

## THE BENEFITS FOR EMERGENCY MEDICINE OF AN ANNUAL APPROACH TO ROSTERING - HEALTHROTA

### Introduction

University Hospitals Sussex (UHSussex) is an NHS Foundation Trust covering West Sussex, Brighton and Hove, and parts of the East Sussex area in the United Kingdom (UK). It comprises six hospitals in its current form.<sup>1</sup> The Emergency Department of the Trust, located principally in the Royal Sussex Country Hospital and Princess Royal Hospital, became a major trauma centre in 2013, which required it to provide 24/7 Accident and Emergency (A&E) consultant cover, intensifying the demands on doctors' capacity. It also further reduced flexibility in rotas, which led to issues with retention of staff. This, in turn, led to difficulties in providing sufficient coverage in the department and increasing pressure on staff. Consequently, there was an increase in psychosocial risks (PSRs) and mental health issues in the department, including time pressure, low control, poor work-life balance, low morale, stress and burnout.

Since 2017, the HealthRota software — a bespoke electronic rostering system — has been implemented in the Trust, as a way of annualising doctors' rotas using a self-rostering system to address the above-mentioned issues, particularly among A&E doctors. The aim of this system was to help retain and recruit staff, whilst saving locum costs<sup>2</sup> and improving patient care (NHS, 2022). It was first piloted in the Emergency Department of UHSussex among consultants and then rolled out to other areas of medicine, and more recently across other staff levels, including junior doctors in the Trust.

The intervention has been successful in achieving its aims, with studies showing improved wellbeing among doctors and all vacant posts in the Emergency Department of the Trust being filled after five years. The success of this intervention stems from the innovative concept of annualising rota hours of doctors combined with the decision to develop a bespoke electronic rostering system (HealthRota) that helps to tackle the challenges of managing doctor rotas. Other electronic rostering systems are rarely able to manage multiple teams, different working schedules and working across multiple hospital sites (Galloway et al., 2022). The replicability of this intervention is evident, given that 50 other emergency departments in the UK have since started to use the system (Teoh et al., 2023, p. 33).

This case study is part of a research project<sup>3</sup> carried out with the aim to provide an overview of research on work-related PSRs and mental health-related outcomes in the health and social care sector.

### Methodology

Findings presented in this case study are based on a review of literature covering the development of the electronic rostering system at UHSussex as well as research on the benefits and outcomes of its implementation in the Emergency Department at the hospital. Sources included academic papers, NHS England statistics and information, as well as the theory behind annualising rotas by the Royal College of Emergency Medicine.

In addition to the literature review, an interview with an Emergency Medicine Consultant/Professor at UHSussex was also conducted. The interviewee shared their insights on the practical implementation of the intervention from inception to its current roll-out across other hospital departments and hospitals in the UK. The interviewee was the person responsible for developing the intervention alongside a small team of software developers with the support of the hospital Trust.

<sup>1</sup> Since 2017, the Foundation Trust is made up of: Worthing Hospital, Royal Alexandra Children's Hospital, Princess Royal Hospital, Royal Sussex County Hospital, St Richard's Hospital and Southlands Hospital.

<sup>2</sup> Locum staff refers to agency staff filling in shifts on short notice for hospitals in the NHS, which represents a higher cost than contracted staff.

<sup>3</sup> The full report is available at: <https://osha.europa.eu/en/publications/overview-work-related-psychosocial-risks-and-mental-health-outcomes-eu-health-and-social-care-sector>

## Description of the intervention

Due to insufficient levels of consultant and registrar coverage, the following risk factors are present in NHS Emergency Departments: time pressure (due to lack of staff), stress, and poor work–life balance. All of these factors can lead to burnout and more doctors leaving the workforce. Lack of flexibility in the traditional rota in the Emergency Department at UHSussex was a significant factor leading to staff leaving the Trust (HEE, 2019). For example, doctors were struggling to plan for personal events and responsibilities, or to engage in non-clinical tasks (e.g. teaching, fellowship, professional development) (Teoh et al., 2023, p. 33). These closely related challenges drove the need to create a more effective rostering system that would allow doctors to create a better work–life balance and have more control over their working hours, without compromising on patient care.

It was decided that the most effective way to achieve this was by adopting an annual approach to rostering. In practice, this meant bringing together all consultant clinical hours over the year to plan a collective rota that considers available working hours after annual leave, training and study leave requests have been taken into account. This was then compared to the clinical hours needed to cover all the shifts. The intervention further aimed to improve rota management by exploring the opportunities technology offers to move towards increased self-rostering, which would provide more control over when and how often an individual might work, including allowing more doctors to work on a part-time basis if desired. As part of this intervention, activities were carried out to determine ground rules and guidance for self-rostering to improve role clarity, as well as understanding between doctors when it comes to requesting certain periods of time off or swapping shifts so that everyone involved benefits from the system. With these aims in mind, the specific HealthRota system was piloted in 2017 which allowed the Emergency Department's clinical hours to be annualised with a self-rostering element as well. Specifically, the annualisation of hours allows (NHS, 2022):

- Doctors to 'block out' dates they do not wish to work up to a year in advance (i.e. from their annual leave and training allocation), with 98% of requests agreed.
- The rota to automatically map the appropriate number of staff with the necessary skill mix onto the shifts that need to be covered — allowing for staff flexibility and efficient cover provision (i.e. with popular shift times not being oversubscribed and less popular shift times still being covered as needed).
- Doctors to know their shift patterns up to a year in advance and to plan accordingly.
- Shifts to be easily swapped via the bespoke HealthRota mobile app that staff can download, without needing to go through rota coordinators.
- Part-time staff to have more flexibility. They can do their jobs over an entire year or have extended periods off, making up the hours by working more intensely for the rest of the year.

## What was done and how

The worsening workplace situation for doctors working in the Emergency Department of the UHSussex following the site becoming a major trauma centre in 2013 triggered the call for a change to how rostering was managed in the department. An Emergency Medicine Consultant in the department, in cooperation with the Trust, led this process, working with IT developers to create an e-rostering system that met the needs of A&E doctors. The annualisation of hours was rolled out as a pilot in the Emergency Department in 2017 for consultants and following its success was implemented in acute medicine and care of the elderly medicine (with adaptations allowing for continuity of care) and was then used across the Trust by junior doctors in general medicine (HealthRota, 2022).

The Emergency Medicine Consultant and a Senior Workforce Coordinator were the two people involved at the development stage of the intervention and were responsible for pioneering this change in rota management. After trialling the different types of software available, they decided to work in partnership with the HealthRota developers 'to create a more intelligent, responsive and bespoke online self-rostering/self-preferencing system', incorporating annualisation for the Trust's hospitals (HealthRota, 2022, p. 2). Once the HealthRota developers got involved in 2017, the team expanded to include a dedicated implementation team and rota managers to ensure accuracy in the creation of the annual rota, that is, ensuring that there were no gaps in staff coverage. In addition, during the implementation stage, there was strong management support from the UHSussex Trust to implement the system fully (Interview data). This was especially the case after the COVID-19 outbreak as the use of the rota during

the pandemic helped build resilience in the team and was an opportunity to fully support a new approach during a moment of crisis where innovative solutions were particularly sought.

The annualised hours system at UHSussex was designed to include all the listed requirements in the Royal College of Emergency Medicine's (RCEM) criteria for an online e-rostering system (see RCEM, 2019, pp. 17-18).

The first step in creating this new system was to change the approach from an individualised rota to a collective rota for the whole consultant team in the Emergency Department. All the clinical hours for the team were added together, that is, excluding annual leave requests, study leave and bank holidays. The available number of staff clinical hours was then compared to the number of hours required to cover the Emergency Department 24/7. Where there were shortages in hours available, staff were recruited or locum staff were used (Teoh et al., 2023, p. 33). This allowed the administrative team behind the rota to book everyone's time in advance so that doctors were better able to plan their time with sufficient warning, with their leave requests respected.

The next step was to increase flexibility for the doctors even further by introducing the self-rostering element. This allowed consultants to pick their own shifts, for example, electing to work more weekends or early mornings depending on their personal and professional preferences. Further, where someone wishes to swap a shift or even take a shift without swapping for another one, the e-rostering system can track the number of hours worked in real time, thus ensuring the correct number of clinical hours have been worked by an individual and reallocating the correct number of hours to the person in question. This greater flexibility allowed consultants to over- or underwork as needed (HealthRota, 2022).

The practical tools to deliver the above involved a series of online tools, a mobile application (with notifications) and an i-Cal exporting feature to allow rotas to be synched with personal calendars (NHS, 2022). More specifically, the HealthRota system included some functionalities to enable users to better manage their working schedules: a way for staff to swap shifts with other staff without involving rota administrators while adhering to real-time contracts and working time rules compliance; a way for users to enter requests for different kinds of leave (e.g. holidays, study leave); and a calculation tool that shows doctors how many hours they have left to work after all their leave and non-clinical time has been entered (and ensures that they work those hours) (NHS, 2022).

The resources allocated to deliver this intervention were first and foremost staff time from the Emergency Department at the UHSussex Trust and the possibility to partner with the IT developers who created the HealthRota.<sup>4</sup> Without these two sets of human resources, delivering this intervention in the form of a dedicated and custom-built system would not have been possible. From the UHSussex side as well, there was a heavier administrative burden from the start to train the rota managers and wider administrative services, but the payoff has been substantial with their workload reduced significantly thanks to the technology now being used. The process will also be further optimised through the use of AI (Interview data).

## What was achieved?

Overall, the annualised rota system in UHSussex's Emergency Department has had a positive impact on staff mental health and wellbeing thanks to the increased control doctors that are given over their working hours, which contributes to a better work-life balance.

More specifically, a survey of doctors benefiting from the intervention found that 67% of respondents reported the rota to be 'very beneficial' to their professional life and career, and 73% found the rota to be 'very beneficial' to their overall quality of life and career (Teoh et al., 2023, p. 34). Allowing doctors to plan their personal lives up to a year in advance means they can prioritise personal and family matters. Indeed, the department now has more female consultants than male, some of whom are mothers, and more male consultants who report being able to spend time with their family (Asokan, 2023). Furthermore, doctors also can spend less time managing their shifts as the system does this for them, thus freeing up more of their time. Shift patterns are better structured to avoid fatigue among staff, for example, ensuring no one works more than three night shifts in a row.

<sup>4</sup> The Emergency Medical Consultant interviewed for this case study owns 10% of the HealthRota after contributing to the creation of this intervention.

This improvement in working conditions has led to an increased retention of staff and higher staffing levels, which in turn reinforces a better system of support and resources for the doctors working in the department. The impact of this is that after five years of annualising hours, UHSussex went from seven consultants and seven registrars to 23.8 full-time equivalent consultants and 20 registrars. Furthermore, locum staff were only used to cover sickness absences in 2022-2023, whereas before the cost of using locum staff was reaching £1.3 million per year (Teoh et al., 2023, p. 34). Reduced reliance on locum staff brings financial benefits to the department as the costs of using locum staff are higher compared to those of employing staff by the hospital. National data on NHS consultant pay scales indicate that while a full-time consultant earns approximately between £88,364 and £119,133 per year, a locum consultant will earn approximately £217,201 per year (Messly, 2023). Therefore, not relying on locum staff to fulfil full-time equivalent consultant roles represents an important saving for UHSussex, which could be used to hire new staff.

Thanks to the reduction in staff shortages and efficiency gains, UHSussex has also been able to roll out a quality training programme for post-F2 doctors<sup>5</sup> wishing to specialise in Emergency Medicine, by creating clinical fellow posts that include 25% non-clinical time (also rostered using the HealthRota). The impacts of these roles have improved clinical care and junior doctor welfare and reduced locum costs further (HealthRota, 2022). The system particularly benefits part-time staff by allowing flexible working (e.g. 33% contracts) in a way not seen before in hospitals for contracted staff, by allowing part-time doctors to work full time for one or two months and then take long breaks for other interests and pursuits (Interview data).

This in turn has led to improved patient care, with patient experience and outcomes both improving, through 24/7 consultant A&E cover. Previously, wards were often understaffed during nights and weekends, which was an inefficient use of staff and led to unsafe levels of cover for the patients. Now, there has been a 68% reduction in medical emergencies at nights and weekends, with four times as many doctors on the ward at one time (NHS, 2022).

These clear benefits and impacts have led to the system being rolled out to cover junior doctors, the wider Trust and over 50 Emergency Departments in the UK, and it has also proven to be effective in other areas of medicine (e.g. elderly care, acute medicine). Indeed, according to a staff survey of doctors using annualised hours at UHSussex, neither role, age nor experience was a factor in recommending the Trust as a place to work (Galloway et al., 2022). Case studies carried out in other hospitals using the HealthRota system also report positive benefits to doctors' wellbeing, indicating the benefits of the system are replicable (Interview data). The annualised system has already been applied to other medical staff such as paramedics and could be applied to nursing contracts eventually (Interview data). The system has also benefited hospital administration staff by reducing the complexity of their role in managing the rota system themselves.

As such, the annualisation of hours has received national recognition and the UHSussex's Emergency Department was named Royal College of Emergency Medicine's education team of the year, receiving awards from the British Medical Journal and the Health Service Journal (NHS, 2022).

## Success factors

The key success factor of the intervention stems from the recognition that the way work was organised in the Emergency Department at UHSussex after it became a major trauma centre was unsustainable. This recognition and impetus from key stakeholders to instigate change was crucial in the development of a new rota system for annualised hours. Namely, the system was designed by both clinicians and administrators, who both have a deep understanding of doctors' rota patterns.

Further, the iterative process of creating the specific system enabled different processes and needs to be included by the implementation team, especially as the system was rolled out to different departments and members of staff. For example, the most recent version of the HealthRota now also includes additional features such as location of doctors during shifts (i.e. which ward/building they are in), to work out pay and job planning for consultants (Interview data).

Another crucial success factor was the fact that doctors by the nature of their work have a sense of collective responsibility to cover clinical needs. Therefore, the understanding between team members

<sup>5</sup> Junior doctors complete two years of foundational training (F1 and F2) once they are qualified before being given the opportunity to pursue further training or specialisation in medicine.



that it is not possible to leave certain, less desirable, shifts empty meant that consultants and registrars in the department were able to work together to achieve unparalleled flexibility and a positive working environment, conducive to their personal needs. Moreover, this provided for improved peer-to-peer team working and a more robust support structure for their junior doctors (HealthRota, 2022).

Increasing 'buy-in' and bringing stakeholders on board was also important to ensure the success of the intervention. Doctor participation to fine-tune the process and ensure they saw first-hand the benefits and challenges of implementation meant that members of hospital staff were also invested in the new system. Further, collecting data to demonstrate the savings and benefits from an early stage was important in terms of engaging with staff working in hospital finance and human resources as this also impacted their way of working.

Finally, being nominated and winning awards has helped to raise the profile of the intervention further. This contributed to it being rolled out in other hospitals and departments, showing the high transferability of this intervention.

## Challenges

The main barrier to the implementation of the early annualised rota system was the limitations of existing NHS rota management technology. It is clear that the creation of a tailor-made system has been pivotal in facilitating the intervention.

A challenge following implementation has been changing the mindset of junior doctors benefiting from the system. The concept of planning one's annual leave several months in advance requires additional organisational skills, as well as an acceptance that not everyone can take the same period of time off (e.g. the Christmas period). Therefore, the novelty of and lack of experience with this system could lead to junior doctors not utilising it to its full potential. Something that has helped with increasing buy-in from this target group is involving junior doctors in the design of more recent iterations of the rota, as well as the creation of clinical fellow roles at UHSussex that offer contracts that incorporate 25% of training and teaching for junior doctors (HEE, 2019). The annualisation of hours means that these training hours are respected, while the fellowship roles themselves presents a clear career progression route for doctors.

There are still some possible areas for improvement. These include refining the use of AI to enhance rota management processes further and reduce the administrative burden even more. There is also a need to continuously refine the different additional features, for example, the location element of the rota could still be improved in terms of usability by doctors (Interview data).

## Key takeaways

The key takeaway of this intervention is that changing the way the work is organised removed the identified PSRs and therefore improved the working conditions of doctors at all levels working in emergency medicine and allowed for increased staffing levels. This in turn improved patient care and is saving the NHS resources by reducing the need for expensive locum staff.

As shown in this case study, the changes that were introduced gave doctors more control over their working hours and flexibility to work part time if desired. In turn, this has had a very positive effect on their mental health and day-to-day lives. Indeed, allowing doctors to better reconcile work and their personal life using annualised hours and self-rostering reduces stress and allows them to provide the best patient care. This is therefore clearly an example of how the way in which work is organised can impact workers' safety and health.

In addition, given the links between working conditions and staff levels, the improvement in the mental health and work-life balance of workers at UHSussex has also resulted in retaining workers and, over time, attracting new staff to the hospital with all vacant posts now filled. This is a self-reinforcing phenomenon, as with higher staff levels, there are fewer last-minute call outs to cover unexpected shifts, higher staff satisfaction and sense of control over the working conditions in the department. Annualising hours has allowed doctors to opt for part-time working arrangements under which they may work intensely for several months and then have a break of several months, as the self-rostering feature of the HealthRota system can account for such preferences as long as clinical cover is provided 24/7.

Therefore, the annualisation of hours has multiple benefits for the doctors by improving their working conditions and control over their work, which in turn reduces PSRs related to lack of control over working patterns. The hospital has also benefited as patient care has improved thanks to safer levels of staffing

in the A&E department. Finally, the increase in staff retention and happiness means that UHSussex has a reduced need for locum cover, which saves the hospital money, enabling more investment in the careers and development of its staff. This means that doctors can focus more on their core tasks and spend more time in training and taking up development opportunities while ensuring that patient care continues to be of a high quality.

The transferability of this intervention is also clear, given that the system has been rolled out in other hospitals and departments and has the flexibility to be adapted to suit their specific needs. The HealthRota system could be used for any shift-based work in any industry by annualising hours, as the core concept of providing the cover an organisation needs to function while giving staff more control over the days they actually are needed to work remains the same (Interview data).

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