



***SERVICE IMPROVEMENT CASE  
STUDY:  
NATIONAL INPATIENT SURVEY***

*The theme of this case study covers service  
improvements in the NHS made to  
reduce noise at night in hospital and lighting to  
help aid better sleep for patients*

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## 1 Introduction

The data collected from the national patient surveys can seem overwhelming, and even when the results are made clear, and trusts have an opportunity to identify strengths and areas for improvement, it can be hard to work out how to go about making changes in response to the feedback patients have given.

Patient Perspective is an approved contractor for the National Patient Survey Programme and has been working with trusts for over 20 years. As part of our service, we have compiled case studies of good practice. Case studies are based on the projects, initiatives and service improvements NHS trusts have undertaken to bring about change.

This case study focuses on results of patient satisfaction for questions in the National Inpatient Survey 2023 relating to noise at night and highlights examples of service improvements made to aid better sleep for patients.

Case studies published to date and available on the Patient Perspective website [Reference 1](#) have covered:

- **Inpatient Survey** – Reducing delays on discharge; nutrition and assistance at mealtimes and reducing noise at night and promoting better sleep.
- **Inpatient Survey** - Improvements in discharging patients from hospital.
- **Inpatient Survey** - patient flow and patient discharge from hospital; enhanced discharge lounges, improvements in discharge summaries.
- **Maternity** – Accommodating partners and visiting times. Telephone triage service, patient flow, and the UNICEF Baby Friendly Initiative.
- **Maternity** - Tongue Tie and Feeding Support.
- **Urgent and Emergency Care** – projects including reducing waiting times and ambulance handovers, virtual wards and care at home initiatives, also featuring; care bags for children and young people and adults with learning disability/autism.
- **Children and Young People** - Patient and staff engagement, patient passports, an interactive children's website, and healthcare app.
- **Children and Young People** - Youth Service Digital Youth Service, Elective Pathways, Youth Councils, patient information and food.

## 2 About the National Inpatient Survey 2023 Reference 2



The Care Quality Commission published benchmark reports and a summary of the results on the website. This survey looks at the experiences of people who stayed at least one night in hospital as an inpatient.

People were eligible to take part in the survey if they stayed in hospital for at least one night during November 2023 and were aged 16 years or over at the time of their stay.

## 3 Case Study

This case study has been collated from responses received from a Freedom of Information request (FOI). Responses were received from 13 Trusts which had performed higher than average in the National Inpatient Survey 2022 on the question relating to noise at night from staff. Graphs in section 6 compares scores for 2023 with 2022.

The FOI asked what improvements trusts have made to reduce noise levels from other patients and staff at night, also if noise monitoring equipment was used on all wards and if this had made an impact on reducing noise levels in all wards at night. Finally, the FOI also requested information on improvements made to improve ward lighting at night to help patients sleep.

There is evidence that Trusts have been working for some time and continue to try and reduce noise at night by introducing sleep campaigns to raise awareness with staff and patients about the importance of sleep. [Reference 3](#) and [references 9.5 – 9.11](#).

In this case study, improvements have been achieved in patient satisfaction scores where some trusts are using or plan to use devices such as , 'sound ears' to measure and visualise noise. The CQC Benchmark reports for the National Inpatient Survey 2023 [reference 2](#) shows the Royal Papworth NHS Foundation Trust scoring much better than other trusts for questions relating to noise at night. Other trusts featured in the case study score higher than other trusts with active campaigns and measures in place to reduce noise levels and improve sleep for patients.



### 3.1 Bolton NHS Foundation Trust

#### Reducing Noise at Night from patients and staff

A quality improvement project has been completed with an aim of reducing noise at night so patients on the wards experience a better night's sleep. The results of the adult inpatient survey show that patients are affected by noise at night from staff and other patients. A survey of all ward areas showed that machines, procedures such as blood tests, doors banging, and lights were a common theme of noise levels being an issue. The project looked at reducing these interruptions by completing tests of change.

The Trust has reinforced the reduction in noise levels from other the policies to help staff be less disruptive and make less noise at night e.g., soft soled shoes. Also, clear procedures to 'close down' ward activity at night to help reduce noise. The senior team now undertake overnight reviews to meet with staff and discuss behaviour and noise at night.

#### Noise monitoring equipment

The Intensive care unit has noise monitoring equipment permanently installed. The Trust also has some portable noise monitoring equipment which are shared as part of projects to make changes to reduce noise. There have been some improvements in reducing noise levels in all wards in local surveys. Discussions are taking place about funding to purchase more noise monitoring equipment.

A patient leaflet has also been devised with advice and guidance for the patients.

#### Improvements to ward lighting

A new set of procedures has been introduced for all adult wards to follow including a checklist which includes turning down lights and reducing the number of lights left on overnight (some lights will also be needed to allow patients to navigate the unfamiliar ward environment overnight). Patients are offered a sleep pack consisting of ear plugs and eye masks to try and improve patient experience with the aim to create protected sleep time from 23.00 – 6.00 hrs.

### **Night Time checklist**

|            |                                                                                                              |
|------------|--------------------------------------------------------------------------------------------------------------|
| <b>1)</b>  | Once medicines rounds are complete in a bay turn off main lights and utilise night lights                    |
| <b>2)</b>  | Ensure observation equipment is available in each bay and consider timings of observations to maximise sleep |
| <b>3)</b>  | Ensure bay doors are closed if appropriate                                                                   |
| <b>4)</b>  | Partially close patient curtains if appropriate                                                              |
| <b>5)</b>  | Ensure TVs and Radios are turned off or headphones are available for patient use                             |
| <b>6)</b>  | Reduce call bell alarms at 23:00                                                                             |
| <b>7)</b>  | Reduce telephone ringing volume at 23:00                                                                     |
| <b>8)</b>  | Ensure equipment is charged appropriately and timings of infusions noted so alarm not sounding               |
| <b>9)</b>  | Offer pain relief, decaffeinated drinks, sleep packs where appropriate                                       |
| <b>10)</b> | Ensure call bell and phone ringer are turned back up at 06:00                                                |

## 3.2 Liverpool Heart and Chest Hospital NHS Foundation Trust

### Reducing Noise at Night from patients and staff

On admission all patients are asked their normal sleep pattern, so staff are aware of any issues they may have with their sleep patterns and their sleep is monitored daily as part of their documented care plan.

Most wards have facilities to offer a side room to patients who are having difficulty sleeping but this depends upon their condition and if they are safe in a side room.

Eye masks and ear buds are available to any patients who request them as well as the offer of milky drinks to aid sleep.

Over the last months, patients who receive a post discharge follow up call are asked if they had any sleep issues and the cause of the disturbance. This information is recorded in the patient's EPR records.

To try to eliminate problems and improve sleep the Matron for Patient Experience has devised a sleep bundle which includes noise reduction measures and has met with the ward managers to review which measures they can implement in their wards.

Hourly, to 2 hourly comfort checks are used to ensure patient comfort and safety, these are documented in the patient's EPR notes.

All ward areas have hearing loops and provide care plans for patients with hearing loss.

Some wards are using posters to provide information and guidance and to remind staff, patients and families of the need to reduce noise.

Patient experience is monitored through follow up calls post discharge, as well as patient shadows and patient stories. Environmental compliance is monitored through Matron's audits, and PLACE inspections.

Wards are using posters to provide information and guidance and to remind staff, of the need to reduce noise.

Staff are required to wear uniform policy regulation footwear to reduce noise.

Issues with equipment are reported promptly to ensure repair and reduce noise.

#### Sound monitoring equipment

The Intensive Care Unit have noise monitoring equipment which has raised awareness of noise levels, as this can be a very busy environment.

#### Improvements to ward lighting

Some of the newer ward environments have low level lighting installed to reduce the risk of light disturbing patients and as each ward is upgraded this can be implemented as part of the upgrade work.

### 3.3 The Clatterbridge Cancer Centre NHS Foundation Trust

#### Reducing Noise at Night from patients and staff

Every inpatient has their own room (100% side room model).

#### Sound monitoring equipment - No

#### Improvements to ward lighting

The hospital is a new build and opened in 2020. Patients have their own rooms and can control the lighting from their bed panel.

### 3.4 Royal Papworth Hospital NHS Foundation Trust

#### Reducing Noise at Night from patients and staff

All ward areas are single side rooms so disruption from other patients is minimal. However, sometimes noise from other patients is unavoidable for clinical reasons and in those situations staff will where possible keep noise to a minimum. Sometimes there can be excessive noise from patients TV'S and radios. In these circumstances patients are encouraged to lower the volume if however, the patients are hearing impaired then if appropriate the doors will be closed providing patient is still visible, as patient safety is paramount.

#### Sound monitoring equipment

After an Audit that was carried out 2 years ago demonstrated that noise levels at night were not acceptable, the trust introduced a piece of equipment called Sound Ears. These were funded by Papworth Charitable Trust. The sound ears are based on a traffic light system and are a visual tool. When noise is within an acceptable range the Ear is Green. When the noise level starts to exceed that level, it turns Amber and when the noise reaches above the preset unacceptable level it turns Red. A re audit has been completed with good compliance from staff relating to the sound ears. Staff are more aware of noise in their working environment. Night Matrons continually monitor noise levels on night rounds and address any issues in real time.

Sound Ears are located at the central nursing station on each ward and in Critical Care. This has had an impact and helped to reduce noise at night. This is backed up by Audits that are carried out to assess compliance with the noise meters.

**SOUND EARS!**  
Coming soon to a nursing station near you!!

- Visual tool (flashing symbol) to facilitate noise reduction via a traffic light system
- **GREEN** = Monitoring
- **AMBER** = Noise level approaching the limit
- **RED** = Noise level has been exceeded
- These are being installed Trust wide in response to patient feedback relating to excessive noise in the clinical area..

**NHS**  
Royal Papworth Hospital  
NHS Foundation Trust

Compassion  
Excellence  
Collaboration

### Improvements to ward lighting

Once the nighttime drug round has been completed, approximately 22:00-22:30 hours the staff are encouraged to turn the lights down within the ward area and nurses' station but also considering a safe working environment.

## 3.5 South Tees Hospitals NHS Foundation Trust

### Reducing Noise at Night from patients and staff

There has been significant investment in the therapeutic care team. This is a team that supports patients with their therapeutic needs on a 1:1 basis.

Particularly noisy patients are placed into side rooms when available and appropriate.

A reducing noise campaign has taken place, led by the Clinical Matrons with the support of communications. Examples of this are computer screen savers, banners and display units at the entrance of different wards and departments. In addition to this patient and relative enquiries are monitored and patient surveys request patient feedback related to this so that local action can be initiated.

Any works that may cause adverse noise will be carried out during normal working hours, we do not anticipate any high level noise during sleeping hours 8pm – 6am

### Sound monitoring equipment

Sound Ear devices are available on several wards whereby the ears turn red if exceeding the recommended noise level in clinical areas. Reducing noise levels over time is challenging to quantify but monitored through patient surveys.

### Improvements to ward lighting

All light fittings throughout the ward are replaced with modern day LED, each bed bay has its own designated dimmable fitting and night lighting. In addition to this lighting with connection to the outside environment has been introduced and then changes to reflect day and night.

### 3.6 Northumbria Healthcare NHS Foundation Trust

#### Reducing Noise at Night from patients and staff

Insulation installed within partition walls to bed bays when time/ programme/ cost allows as part of ward refurbishment works would be considered on a case-by-case basis depending on time, resources and existing site conditions.

Ward refurbishment scheme has ensured acoustic treatments to improve performance.

The Trust has a programme to implement localised ensuite rooms. This has several benefits including infection control, patient experience but also reduces patient and staff movement through the night restricting them to bed bays rather than across the ward.

#### Sound Monitoring equipment

Clinical staff monitor noise levels locally.

#### Improvements to ward lighting

There are no current specific works ongoing, however LEDs are installed on new projects and the patient experience team would undertake an exercise and advise on improvements at the time.

### 3.7 Royal National Orthopaedic Hospital NHS Foundation Trust

#### Reducing Noise at Night from patients and staff

Reduced the Volume of the Call Bells system, working with Patient liaison

#### Sound Monitoring equipment

No plans to introduce now. Any issues highlighted are communicated with PALS.

#### Improvements to ward lighting

Most ward areas have either night lights or lighting reduced manually by ward staff.

### 3.8 Mersey and West Lancashire Teaching Hospitals NHS Trust

St Helens and Knowsley Teaching Hospitals NHS Trust and Southport and Ormskirk Hospital NHS Trust became a single legal entity known as Mersey and West Lancashire Teaching Hospitals NHS Trust on 1st July 2023, as such parts of the response may be provided in two sections relating to the hospital sites of each of the legacy organisations.

#### Reducing Noise at Night from patients and staff

Legacy Southport and Ormskirk 2022 National Patient Survey Actions - Relaunches the silent night campaign in Dec-23 (originally launched Dec-21). Campaign involves sharing visual top tips for patients to keep the noise down at night. Sleep masks and earplugs available to patients. TV headphones available for patient use.

Legacy St Helens & Knowsley National Patient Survey Actions - Focused actions were added to the improvement plan following the 2021 results which resulted in a marked improvement in scores for the same questions in 2022. There have been no PALS concerns raised relating to unacceptable noise at night. Eye masks and earplugs available on wards for appropriate patients to patients. TV headphones are encouraged and available on all wards for patient to use.

Southport and Ormskirk sites response - Relaunches the silent night campaign in Dec-23 (originally launched Dec-21). Campaign involved sharing top tips for staff to keep the noise down at night. Sound ears in place on all inpatient areas.

St Helens and Knowsley sites response - There was a focussed campaign using a 7-minute briefing to disseminate how staff can help to improve patients quality of sleep whilst in hospital (closing bay doors if appropriate, having phone volume to a minimum at nurses station when staff present, being mindful of use of night lights/ apologising if there is increased noise due to another patients need, soft close bins). Nighttime bed managers challenge excessive noise when they visit clinical areas. Questions around disturbance of sleep were added to Patient Experience questionnaire to enable staff to address early and offer ear plugs/eye mask.

### Sound Monitoring equipment

Southport and Ormskirk sites do have sound monitoring equipment on all wards.

St Helens & Knowsley – do not have sound monitoring equipment.

### Improvements to ward lighting

Southport and Ormskirk sites - none

St Helens and Knowsley sites - Nighttime bed managers challenge inappropriate use of lights at night when they visit clinical areas. A question around disturbance of sleep was added to Patient Experience questionnaire to enable staff to address early and offer ear plugs/eye mask. The 2022 In-patient survey results saw a marked improvement in scores relating to how patients slept at night whilst in hospital.

## 3.9 The Queen Victoria Hospital NHS Foundation Trust

### Reducing Noise at Night from patients and staff

Staff are reminded of the importance of maintaining a restful environment at night via the Nursing Quality Forum and sharing of the inpatient survey results.

In 2022 and 2023 the trust scored "much better than expected" in the inpatient survey and scored 8.3 and 8.5 against UK average of 6.1 and 5.4 for the question on patients prevented from sleeping by other patients.

In 2022 and 2023 the trust scored "much better than expected" in the inpatient survey scoring 9.5 and 9.4 against UK average of 8.1 and 8.4 for noise at night from staff.

**Sound Monitoring equipment** None with no plans to introduce.

### Improvements to ward lighting

In 2022 and 2023 the trust scored "much better than expected" in the inpatient survey 9.0 and 9.1 against UK average of 8.1 and 8.4.

### 3.10 The Walton Centre NHS Foundation Trust

#### Reducing Noise at Night from patients and staff

Night packs are offered to patients which include ear buds and night mask and a leaflet explaining how they can support reducing noise. The use of headphones by patients are requested to be used on electronic devices.

A 'noise at night' project was completed in March 2024 which reviewed unnecessary noise from the ward environment, this led to adjustment of door closures, replacement of bins for soft closing units, and communications to non-clinical teams around the need to keep a quiet environment during nighttime hours.

#### Sound Monitoring equipment

No

#### Improvements to ward lighting

New beds have lights underneath which although doesn't help sleep as such, it allows for ward lights to be switched off at nighttime, aiding better sleep but without compromising on falls risk for patients who need to get up during the night to use bathrooms. [Reference 4](#)

### 3.11 Warrington and Halton Teaching Hospitals NHS Trust

#### Reducing Noise at Night from patients and staff

There is an option of headphones to reduce noise from TV and radio, and ear plugs are also provided on request. Side rooms are used where possible if a patient has cognitive issues to limit disruption to other patients.

In the paediatric ward if a child requires regular intervention which could cause upset to them, then they will be cared for in a cubicle to reduce the noise and provide privacy for all.

Improvements have been made with the aim of reducing noise levels at night from staff including reducing the volume of alarms to a level that maintains safety, this includes ring tones on ward phones lowered to safe levels. The doors to bays and side rooms are kept closed where possible and soft close lid bins are used on the wards. Additionally, break areas and handover areas are away from the clinical area.

### Sound Monitoring equipment

A sound ear is in use on the Intensive Care Unit, which acts as a traffic light system for increases in sound. If the ear is to flash red, staff would recognise the noise is too loud and try to establish the trigger to be mindful of noise levels.

A sound ear is also in place in the Neonatal Unit, which has had a positive impact with staff noise, however, the sound ear does also pick up monitoring equipment quite easily.

No plans at present to introduce on the adult wards, but this will be reviewed as a future quality improvement project.

### Improvements to ward lighting

Improvements have been made to improving ward lighting at night by switching off bay lighting when safe to do so and encouraging the use of individual bed side lights. Eye masks are also available to patients on request.

## 3.12 University College London Hospitals NHS Foundation Trust

### Reducing Noise at Night from patients and staff

Staff are aware they need to be discrete when working at night to reduce unnecessary noise at night.

Currently UCLH does not monitor noise levels in wards this only happens in high-risk noise areas where required, such as plant and generator rooms. Wherever there is a risk of increased noise at night (i.e. works) this is restricted to early in the night (prior to lights out) and communicated to clinical areas. Patients are encouraged to bring earplugs, if there are noisy works these are provided to the area wherever possible for use at any time affected.

### Sound Monitoring equipment – No

### Improvements to ward lighting

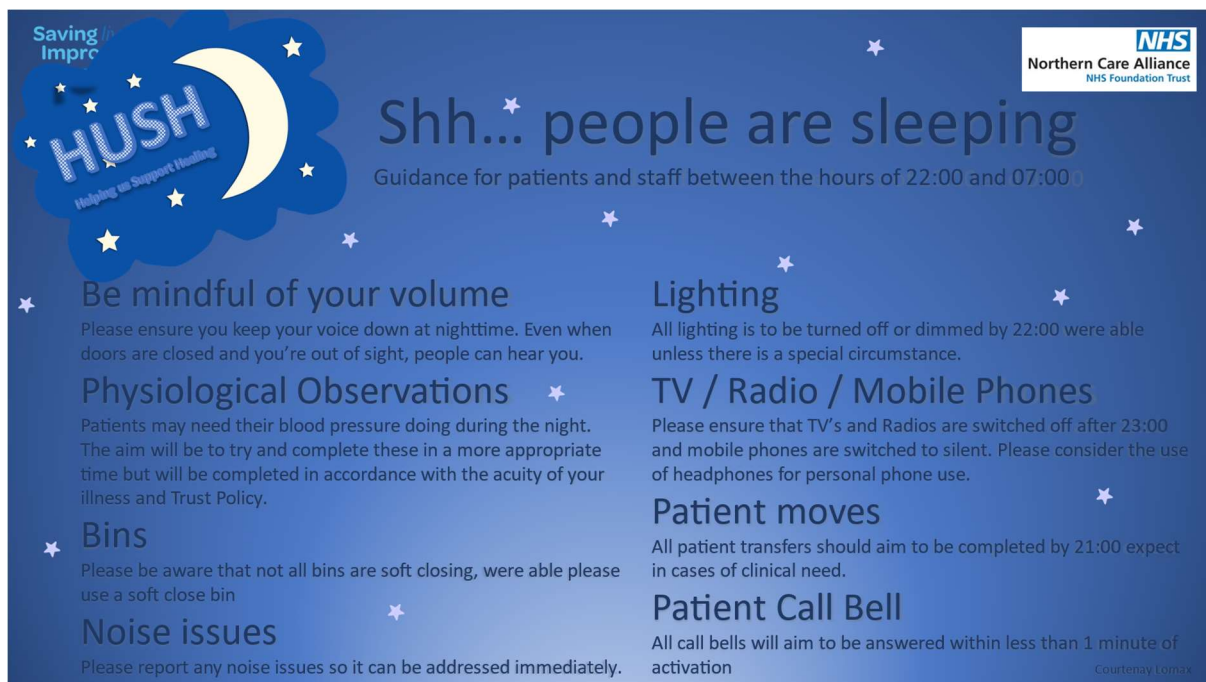
The Trust is rolling out LED lighting and reduces the light levels in wards at night.

### 3.13 Northern Care Alliance NHS Foundation Trust

#### Reducing Noise at Night from patients and staff

There has been several specific noise at night initiatives across our sites, see NCA Night time Poster.

A new 'HUSH' (Helping us support healing) campaign is soon to be rolled out all across NCA inpatient areas to help reduce noise at night.



A sleep survey is regularly used across many of our sites to help monitor noise at night levels.

Saving lives,  
Improving lives

#### Sleep survey Questions

All in patient areas were survey regarding quality of sleep and suggestions for improvement. Patients were asked the following questions

1. Do you think you are getting enough sleep at night?
2. Have you ever had your sleep disturbed at night?
3. If your sleep has been disturbed was this due to staff conducting observations?
- 4a. Has your sleep ever been disturbed by staff conversation outside your room?.
- 4b. If so, were these conversations appropriate?
- 4c. Please tell us more detail
5. Are you disturbed by other patients. Raised voices/call bells?
6. What could we do to improve your sleep at night?

### Sound Monitoring equipment

Sound monitoring equipment is in place on the ICU department but no plans to increase now.

### Improvements to ward lighting

Lights off is covered in the HUSH campaign and eye masks are available on requests in the Trust night packs.

## 3.14 North Middlesex University Hospital NHS Trust

### Reducing Noise at Night from patients and staff

As part of the quality improvement initiative following the Adult Inpatients National Survey, a Patient Welcome Pack was introduced, which includes items such as earplugs to help patients block out noise from other patients.



Another initiative is the "Shhhhhh poster" to remind other patients to be respectful of the noise level on the ward.



### Sound Monitoring equipment

Listening Ear" devices (noise identification devices) were installed on six wards to help reduce noise levels and are now being installed on all wards.

Assessments have been carried out to ascertain where the devices will go on the wards.

These devices provide a visible alert by lighting up green, amber, or red, indicating rising noise levels. This serves as a reminder for the ward team to reduce unnecessary noise where possible, and promoting a restful environment for our patients.



The listening Ears devices have built in USB sticks which allows us to extract data and monitor noise levels within the wards. The plan is to teach ward staff how to download this information regularly for us to analyse the data and establish if this has made an impact. Teaching sessions will be organised to ensure staff are confident in extracting the data. 14 additional devices have been configured and ready to be installed in the outstanding 14 wards.

### Improvements to ward lighting

Wards have been issued with lamps for each nurse base and encouraged to use this overnight.

Ward lamps have been purchased for the nursing desk to reduce the lighting on the ward to allow patients to have a better sleep. Wards can turn off or reduce the main lights to promote better sleep for patients. Ward lighting needs to be comfortable so that it does not negatively affect patients who are sleeping or recovering, whilst also allowing nursing staff to be able to complete their care safely.



#### 4 Questions patients are asked in the national inpatient survey about the ward relating to sleep

Q6.1. Were you ever prevented from sleeping at night by any of the following: noise from other patients

Q6.2 Were you ever prevented from sleeping at night by any of the following: noise from staff

Q6.4 Were you ever prevented from sleeping at night by any of the following: hospital lighting

Q6.5 Were you ever prevented from sleeping at night by any of the following: room temperature (new question 2023)

#### 5 Examples of patient comments in the National Inpatient Survey 2023 reported when asked what could be improved relating to noise at night and being unable to sleep.

*"Although very busy all night long they still had time to smile and ask if I was okay but I did find it very hard to sleep"*

*"I appreciate that it would be difficult to change, but the incessant multiple loud beeps from assorted equipment on the ward, every 3 - 4 seconds, meant that I spent the whole of the first night without a blink of sleep. Overall, I did not get a straight whole hour of sleep during my stay"*

*"Please try and ensure night staff appreciate the need for patients to sleep and so keep noise to a minimum"*

*"The noise at night was very distracting and stopped me sleeping"*

*"A reduction of noise on the ward at night is needed. I could not sleep due to too much noise coming from the nurse station"*

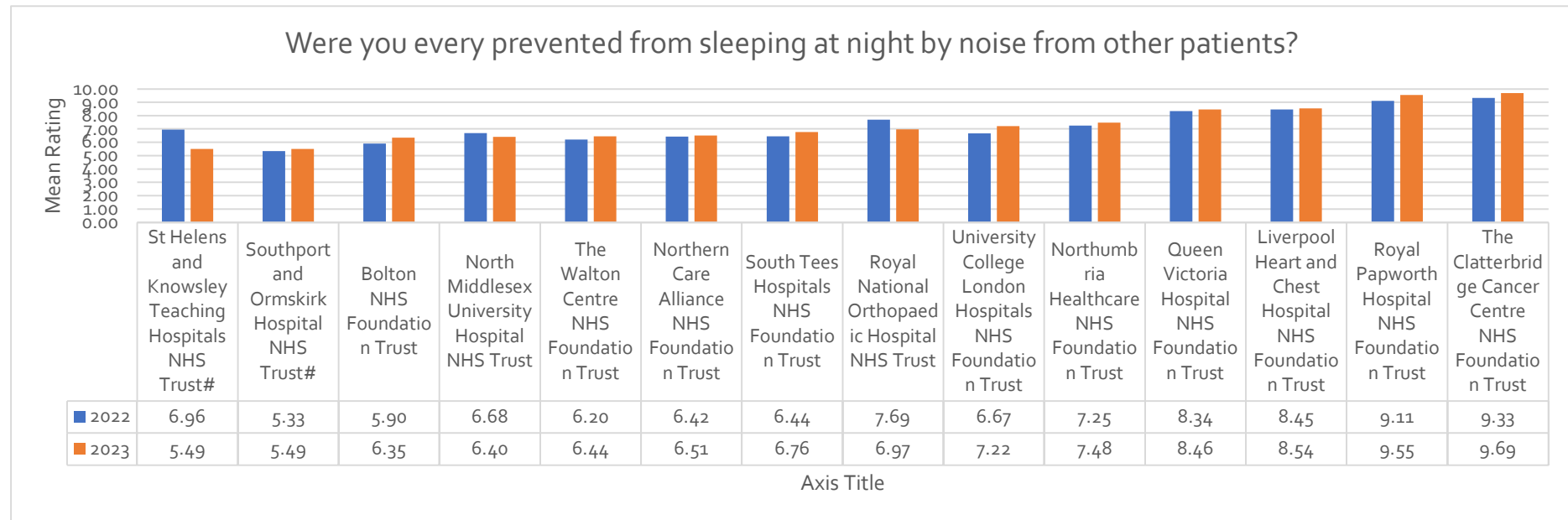
*"I fully respect the medical teams who work nights but the noise from the central desk was very loud and certainly prevented sleep"*

*"The staff also need to stop making noises especially on a night when the lights go off, staff talk quite loudly and laugh. This disturbs the patients sleep when it's already hard to switch off due to pain"*

## 6 Graphs CQC National Inpatient Survey 2023 – Trusts (included in case study) results

Q6\_1. Were you ever prevented from sleeping at night by noise from other patients?

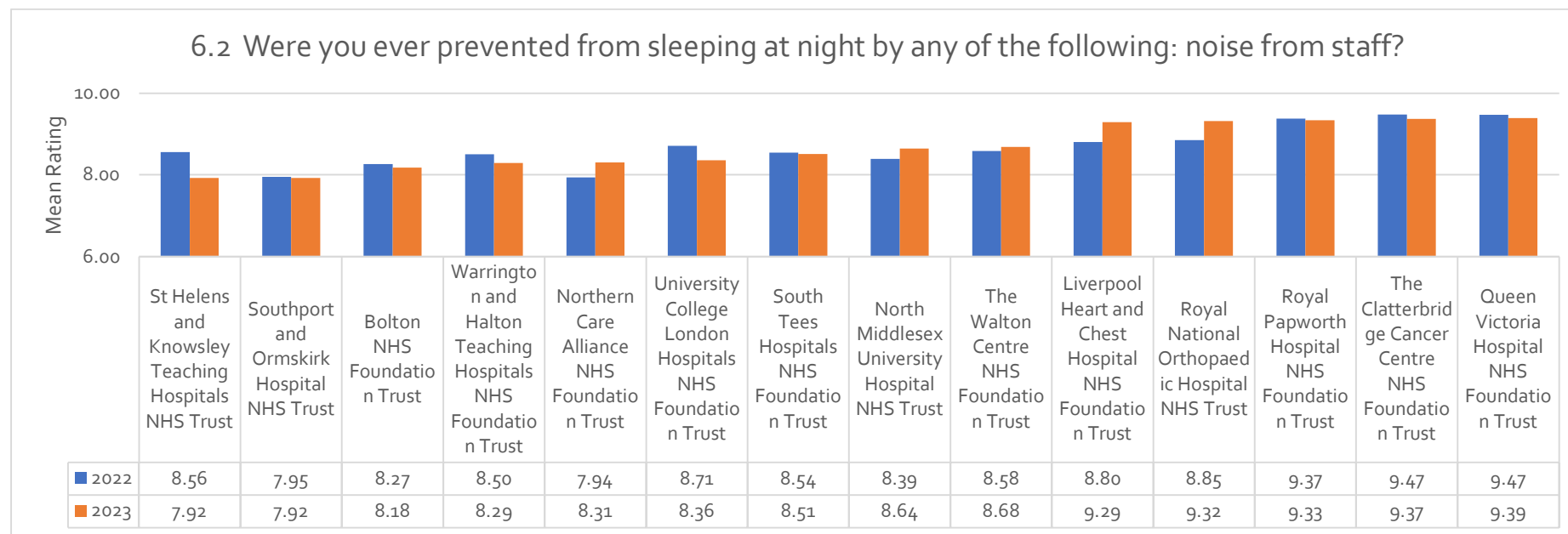
National Scores 2023 - Lowest 5.4    Average 6.5    Highest 9.7



#now Lancashire Teaching Hospitals

## Q6\_2. Were you ever prevented from sleeping at night by noise from staff?

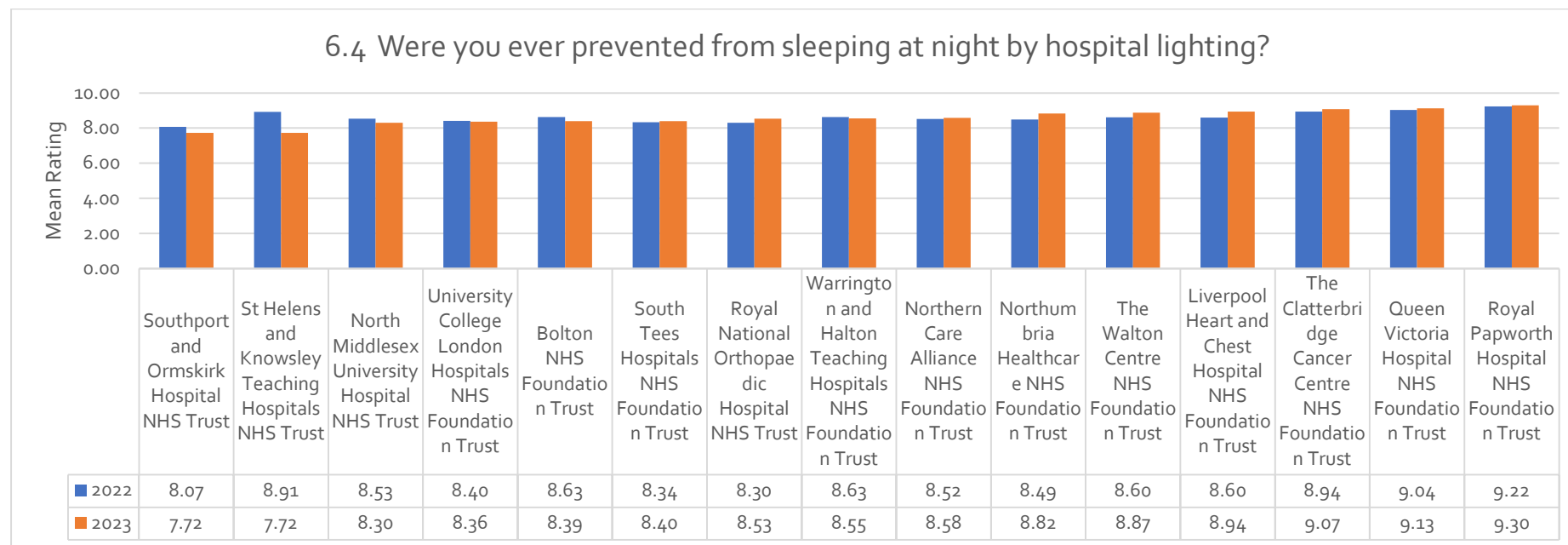
National Scores 2023 - Lowest 7.5      Average 8.4      Highest 9.4



#now Lancashire Teaching Hospitals

## Q6\_4. Were you ever prevented from sleeping at night by hospital lighting?

National Scores 2023 - Lowest 7.2      Average 8.1      Highest 9.2



#now Lancashire Teaching Hospitals

## 6.2 Benchmark Performance - National Inpatient Survey 2023 reference 2

Compared to other trusts - performed better, worse, or about the same

| Compared to other Trusts                  | 6.1 Noise from other patients | 6.2 Noise from staff | 6.4 Lighting   | Not prevented from sleeping |
|-------------------------------------------|-------------------------------|----------------------|----------------|-----------------------------|
| The Clatterbridge Cancer Centre NHSFT     | Much better                   | Much better          | Better         | Much better                 |
| Queen Victoria Hospital NHSFT             | Much better                   | Much better          | Much better    | Much better                 |
| Liverpool Heart and Chest Hospital NHSFT  | Much better                   | Much better          | Better         | Much Better                 |
| Royal National Orthopaedic Hospital NHSFT | About the same                | Much better          | About the same | About the same              |
| Walton Centre NHSFT                       | About the same                | About the same       | Better         | About the same              |

Other trusts in the case study scored about the same on the above question with one trust scoring worse than others.

## 7 Promoting results

The CQC Benchmark reports include a template poster. These topics are calculated by comparing trust results to the average of all trusts. “Where patient experience is best”: There are five results for each trust that are highest compared with the average of all trusts. “Where patient experience could improve”. These are also five results for each trust that are lowest compared with the average of all trusts.

Example of CQC Benchmark poster

**NHS**  
**NHS Adult Inpatient Survey 2023**  
Results for [redacted] NHS Foundation Trust

**Where patient experience is best**

- ✓ **Wait to get a bed:** The wait to get a bed on a ward after arrival
- ✓ **Food:** Patients being able to get hospital food outside of set meal times
- ✓ **Sleeping:** Patients not being prevented from sleeping at night
- ✓ **Provide views on care:** Patients being given the opportunity to give views on the quality of their care while at hospital
- ✓ **Leaving hospital:** Staff telling patients who to contact if worried about condition/treatment after leaving hospital

**Where patient experience could improve**

- **Sleeping:** Patients being prevented from sleeping at night due to room temperature
- **Privacy:** Patients being given enough privacy when being examined or treated
- **Drink:** Patients getting enough to drink
- **Leaving hospital:** Patients able to understand information given about what they should/shouldn't do after leaving hospital
- **Inclusion in conversation:** Patients being included in conversation when doctors are speaking about their care

These topics are calculated by comparing your trust's results to the average of all trusts. "Where patient experience is best": These are the five results

## 8 Patient Perspective

If you would like more information on services from Patient Perspective visit <https://patientperspective.org/>. If you have further examples to add to the case study, please email us and we will include them in an update. If there are other topics you are interested in receiving case studies about or you have good examples you wish to share with others please also let us know. [sue.pickup@patientperspective.org](mailto:sue.pickup@patientperspective.org)

Fieldwork for the next National Inpatient Survey will take place January - April 2025 with the benchmark report from the CQC provisionally due August 2025.

## 9 References

### 9.1 Reference 1

<https://patientperspective.org/case-studies>

### 9.2 Reference 2

<https://www.cqc.org.uk/publications/surveys/adult-inpatient-survey>

### 9.3 Reference 3

<https://www.nursingtimes.net/news/hospital/nurses-urged-to-keep-noise-down-in-new-sleep-campaign-19-12-2018/#:~:text=The%20Sleep%20Helps%20Healing%20campaign%20urges%20nursing%20and%20healthcare%20staff,hours%20of%2011pm%20and%206am.>

### 9.4 Reference 4

<https://www.thewaltoncentre.nhs.uk/treatment-and-care/noise-at-night.htm>

### 9.5 Reference 5

<https://www.nenc-healthiertogether.nhs.uk/professionals/leaflets-guides-information-for-professionals/sleep-health-hospital-for-staff>

### 9.6 Reference 6

<https://www.kcl.ac.uk/news/noise-pollution-in-hospitals-a-rising-problem#:~:text=There%20are%20a%20number%20of,%2C%20visitor%2C%20and%20patient%20conversations.>

### 9.7 Reference 7

<https://www.aamc.org/news/hospitals-are-noisy-they-don-t-have-be>

### 9.8 Reference 8

<https://www.sciencedirect.com/science/article/pii/S2214139122000105>

### 9.9 Reference 9

[https://journals.lww.com/nohe/fulltext/2022/24140/noise\\_pollution\\_in\\_intensive\\_care\\_unit\\_a\\_hidden.2.aspx](https://journals.lww.com/nohe/fulltext/2022/24140/noise_pollution_in_intensive_care_unit_a_hidden.2.aspx)

### 9.10 Reference 10

<https://www.dbth.nhs.uk/shh-campaign/>

### 9.11 Reference 11

[Royal Cornwall NHS Hospitals Trust are running a Silent Hospital Pilot Project](#)

## 10 Evidence Summary and Review

Thank you to Mid Cheshire Hospitals NHS FT library service for providing the following information.

In the UK 40% of hospital patients are bothered by noise at night, according to the NHS Patient Survey. Levels regularly exceed international recommendations and noise levels over 100 decibels – the point which can damage hearing – have been measured in intensive-care units. Noise hinders communication among staff, causes annoyance, irritation, and fatigue, and detrimentally affects the quality and safety of healthcare. Noise has been linked to the development of “ICU psychosis,” hospitalization-induced stress, increased pain sensitivity, high blood pressure, and poor mental health. However, noise does not always correlate with decibel levels – a tea trolley may be welcome, whereas a dripping tap, objectively quieter, is not. Sources of noise include: alarms, televisions, rattling trolleys, ringing phones and staff, patients or visitors talking<sup>1</sup>

### Sleep and Noise in Hospitals

Cunha<sup>2</sup> found that subjective wellbeing was influenced by hospital noise in general, and, more specifically, the noise from clinical sources such as monitors, infusion pumps, and other equipment. Cunha also found that “some physiological and psychological disturbances in patients are related to hospital noise.”

Kooshanfar<sup>3</sup> studied 148 nurses working in intensive-care units. The main sources of noise were monitoring alarms and ventilators. The main effects were on the nurses’ physiology and performance.

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<sup>1</sup> Xyrichis, Andreas – Noise pollution in hospitals *British Medical Journal* 19<sup>th</sup> November, 2018

<sup>2</sup> Cunha, Madalena – Hospital noise and patients’ wellbeing *Procedia – Social and Behavioural Sciences* 171, 246-251, 16<sup>th</sup> January 2015

<sup>3</sup> Kooshanfar, Zahra – Sources of noise and their effects on nurses in intensive-care units: a cross-sectional study *International Journal of Africa Nursing Studies* 16, 2022

Falk<sup>4</sup> measured noise levels in infant incubators, recovery rooms, and an acute-care unit over 24 hours. Existing noise levels probably stimulated the hypophyseal-adrenocortical axis of patients, exceeded the noise threshold for peripheral vasoconstriction, posed a threat to hearing in patients receiving aminoglycosidic antibiotics, and were incompatible with sleep.

Topf<sup>5</sup> found that sensitivity to noise and objective noise levels both predicted people's disturbance and that sensitivity to noise was a personal attribute that was predictive of disturbance regardless of the amount of objective noise imposed.

Snyder-Halpern<sup>6</sup> argued that "the most acute effects on sleep in critical-care units result from hospital-induced noise, which is constant, and which may exacerbate the difficulty of sleeping in unfamiliar, unfriendly hospital surroundings." Snyder-Halpern concluded that "physical and psychological alterations can occur when noise interferes with sleep, as recovery sleep was experienced secondarily to the noise condition. Psychologic disturbance resulting from noise produced the greatest disturbance among [the participants]"

Topf<sup>7</sup> studied 150 men in hospital for operations. The degree of objective noise, the intrinsic sensitivity of the participants to noise, and noise-induced stress were significantly and positively related to coping, in the form of exercised control over noise. Greater sensitivity of the participants to noise was positively correlated with ability to cope, regardless of the objective level of noise.

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<sup>4</sup> Falk, Stephen A. – Hospital noise: levels and potential health hazards *The New England Journal of Medicine* 289(15), 774-781, October 1973

<sup>5</sup> Topf, Margaret – Personal and environmental predictors of patient disturbance due to hospital noise *Journal of Applied Psychology* 70(1), 22-28, February 1985

<sup>6</sup> Snyder-Halpern, Rita – The effect of critical care unit noise on patient sleep cycles *Critical Care Quarterly* 7(4), 41-51, March 1985

<sup>7</sup> Topf, Margaret – Noise-induced stress in hospital patients: coping and non-auditory health outcomes *Journal of Human Stress* 11(3), 125-134, Fall 1985

Griffin<sup>8</sup> found that progressive muscle relaxation led to significantly reduced disturbance due to hospital noise.

Topf<sup>9</sup> studied 100 critical-care nurses working in a hospital. A reduced sensitivity to noise and greater personal hardiness (specifically commitment) acted as “noise-induced stress resistance resources.”

Topf<sup>10</sup> found that white noise did not reduce the impact of critical-care unit sound levels on sleep. “However, the results provided strong support for a causal relationship between CCU sounds and poorer sleep. Scores for subjective stress due to CCU sounds yielded significant relationships with nine of 16 measures of sleep. Topf<sup>11</sup> also found “strong support for a causal relationship between CCU sounds and greater subjective stress but not for physiological stress measured by urinary epinephrine. As predicted, scores for sensitivity of the person to noise were positively correlated with scores for noise-induced subjective stress.”

Dixon<sup>12</sup> interviewed 10 hospital patients about their sleep patterns in hospital. One of the themes which emerged was “sleep pattern interruptions related to the hospital environment and routine, including such factors as noise, lighting, and staff entering the room for various reasons.”

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<sup>8</sup> Griffin, Joyce P. – The effects of progressive muscular relaxation on subjectively reported disturbance due to hospital noise *Behavioural Medicine* 14(1), 37-42, Spring 1988

<sup>9</sup> Topf, Margaret – Sensitivity to noise, personality hardiness, and noise-induced stress in critical-care nurses *Environment and Behaviour* 21(6), 717-733, November 1989

<sup>10</sup> Topf, Margaret – Effects of personal control over hospital noise on sleep *Research in Nursing and Health* 15(1), 19-28, February 1992

<sup>11</sup> Topf, Margaret – Stress effects of personal control over hospital noise *Behavioural Medicine* 18(2), 84-94, Summer 1992

<sup>12</sup> Dixon, Donna Souders – An exploration of the sleep patterns of individuals when their environment changes from home to the hospital *Dissertation Abstracts International: Section B – The Sciences and Engineering* 55(11-B), May 1995

Webb<sup>13</sup> found that heart-rate variability responses were due to an interaction between objective noise, noise sensitivity and noise annoyance. Using earplugs had no effect on these relationships.

A survey of past patients of Salford Royal Hospitals found that when it came to ward design “the main concerns were limitation of private space around the bed area, supportive of privacy and dignity; ward noise; and other disturbances.”<sup>14</sup>

Helmes<sup>15</sup> studied whether playing baroque music for 30 minutes at a time would reduce the frequency of repetitive shouting and banging by elderly patients in a teaching hospital. The music led to a reduced frequency of disruptive noises of between 89% and 63% from peak levels. In two particularly disruptive patients the music led to a 31% reduction in disruptive noises.

Hweidi<sup>16</sup> studied 165 patients in Jordan who had been in a critical-care unit. Hearing buzzers and alarms from machinery were among the main stressors named.

Akansel<sup>17</sup> studied noise levels in an intensive-care unit. They ranged from 49 to 89 decibels, with an average of 65. Noises created by other patients, those who were admitted from emergency rooms and operating rooms into the ICU, monitor alarms, and conversations among staff were the most disturbing noise sources for patients.

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<sup>13</sup> Webb, Jill – Effects of hospital noise on heart-rate variability of acutely-ill adults *Dissertation Abstracts International: Section B – The Sciences and Engineering* 59(10-B), April 1999

<sup>14</sup> Douglas, Calbert H. – Patient-centred improvements in health-care built environments: perspectives and design indicators *Health Expectations* 8(3), 264-276, September 2005

<sup>15</sup> Helmes, Edward – Effects of music in reducing disruptive behaviour in a general hospital *Journal of the American Psychiatric Nurses’ Association* 12(1), 37-44, February 2006

<sup>16</sup> Hweidi, Issa M. – Jordanian patients’ perception of stressors in critical-care units: a questionnaire survey *International Journal of Nursing Studies* 44(2), 227-235, February 2007

<sup>17</sup> Akansel, Neriman – Effects of intensive-care unit noise on patients: a study on coronary-artery bypass graft surgery patients *Journal of Clinical Nursing* 17(12), 1581-1590, June 2008

Gardner<sup>18</sup> studied the effect of a scheduled quiet-time intervention to promote inpatient rest and sleep. It led to significant differences in average decibel level and the numbers of patients awake and asleep. "Overall, patients, visitors and health professionals were satisfied with the quiet-time intervention."

Lei<sup>19</sup> surveyed 397 patients and 101 nurses. 45.6% of the patients reported poor sleep quality and 57.4% reported a decrease in the quality of their sleep. The main sleep-disturbing factors were worries about their illness; discomfort due to their illness; using the toilet at night; and noise from nurses' shoes. There was a significant difference in the perception of sleep quality and sleep-disturbing factors between inpatients and nurses.

Richardson<sup>20</sup> studied the effectiveness of a noise-reduction programme. "A primarily nursing focused, multi-method approach, involving development of clinical guidelines, ward environment review and a staff noise awareness and education programme, was used to target mainly nursing staff plus other healthcare staff on three wards within one hospital." Average decibel levels fell from 96.48 to 77.52.

Pope<sup>21</sup> found that "patient-care areas in today's hospitals are as noisy as a busy office," and that nurses' judgement was "not sufficient to make informed decisions directed towards controlling inpatients' acoustic environment." "On average, more than 12 noise generators were identified during any one five-minute study period."

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<sup>18</sup> Gardner, Glenn – Creating a therapeutic environment: a non-randomized controlled trial of a quiet time intervention for patients in acute care *International Journal of Nursing Studies* 46(6), 778-786, June 2009

<sup>19</sup> Lei, Zhang – Sleep quality and sleep disturbing factors of inpatients in a Chinese general hospital *Journal of Clinical Nursing* 18(17), 2521-2529, September 2009

<sup>20</sup> Richardson, Annette – Development and implementation of a noise-reduction intervention programme: a pre- and post-audit of three hospital wards *Journal of Clinical Nursing* 18(23), 3316-3324, December 2009

<sup>21</sup> Pope, Diana – Decibel levels and noise generators on four medical-surgical nursing units *Journal of Clinical Nursing* 19(17-18), 2463-2470, September 2010

Eliassen<sup>22</sup> found that nurses were aware of four approaches to improve patients' sleep: noise reduction, light reduction, making them more comfortable, and "clustering," patient-care activities to allow uninterrupted time for adequate sleep. However "the challenge of caring for critically-ill patients with demands of frequent assessment and nursing may influence which interventions are prioritized."

Pinheiro<sup>23</sup> studied noise levels in a neonatal intensive care unit, both inside and outside the incubator. Noise levels inside ranged from 45.4 decibels to 79.1 decibels inside the incubator, and from 52.6 decibels to 80.4 decibels outside. Both inside and outside the incubator noise levels were higher than recommended.

Zamberlan-Amorim<sup>24</sup> studied the effect of a participatory programme to reduce noise in a neonatal unit. "The programme was proven to be effective in significantly reducing noise levels ... although levels were still more intense than recommended."

Jones<sup>25</sup> studied the effectiveness of eye-masks and ear-plugs in helping people to get to sleep in critical care. Noise was identified as a significant factor preventing sleep. The intervention group identified earplugs and eye masks as factors promoting sleep.

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<sup>22</sup> Eliassen, Kirsten M. – Sleep promotion in the intensive-care unit: a survey of nurses' interventions *Intensive and Critical Care Nursing* 27(3), 138-142, June 2011

<sup>23</sup> Pinheiro, Eliana Moreira – Noise at the neonatal intensive care unit and inside the incubator *Revista Latino-Americana de Enfermagem* 19(5), 1214-1221, September-October 2011

<sup>24</sup> Zamberlan-Amorim, Nelma Ellen – Impact of a participatory programme to reduce noise in a neonatal unit *Revista Latino-Americana de Enfermagem* 20(1), 109-116, January-February 2012

<sup>25</sup> Jones, Catherine – Eye masks and earplugs improve patients' perception of sleep *Nursing in Critical Care* 17(5), 247-254, September-October 2012

Ortiga<sup>26</sup> measured noise levels in four different locations in an emergency department in Australia. All four locations exceeded the maximum recommended levels by up to 20 decibels. Staff surveys suggested that most noise was created by people (conversations). Ortiga recommended reducing the generation of noise, reviewing building layout and introducing physical noise controls such as noise-absorbing ceiling tiles and acoustic barriers/curtains.

Pope<sup>27</sup> studied the effect of hospital noise on patients' ability to hear, understand, and recall speech. Noise level and sentence context had the largest effect on key-word identification. Noise level had the largest effect on sentence recall. Type of hospital noise, and hearing loss also significantly influenced performance on both measures.

Guérin<sup>28</sup> studied noise levels in a pharmacy department, both before and after an intervention which included work-zone reorganization, digitization of the prescription process, and education "about the impact of some work habits." The average noise levels were 59.4 decibels during the day and 52.3 at night. The initiative made no difference to noise levels. Guérin concluded that "average values of approximately 60 decibels seem to be unacceptable for work that requires a high level of attention."

Aita<sup>29</sup> found that giving babies earmuffs and goggles to cut down on light and noise led to a significantly *greater* stress response and did not recommend this as an option.

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<sup>26</sup> Ortiga, Julianne – The sound of urgency: understanding noise in the emergency department *Music and Medicine* 5(1), 44-51, January 2013

<sup>27</sup> Pope, Diana S. – Effect of hospital noise on patients' ability to hear, understand, and recall speech *Research in Nursing and Health* 36(3), 228-241, June 2013

<sup>28</sup> Guérin, Aurélie – Pre-post pilot study of noise levels at a university hospital centre pharmacy department *Journal of Pharmacy Practice* 26(4), 448-453, August 2013

<sup>29</sup> Aita, Marilyn – Intervention minimizing pre-term infants' exposure to NICU light and noise *Clinical Nursing Research* 22(3), 337-358, August 2013

Hinkulow<sup>30</sup> studied the effectiveness of a programme called HUSH (Hospital's Ultimate Silence for Healing). It was "conceptualized as a nursing action to create mental respite," and its effect "was recognized by patients and nurses but also by visitors, hospital administrators and non-nursing hospital personnel."

Szymczak<sup>31</sup> compared single rooms and wards on a neonatal intensive-care unit. They had equal sound "peaks," and overall noise-level variability but the single rooms had more time when they were quieter than the wards.

Evidence shows that noise exposure leads to annoyance, disturbs sleep and causes daytime sleepiness, affects patient outcomes and staff performance in hospitals, increases the occurrence of high blood pressure and cardiovascular disease, and impairs cognitive performance in schoolchildren.<sup>32</sup>

Bridi<sup>33</sup> studied alarms in a coronary-care unit. A total of 426 alarms were recorded in 40 hours. 227 were triggered by "multi-parametric monitos," and the rest were triggered by equipment – infusion pumps, dialysis pumps, mechanical ventilators, and intra-aortic balloons. There was an average of 10.6 alarms an hour. Bridi concluded "the alarms of equipment intended to protect patients have increase noise within the unit, the level of distraction and interruptions in the workflow, leading to a false sense of security."

Oliveira<sup>34</sup> studied five paediatric wards in a tertiary-level hospital. "In all wards, the intensity of sound was much higher than desirable, being above 45 decibels during 85% of the time.

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<sup>30</sup> Hinkulow, Maricel B. – Evidence to change practice: creating a restful hospital environment for nurses and patients *Archives of Psychiatric Nursing* 28(1), 74-75, February 2014

<sup>31</sup> Szymczak, Stacy E. – Impact of NICU design on environmental noise *Journal of Neonatal Nursing* 20(2), 77-81, April 2014

<sup>32</sup> Basner, Mathias – Auditory and non-auditory effects of noise on health *The Lancet* 383, 9925, 1325-1332, April 12<sup>th</sup>, 2014

<sup>33</sup> Bridi, Adriana Carla – Clinical alarms in intensive care: implications of alarm fatigue for the safety of patients *Revista Latino-Americana de Enfermagem* 22(6), 1034-1040, November-December 2014

<sup>34</sup> Oliveira, Lia – Environment in paediatric wards: light, sound, and temperature *Sleep Medicine* 16(9), 1041-1048, September 2015

DuBose<sup>35</sup> reviewed the evidence on supporting patients' sleep and concluded that "noise is a modifiable cause of some sleep disruptions in hospitals, and when reduced can lead to more sleep. Earplugs and eye masks may help, but changing the sound and light environment is more effective. Calming music in the evening has been shown to be effective as well as daytime bright light exposure."

A narrative review by Iyendo<sup>36</sup> found that "not all noises give a negative impression within healthcare soundscapes. Listening to soothing music was shown to reduce stress, blood pressure and post-operative trauma when compared to silence. Much of the sound conveys meaningful information that is positive for both patients and nurses ... [e.g.] soft wind, bird twitter [sic], and ocean sounds."

Soubra<sup>37</sup> studied the effect of a quality-improvement programme aimed at reducing noise in a paediatric unit. The first phase involved obtaining patient-satisfaction ratings and recording sound levels; the second phase included implementing a noise-reduction programme and designing a noise-detector machine, and the third phase included obtaining patient-satisfaction data and recording noise levels. The project *did* reduce noise levels, but there was no improvement in patient satisfaction.

Lin<sup>38</sup> studied 48 people working in hospital cafeterias and found that exposure to noise at work during the day had sustained effects on night-time sleep quality (specifically on slow-wave sleep), and sleep efficiency.

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<sup>35</sup> DuBose, Jennifer R. - Improving inpatient environments to support patient sleep *International Journal for Quality in Health Care* 28(5), 540-553, October 10<sup>th</sup>, 2016

<sup>36</sup> Iyendo, Timothy Onosahwo – Exploring the effect of sound and music on health in hospital settings: a narrative review *International Journal of Nursing Studies* 63, 82-100, November 2016

<sup>37</sup> Soubra, Maher – Effect of a quality improvement project to reduce noise in a paediatric unit *MCN: The American Journal of Maternal/Child Nursing* 43(2), 83-88, March-April 2018

<sup>38</sup> Lin, Cheng-Yu – Will daytime occupational noise exposures induce night-time sleep disturbance? *Sleep Medicine* 50, 87-96, October 2018

Bliefnick<sup>39</sup> found that patient satisfaction scores apropos noise were higher when the average decibel level was 35 or lower. Soundscapes with more peaks in noise and louder peak noise events were seen as worse than ones with a more consistent sound level.

Zijlstra<sup>40</sup> studied the effect of a no-talking rule in an outpatient infusion centre. It led to a “statistically-significant but rather small,” reduction in decibel levels. 57% preferred the chance to talk, 36% had no preference, and only 7% preferred no talking.

Ho<sup>41</sup> described the Silent Night project implemented in two general units of an academic tertiary hospital. Patient surveys were administered to obtain patients’ perspectives on the sources of noise disturbance at night; noise-monitoring machines were installed in two wards to obtain objective data; and data was collected on noise-generating activities which were observed. The overall quality of sleep reported by patients improved by 17% and patients reported reduced noise disturbances from direct-care activities, environmental noise, and medical-equipment alarms. The average noise level fell from 57.04 to 55.22 decibels, and noise-generating activities fell by 60%.

Zhang<sup>42</sup> interviewed 12 NICU staff about noise reduction and concluded that “if quiet time needs to be set up, implemented and maintained in the neonatal intensive care unit, it is necessary to establish a quiet-time culture throughout the whole ward, to carry out detailed management of quiet time and to cooperate and communicate with multidisciplinary departments.”

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<sup>39</sup> Bliefnick, Jay Michael – Evaluation of hospital soundscapes to improve patient and staff experience *Dissertation Abstracts International: Section B – The Sciences and Engineering* 80(5-B), 2019

<sup>40</sup> Zijlstra, Emma – The effect of non-talking rule on the sound level and perception of patients in an outpatient infusion centre *PLoS One* 14(2), February 28<sup>th</sup>, 2019

<sup>41</sup> Ho, Alexander G.T. – Conducive environments reduce sleep disturbances and improve sleep quality: a quality improvement project *JBI Evidence Implantation* 19(1), 105-117, March 2021

<sup>42</sup> Zhang, Shu-wen – Medical staff’s sentiments on the establishment of quiet time in the NICU *Journal of Nursing Management* 30(7), 3599-3607, October 2022

Ruettgers<sup>43</sup> surveyed 350 healthcare professionals working in intensive-care units. 69.3% said that sound levels were too high. Short-lasting human sounds (moans or laughs); devices and alarms; and short-lasting object sounds were seen as the most disturbing. Reducing medical-equipment alarms was seen as having the most potential to reduce noise levels.

Green<sup>44</sup> studied patients at the end of life and concluded that “environmental factors in the physical clinical setting such as noise and smell ... exacerbated suffering.”

Bilginer<sup>45</sup> found that noise was a challenging issue for autistic children admitted to an emergency department.

Adams<sup>46</sup> studied the effectiveness of a HUSH (Help Us Support Healing) project at a tertiary public hospital in Australia. The project included the provision of HUSH sleep packs with earplugs, eye masks, and herbal teas; patient-information resources, and ward-based Sleep Champions. Surveys of patients showed a statistically-significant decrease in patient-reported noise disturbances.

Abbasi<sup>47</sup> found that staff aggression had a significant correlation with noise levels and staff's general health. The emergency department, paediatrics and

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<sup>43</sup> Ruettgers, Nicole – Perceived sounds and their reported level of disturbance in intensive-care units: a multinational survey among healthcare professionals *PLoS One* 17(12), December 30<sup>th</sup>, 2022

<sup>44</sup> Green, Laura – Iatrogenic suffering at the end of life: an ethnographic study *Palliative Medicine* 37(7), 984-992, July 2023

<sup>45</sup> Bilginer, Çilem – Patients with autism in the emergency department: cause of admissions and challenges *International Journal of Developmental Disabilities* 69(5), 710-716, September 2023

<sup>46</sup> Adams, Corey – The HUSH project: using co-design to reduce sleep disruptions for patients in hospital *Health Expectations* September 23<sup>rd</sup>, 2023

<sup>47</sup> Abbasi, Hedayat – Noise pollution, annoyance, and sensitivity: its impact on general health and aggression of hospital staffs [sic] *Current Psychology* 43(16), 14171-14182, April 2024

the laboratory had the highest noise levels with the emergency ward being particularly bad.

Boyle<sup>48</sup> studied 33 patients apropos insomnia symptoms and environmental disruptors. 89.1% reported that their sleep was disturbed by environmental factors, primarily being woken up by staff.

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<sup>48</sup> Boyle, Julia T. – Insomnia symptoms and environmental disruptors: a preliminary evaluation of veterans in subacute rehabilitation *Clinical Gerontologist* 47(3), 494-506, May-June 2024