with their patients.”

In addition, staff felt that the modified observation protocol reassured them during their observation rounds at night.

As Rumi Mohideen, Healthcare Assistant on Vaughan Thomas ward, stated, “It can be very difficult to see breathing at night time, especially if a patient is sleeping in an unusual position or with their back turned away from the door. This [the modified protocol] makes it much easier to see the patient is ok because it gives you their breathing rate”

“Sleep is crucial for patient recovery. We hope that by using Oxehealth to do observations, sleep will improve for many of our patients, which in turn could have a positive impact on their recovery.”

Dr Alvaro Barrera, Consultant Psychiatrist, Vaughan Thomas ward

“The modified protocol easily slots into how the ward works and doesn’t require much training. It’s an improvement that gives our teams confidence when managing patient risk.”

Vanessa Odlin, Director Service, Oxford Health NHS Foundation Trust

Staff survey responses

Modified protocol¹²



5. Staff find the system easy to use and faster than conventional methods

All staff surveyed felt that the modified protocol is easy to use. In addition, the modified observation protocol saves staff time during the night shift.

Staff avoid spending time opening hatches/doors and turning on lights as the Digital Care Assistant provides a clear video feed, even in the dark. The reduced need to attend every room routinely, rather than the rooms with patients actively requiring clinical time, reduces time spent walking around the ward unnecessarily. Overall, this significantly reduces the time taken to do observation rounds.

The service evaluation ran a small time and motion analysis from a sample of 10 observation rounds over two night shifts. The results indicate that staff can complete observation rounds in approximately half the time using the modified protocol compared to conventional methods. Further work will be undertaken to validate this finding.¹³

“Observations are faster because the patient can be seen very clearly and it’s more convenient than the usual observation methods. It lets me spend more time with patients that need it.”

Adrian Sporis, Healthcare Assistant,
Vaughan Thomas ward

Conclusion

The introduction of a modified nursing observation protocol has essentially removed the need to disturb or wake resting patients to confirm they are safe at night. This has significantly improved the patient experience on the ward at night. Patients feel they can get better sleep and more privacy at night.

Staff have embraced the modified observation protocol, which is easy to use and has easily slotted into their existing routines with little training burden. Staff are able to check patients are safe at night without disturbing their rest, and feel reassured that they are safe as a result of deriving medically accurate pulse or breathing rates.

The modified observation protocol is as safe as conventional methods, with the additional benefit that staff are able to complete observation rounds almost twice as quickly. Clinical time saved can be reinvested in therapeutic care for those patients most in need at night.

“The way that nursing observations have taken place, with nurses checking patients in person, has not really changed for decades and can be incredibly disruptive to patient sleep.

Working with Oxehealth is transforming the patient experience at night while providing reassurance to staff that the patient is safe.”

Pauline Scully, Deputy Chief
Operating Officer, Oxford Health
NHS Foundation Trust

Appendix: Service improvement scope and methodology

Vaughan Thomas is a male acute mental health inpatient ward at Oxford Health NHS Foundation Trust. It has 18 bedrooms, with the Digital Care Assistant installed in the 6 higher acuity bedrooms (33% of the total ward).

Oxford Health NHS Foundation Trust conducted a service improvement project to evaluate whether to adopt the Digital Care Assistant Vital Signs to support general and intermittent observations during the night shift (21:00 to 07:00).

Observation, survey and interview data were collected:

- To evaluate the modified observation protocol, over a 5-month period, observations were initially simulated and tested in parallel with conventional observations then used as the primary method of observation.
- Phase 1a: 52 observations using the modified observation protocol over 6 patient nights were taken in parallel and compared with conventional observations to evaluate patient safety.
- Phase 1b: 275 observations using the modified observation protocol were taken over 22 patient nights to compare potential patient disturbance. 103 observations were completed in real-time and 172 were completed retrospectively.¹⁴
- Phase 2: Since implementation of the modified protocol, 5,131 observations over 67 night shifts (>300 patient nights) have been monitored to continue to assess safety, performance and adherence (as at 11/04/2019).
- To evaluate staff perceptions, 10 ward staff completed questionnaires and provided qualitative feedback.

- To evaluate patient perceptions, 17 patients were surveyed and all 25 patients in the evaluation received informal interviews on their sleep.¹⁵

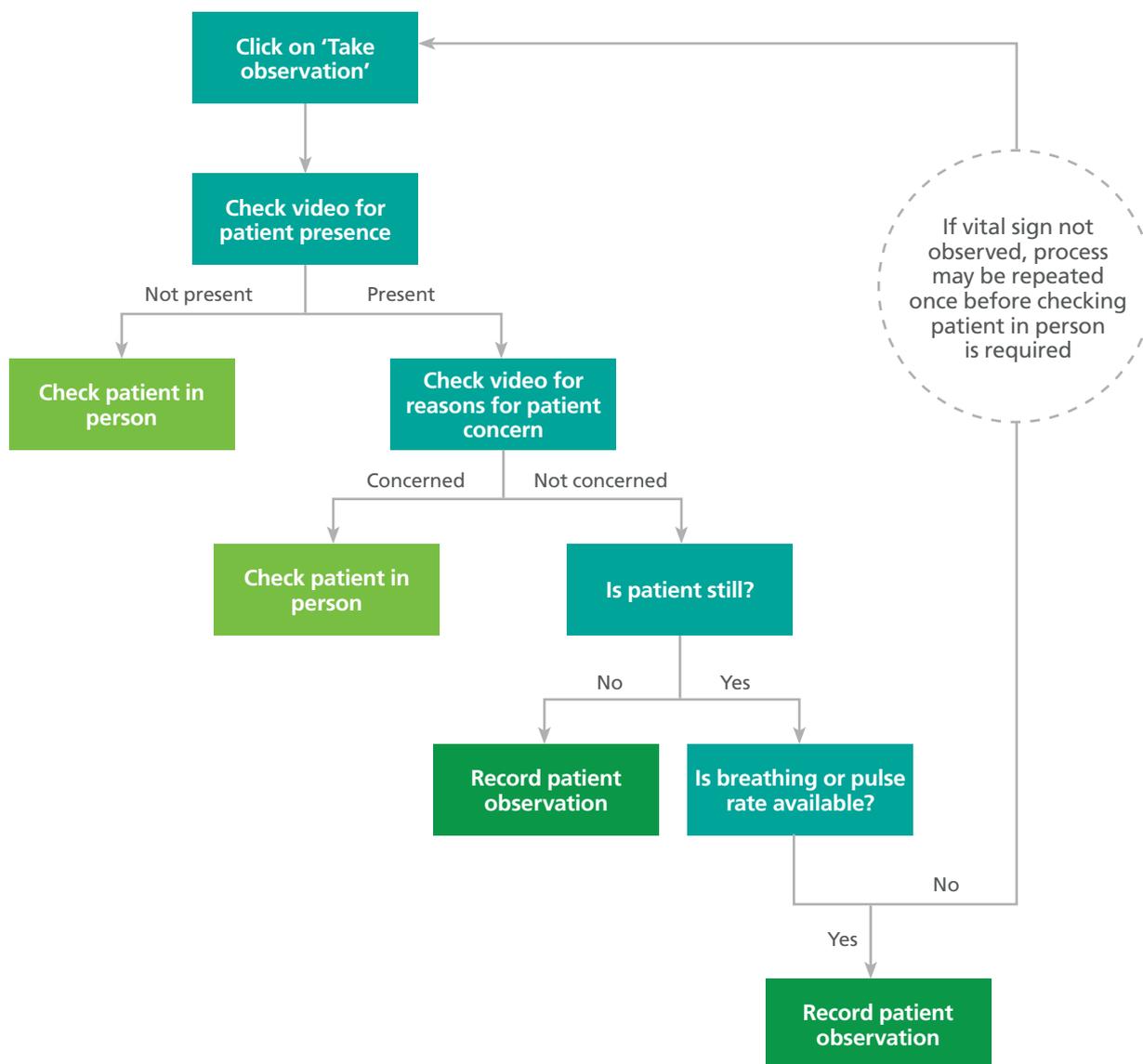
Time and motion analysis was conducted to evaluate the difference in time taken to complete observations between the conventional and modified observation protocol:

- 10 observations rounds across 18 patient bedrooms were shadowed over 2 night shifts. Each round consisted of approximately 12 observations taken using the conventional protocol and 6 taken using the modified protocol.¹⁶
- The average time per observation for 126 conventional observations was compared to the average time per observation for 51 observations using the modified protocol.

The modified observation protocol was modelled on existing ward general and intermittent observations and captures a medical grade pulse and breathing rate. There was no change to Oxford Health's Safe and Supportive Observation policy.

Staff were trained on the process and supported throughout the evaluation period. The training emphasised that at all times, clinical judgement remained paramount to carrying out observations. New staff (e.g. Bank and Agency) were trained as needed by designated ward staff that cover all night shifts.

Modified observation protocol: workflow



To take an observation:

- The patient is observed through a video feed and checked for any reason for concern.
- If the patient is not present, or there is reason for concern, the patient is checked in person.
- If there is no reason for concern, patient status (e.g. asleep) and pulse or breathing rate are captured.
- If there is no pulse or breathing rate available, the process can be repeated once before checking the patient in person.

A full observations workflow is being developed to digitalise paper observations sheets to improve adherence and reduce clerical and administrative time burden.

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About Oxford Health NHS Foundation Trust

Oxford Health NHS Foundation Trust (OHFT) provides physical, mental health and social care for people of all ages across Oxfordshire, Buckinghamshire, Swindon, Wiltshire, Bath and North East Somerset. Our services are delivered at community bases, hospitals, clinics and people's homes. We focus on delivering care as close to home as possible.

As a leading teaching, training and research trust, we have close links to Oxford and Oxford Brookes, Buckinghamshire, Reading and Bath universities. We are part of the Oxford Academic Health Science Centre, working closely with our university colleagues to translate their findings into clinical care as quickly as possible, enabling people using our services to benefit from the latest advances in healthcare.

We host the NIHR Oxford Health Biomedical Research Centre with Oxford University, and aim to bring the best science to the complex problems of mental disorders and dementia. We also host the Collaboration for Leadership in Applied Health Research and Care (CLAHRC) Oxford; a partnership between universities, healthcare commissioners and providers, charities and industry, targeting health and social care problems in Oxfordshire and the Thames Valley.

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About Oxehealth

Oxehealth's Digital Care Assistant gives clinicians, carers and custodians more time for hands-on care where and when they are needed most. The technology is an assistant for when you can't be there, paying attention to every room.

Oxehealth's software solutions use secure optical sensors to generate the alerts and reports that the clinicians, carers and custodians need, seamlessly slotted into their existing workflow. Oxehealth serves customers in mental health, care home, acute hospital, prison, police & homecare settings.

Oxehealth was the first joint spin-out of the University of Oxford's Institute of Biomedical Engineering and Oxford University Hospitals NHS Foundation Trust. The company was founded by Professor Lionel Tarassenko, Head of Engineering at the University of Oxford, in 2012.

Oxehealth's objective is to increase patient safety, privacy, dignity and independence. Its technology design, data privacy & security policies are designed to deliver on that promise.

Oxehealth's business and technology processes have achieved ISO13485 certification and the Cyber Essentials Plus security accreditation. Oxehealth's Vital Signs product is a Class II(a) European medical device.

Prior to taking on a customer, Oxehealth works with organisations to review and formally adopt a detailed Data Privacy Impact Assessment (DPIA) which lays out how data is processed on behalf of the Data Controller (the organisation) in compliance with the General Data Protection Regulation and Caldicott Guardian principles of that organisation.

Footnotes

¹ Krystal AD. Psychiatric disorders and sleep. *Neurol Clin* 2012; 30(4): 1389–413. doi: 10.1016/j.ncl.2012.08.018

² Veale D, Against the stream: intermittent nurse observations of in-patients at night serve no purpose and cause sleep deprivation, *BJPsych Bulletin* 2019. doi:10.1192/bjb.2018.116

³ General observations are defined as “hourly” or “Level 1” observations; intermittent observations are defined as observations that are more frequent than hourly (e.g. every 15 minutes) or “Level 2”

⁴ The Oxehealth Vital Signs device is a certified medical device in Europe. It is intended for noninvasive spot measurement of pulse rate and respiratory rate. It is a fixed-installation device for use within single occupancy rooms within hospitals, general care, domestic and secured environments where a framework exists which mandates periodic checks by a trained professional to ensure subject safety. See Instructions for Use for intended use, contraindications, warnings, cautions, usage directions and maintenance

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⁶ From 275 observations: 255 observations returned a vital sign first-time-round; 3 observations returned a vital sign second-time-round; for 16 observations the patient was clearly seen moving. For the remaining 1 observation it was clear that the patient had just rolled over in bed; vital signs may take 10-20 seconds to acquire after a “major movement” such as rolling over in bed.

⁷ During 66 nights, 5,131 observations were done using the optical sensors; represents >300 patient-nights. Ward incident log reviewed by consultant to ensure no incidents related to the sensors

⁸ N = 11

⁹ N = 7 (N = 6 for number of patient responses on improved sleep)

¹⁰ N = 13

¹¹ N = 10

¹² N = 10

¹³ An observation includes confirming patient location and safety as per policy and recording the observation in an observation sheet. Conventional observations took 26 seconds per observation. Modified observation protocol took 14 seconds. Writing time was normalised between observation types as this was not changed for the experiment. Oxehealth-assisted observations were 45% faster when comparing the same staff for conventional obs and Oxehealth-assisted obs over two night shifts

¹⁴ 275 Oxehealth-assisted observations were taken: 172 Oxehealth-assisted observations completed retrospectively using Oxehealth historical data and 103 were conducted by staff during night shifts (which includes the 52 observations taken in Phase 1)

¹⁵ 17 surveyed patients included; 8 patients that were not in Oxehealth rooms, 5 patients that were in Oxehealth rooms and 4 patients that were in both (i.e. surveyed before and after being in the Oxehealth room)

¹⁶ Observation rounds included conventional observations and Oxehealth-assisted observations: 6 out of 18 bedrooms had Oxehealth’s Digital Care Assistant installed and used Oxehealth-assisted observations, the remaining 12 bedrooms used the conventional observation process



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