HealthRota

NHS
University Hospital Sussex
NHS Foundation Trust

Brighton creates a blueprint for tackling burnout, capacity issues and transforming workforce management with annualisation & e-Rostering

Case Study 1st September 2022

Discover how the UK's first true annualisation and e-rostering solution supported the A&E and general medicine departments at Royal Sussex County Hospital in Brighton and the Princess Royal Hospital in Haywards Heath, to implement three aims which were previously thought to be mutually exclusive; improve patient care, create a happier workforce, and reduce locum costs.

Introduction

To provide safe and high-quality inpatient and emergency care, and with the cost of employing locum doctors becoming unsustainable across legacy Brighton and Sussex NHS Trust (Royal Sussex County Hospital (RSCH) and Princess Royal Hospital (PRH)), it was essential for doctors to be deployed in an optimal way, whilst supporting them to achieve a better work-life balance.

Traditional manual systems for planning and deploying the workforce are laborious and open to error. However, new ways of working and the implementation of the digital platform – HealthRota, has provided a more comprehensive approach to staff deployment in line with demand at the trust.

The innovative approach has given staff the tools to manage their time more easily, leading to improvements in morale, flexibility, and patient safety whilst helping the hospitals to completely eliminate planned junior doctor locum costs from August 2022 across A&E and General Medicine wards and on-call rota.

Challenges

With the individual rota for any given hospital doctor typically a composite of numerous rota's - encompassing their base ward or department, clinical duties, on-call requirements, outpatient responsibilities, and non-clinical tasks such as medical management, training, research, and teaching, it's clear to see why medical rotas can be extremely complex to manage.

Across many UK hospitals these rotas have been typically managed on spreadsheets which are not built with the functionality to support the complexities of medical rota systems. The outcome for staff is a rigid rota offering little flexibility and making the idea of achieving a better work-life balance an unrealistic prospect. Now, with added concerns about the staffing crisis, patient safety and the need to tackle the NHS backlog for elective care, the entire process has become untenable for many hospital trusts.

In the RSCH and PRH A&E and general medicine departments, medical rotas were previously managed using spreadsheets, often by different members of staff in varying departments. With no overview of the entire process, updates were not routinely made when a staff member was absent and worse, ward staffing was variable; with days when there were 4-5 junior doctors covering one ward, and 0-1 on another. The entire process was inefficient, time-consuming and led to potentially unsafe levels of staffing.

Furthermore, due to the introduction of the Major Trauma Centre and the need to provide 24/7 A&E consultant cover, the capacity issues became intensified. Recruitment and retention challenges led to low morale, burnout and general upset for consultants because of the lack of rota transparency and the uncertainty of knowing if they were working the correct number of hours that they were contracted for.

Solution

Workforce management pioneer and A&E consultant, Professor Rob Galloway, Amy Brown, Senior Workforce Coordinator, and their team, were looking for a way out with a comprehensive solution to all these challenges.

After several attempts to find the right e-rostering solution that truly allowed the use of annualised hours, in 2017, they discovered HealthRota. From here on, the team has worked in partnership with the HealthRota team to create a more intelligent, responsive and bespoke online self-rostering/self preferencing system that incorporates annualisation for the RSCH and PRH.

The team started out by using A&E as a proof of concept, before creating successful solutions for acute medicine and care of the elderly consultants and then all the junior doctors in general medicine wards across both hospitals.

The Implementation of HealthRota in Accident and Emergency (A&E)

The team began the roll out with A&E consultants followed by registrars. To do this, they calculated the number of professional activities (PAs) each group were required to do, minus any annual leave, study leave and bank holidays. This provided an accurate figure for the total number of PAs available within the team in a single year (annualisation), month or week. Using this figure, they were able to create a calculated shift structure, balancing staffing with the available PA allocation. Where clinical demand required additional PAs to be worked, the team could calculate the number of extra consultants and registrars needed, or have clarity on the locum requirements for that period.

Based on the annualised PA calculations, consultants and registrars were switched on to self-rostering, enabling them to pick their own shifts. This provided a level of flexibility staff had never experienced before; for example, some opted to work more weekends, whilst others selected early mornings or evenings depending on their personal and professional preferences.

Where a consultant or registrar wished to swap a shift, or simply take on a shift without a swap, the HealthRota platform is able to track change the hours worked (PAs) in real-time and allocate the correct number of PAs to the relevant staff member. With the ability for managers and rota coordinators to view up-to-date information about the work completed, consultants and registrars can effectively overwork or underwork during selected periods.

Under Professor Galloway's leadership, the team came together and took collective responsibility for covering all the shifts between them. The agreement being that no shift was left unfulfilled, even after all leave and days in lieu were accounted for, and a key proviso that they did not owe, or were not owed, any PAs when they left their job. In return, consultants and registrars achieved unparalleled flexibility, a positive and conducive working environment, improved

"The shifts follow the person. Every person has a set number of hours to do, but they can effectively work when they want.."

peer-to-peer team working and a more robust support structure for their junior doctors.

Professor Galloway said: "It enabled a consultant that was recruited on a clinical 4 PA contract to work in weeks of high intensity; working 10-16 PAs per week so she could take time off for several weeks to continue being an expedition doctor.

"The shifts follow the person. Every person has a set number of hours to do, but they can effectively work when they want as long as the group of doctors rostered can cover the shifts needed."

He adds: "A few weeks ago, my son had a football match and I wanted to go and watch him so I put my shift up on HealthRota and a colleague took it off me, taking the PAs from me but without a swap being needed. It started to change people's flexibility and their way of life as A&E consultants. This impact cannot be under-estimated; I remember being at a Christmas party when three partners came up to me and said that it literally saved their marriage!"

Since the implementation, capacity and demand planning has become much easier to manage, and with data now available on the PA requirements of individual departments, business cases have been written and granted for recruitment purposes.

These developments have enabled the successful implementation of a 7-day-a-week consultant night shift rota and facilitated an increase in the number of employed consultants from 8 full-time equivalents (FTE) to 24.

Adapting for Junior doctors in A&E

Shortly after, the approach was adopted for rostering junior doctors (senior house officers and F1 level) in A&E. This involved working out annualised hours, obtaining their request for when they didn't work (self-preferencing rotas) and creating bespoke rotas from basic templates which provided the cover needed, while allowing the flexibility that doctors wanted. The software also ensured that the doctors only worked the number of hours they were contracted for and worked an equal amount of out-of-hours shifts (which on traditional un-adapted templates is impossible to create). By rostering them for two hours less than their contracted hours, it also ensured they were guaranteed their Health Education England (HEE) mandated two hours a week self-development time.

This enabled the department to recruit high-quality post F2 clinical fellows, and start to improve clinical care, junior doctor welfare and reduce locum costs. In addition, the clinical fellow jobs had 25% non-clinical time which were also rostered within HealthRota and started to have added improvements for the department – teaching their medical students and undertaking quality improvement projects

Weekend cover has improved by enlisting foundation level doctors (such as academics) who do not routinely work in A&E, via HealthRota. This has completely eliminated the use of routine locum staff during the weekends when cover was previously difficult to coordinate.

All of these measures also led to a dramatic decrease in exception reporting, and high praise from the Trust's Guardian of Safe Working.

Expanding in to General Medicine and Care of the Elderly

Following the successful roll-out of consultants in A&E, acute medical consultants and care of the elderly consultants adopted the same system of annualisation, but adapted it so that they could provide the continuity required for their ward and clinic work.

This improved the department's ability to recruit and retain staff and improve the well-being of the consultant body. Following this, Professor Galloway and the team created the same benefits for junior doctors (registrar to F1 level) across General Medicine and Care of the Elderly wards, across RSCH and PRH hospitals. They use similar systems of annualisation to A&E but with some adaptations to how they created the rotas because continuity of care is paramount for ward patients and junior doctor training, whereas in A&E this is not the case.

The new rotas enable doctors to specify the days they cannot work and when they want to take their study and annual leave (self-preferencing) . This can be requested and is approved months before they start the job. Templated rotas are then re-configured to ensure that all shifts are covered, taking into consideration the needs for continuity.

Traditionally, fixed templates restricted how leave was processed. Doctors could only book annual leave when they were rostered for 'standard days', and they would only find

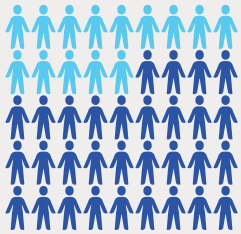
+16,000 hours of undergraduate education

out if that request had been approved or not up to 6 weeks prior to starting the post. This was a key frustration for junior doctors who found it difficult to plan and manage their personal commitments in line with their professional responsibilities. In comparison, the new approach allows junior doctors to choose their leave months in advance. And, unless there are significant shortages in capacity i.e., during Christmas holidays, this time is almost always honoured.

Since the implementation, the Trust has been able to operate a 7-day model of care, with dedicated ward-based doctors available from 8am to 8.30pm. This has reduced out of hours emergency medical calls by 68% in two years. An emergency call is sent when a patient is deteriorating, but with doctors now available on each of the wards during evenings and weekends, patients are offered immediate preventative care which means that the number of emergency calls has significantly dropped.

Amy said: “It’s great because it very clearly shows if you have the capacity or not to provide the service that you need. Where we have the capacity, we can move people around to ensure an even staffing structure, and where there is not the capacity long term, it provides objective data and a transparent mechanism for creating a business case to recruit more doctors, rather than rely on locum staff.”

+200%
increase in A&E consultants & registrars



Results

The new approach to rostering in Brighton has led to an overall increase in job satisfaction among doctors, enabling the Trust to recruit and retain a pool of talented and experienced staff.

From August 2022, optimal staffing levels have been calculated for each ward area and A&E department in RSCH and PRH, with clear visibility about the number of doctors required. Due to the flexibility of the rota system, all these shifts have been created and evenly filled.

78 FTE SHO and registrar fellows across medicine and A&E at both sites have been recruited, all with post F2/NHS experienced/UK trained doctors, to work alongside the HEE trainee doctors. The successful recruitment was only possible because people specifically wanted to come to work at RSCH/ PRH because of the flexible rota. As a result, there are no planned locum costs from August 2022, except to cover unexpected sickness. This would not be possible with traditional templated rota systems.

Key features used in Brighton

Annualisation with automated PA calculations

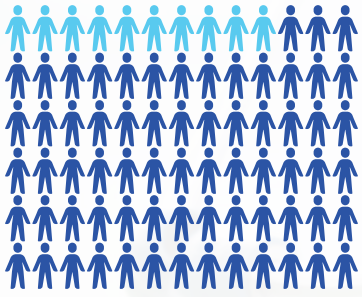
Annualised rotas and self-rostering/self-preferencing has created an equal distribution of shifts, reducing levels of burnout and ensuring that doctors only work the hours that they are paid for.

By using a combination of period of activity and hourly contracts for consultants, middle grade and junior doctors, all doctors are empowered with the flexibility to choose the amount of clinical work they wish to do. This includes a number of F3 and F4 doctors who work 33%, 50% and 75% contracts - with everyone having the ability to work for extended periods and take time away for travelling or childcare, for example. This typically provides the flexibility of locum staff, but with the skills and experience of a permanent workforce.

In comparison to traditional rostering systems, the new approach means that rotas are created and structured only after all types of leave have been calculated. This provides the flexibility that staff have asked for, whilst maintaining the principle that shifts are distributed equally, regardless of the day or ward area. It also helps to create rotas that are planned to be locum free, saving the Trust millions of pounds each year. Annualisation has also enabled:

- More effective planning and rostering, significantly reducing admin time.
- Annual leave to be booked up to a year in advance.
- Better utilisation of resources with optimised staff deployments.
- Rotas that are developed with all types of absence factored in at the point of creation, with the appropriate number of staff and the skill mix automatically mapped for each shift.
- Consistent daily staffing numbers which are not depleted by leave requests.
- The flexibility to work when and during hours that suit the rota and the individual with 98% of annual requests agreed.
- Fair and equitable distribution of shifts, regardless of the specific line of the template used.
- Ability to factor in regular periods of rest into templates.
- Accurate work schedules based on templates or individual shifts.
- Real-time compliance and calculation of hours when swapping or amending shifts, ensuring that individuals do not work more or less hours than contracted for, and that the rota remains compliant.

+680%



increase in fellow doctors

“We have mitigated all these issues and the benefits have been unreal!”

Greater flexibility and work-life balance with self-rostering

With doctors able to mark themselves as ‘unavailable’ or ‘available’ using the HealthRota application on their desktop or mobile devices, emergency and medicine departments can operate a fully flexible and bespoke rota system that is almost entirely locum-free (except for last-minute sickness).

Shift swapping provides the functionality to utilise available staff more efficiently, rather than relying on the fixed and inflexible templates of the past. Staff have their rotas emailed directly to their online calendar and can easily swap shifts, request annual leave and self-roster independently – all via the mobile app, giving them greater ownership and control over their own time. This also removes the dependence on rota coordinators to do the same, saving valuable time and resources.

Enabling a successful crisis response during the Covid-19 pandemic

With the HealthRota e-rostering system already in place and demonstrating significant benefits prior to the Covid-19 pandemic, the Trust made the decision to roster the entire junior workforce onto the platform using annualised rotas. This allowed the team to seamlessly initiate a crisis response which prevented doctors moving between wards by providing a temporary base ward. Each ward was rostered with nine doctors, providing cover for 24 hours-a-day, 7 days-a-week. This allowed the Trust to honour 100% of the doctor’s annual leave entitlements and enabled staff to take time off when they requested.

Amy said: “It saved us. It was amazing.”

She adds: “If you can imagine a control room with your Chiefs planning your team, that is what we did. We were able to stop everyone from moving around and still ensured our workforce got regular breaks, their annual leave when requested and that we still had sufficient capacity to meet the demands of the Covid pandemic despite the number of staff not able to work. We built resilience into the team and so during wave one, not one doctor felt that they were being overworked. It was unbelievable. ”

The HealthRota software was able to adapt to the new requirements. As a result, A&E and medicine had zero locum requirements even with all the covid related sickness during the first wave of the pandemic. The redeployments had no impact on the commercial use or cost of the platform - and furthermore, additional functionality was developed by HealthRota ‘just in case’ it would be needed by the team.

Conclusion

As someone that had witnessed the impact of poor rostering practices on medical teams for many years, Professor Rob Galloway was compelled to instil a new culture of transparency and ownership. He understood that empowering doctors with the freedom and flexibility to work when they wanted, would in turn lead to a sense of collective responsibility for managing the demands of the A&E and general medicine departments.

Despite the early challenges with effective and efficient deployment of staff, and the rising costs of using locum doctors to fill the gaps, Professor Galloway and his team, supported by HealthRota, have served to resolve the issues facing the A&E and medicine departments, while also improving the quality of working life for the clinical professionals using the system.

Annualisation and self-rostering has created a sustainable and future-proofed approach to workforce management. It has given staff the flexibility to work full-time, part-time, or any hours they choose over a given year. This way, they can opt to work periodically, or more intensively over a selected period and take the rest of the time off as they choose – all without impacting the running of the emergency department.

Patient safety has also increased with the ability to provide more clinical cover on the wards outside of the usual 9am - 5pm hours seen in other hospitals. Talking about the difference e-rostering has made for patients and his team, Professor Galloway says: “We have completely transformed A&E and medical staffing at RSCH and PRH.”

With sole responsibility for rostering 160 doctors every 4 months, across 15 specialties, Amy said: “You go on Twitter, and you see ‘burnout,’ ‘no flexibility,’ ‘cannot get my annual leave’ or worse, people leaving the NHS! And yet, we are sitting here with the solution. We have mitigated all these issues and the benefits have been unreal!”

The transformation has also been cited as a positive factor amongst several professionals. In a recent survey conducted by the Trust, a consultant stated: “I don't know why this isn't used at every trust. It brings HR into the 21st century. It delivers better care for patients as staffing levels are more uniform, but most importantly, it makes for a happier workforce.”

Another said: “I did not know about the HealthRota app before coming to RSCH and PRH, but I was really amazed with the system. Having all our entitled leave allocated when organising our rota was extremely helpful, compared to other trusts where it would be difficult to use up all your annual or study leave due to staffing difficulties, which was a major contributing factor leading to burnout and decreased wellbeing. This is one major aspect that has made me want to consider staying at this Trust next year.”

The HealthRota e-rostering digital platform has been central to the approach pioneered by Dr Galloway in Brighton. For his contribution to NHS workforce management, in 2021, Dr Galloway was nationally recognised in the HSJ top 20 wildcard list among the people that NHS England and the Health Secretary, ‘would do well to listen to’. He was named for using innovative approaches to juniors’ rotas, including self-rostering and annualised hours.

Overall Benefits

- All rotas are annualised, with all types of annual leave, days off in-lieu, and non-shop-floor time is factored into the rotas. From August 2022, the only locum requirements are to cover unexpected sickness across A&E and the medical wards.

- All available posts have been recruited for, with locum savings used to fund and improve staffing levels. In five years, the Trust went from seven consultants and seven registrars (for two sites) to 23.8 full-time equivalent (FTE) consultants and 20 registrars (=43.8). In seven years, fellow doctor numbers have increased from 4 in A&E and 6 in medicine to 78 FTE across both departments.

- The Trust benefits from 24/7 consultant A&E cover at Brighton, and cover between 8am and 10.30pm every day of the week at the Princess Royal hospital.

- The cost of using locum doctors has been curtailed. For example, before the annualised rota system was introduced, £1.3m was spent on locums at RSCH and PRH in A&E alone. The year after annualisation was implemented (2018), the locum costs were less than £50K.

- For 2022-23, the only projected locum need is to cover sickness absence. This is projected to be less than 300K a year for the whole of A&E and medicine across two sites.

- With objective data available for capacity and demand planning, and with self-rostering and annualisation cited to be a positive factor for staff teams, it has proven easier to recruit UK trained post F2 doctors to clinical roles.

- The Trust has the data available instantly to assess who can cover shifts or who is available should a major incident occur.

- The administrative time required to run rotas has been drastically reduced.

- Aside from any ongoing challenges of Covid-19, A&E and general medicine is almost consistently run with the staffing it needs. This has enhanced out-of-hours cover, improved clinical safety, patient experience and outcomes.

- Doctor wellbeing has improved with burnout rates falling significantly due to better work-life balance and the flexibility to work when preferable, with easy access to self-rostering on the HealthRota app.

- The learning environment has been enriched with more support available for junior doctors. The Trust has been able to recruit clinical fellows who work 75% clinical time, and 25% non-clinical time in areas such as research, simulation and education.

- With 44 FTE educational fellows delivering over 16,000 hours of undergraduate education, the Trust has positively impacted on the education of its medical students, transforming feedback of students. The administration team roster the educational fellow's rotas to ensure that there are fellows available when the students are on placement. In 2021, Brighton and Sussex Medical School came 3rd in the national student survey for medical school with an overall 95% student satisfaction. The educational fellows were a significant contributor to this performance.

- The Trust now has 14 research fellows starting multiple projects in line with the Trusts' key research objectives.

Additional information

The Benefits of Annualisation (short video)

The BMA has supported the benefits of this annualised approach as shown in this video: bit.ly/bma-hr.

Accolades awarded based on the Annualised approach

- August 2022: Shortlisted for the 2022 (HETT) Health Excellence Through Technology Unexpected Innovation Awards – Digital Workforce Category
- June 2021: HSJ Wildcard top 10 influence on NHS workforce ideas. Awarded to Rob Galloway for work with HealthRota on medicine ward rotas.
- May 2018: BMJ 2018 Innovation Team of the Year- highly commended award for staffing solutions to A&E.
- November 2017: HSJ Award - highly commended within the workforce category formwork on innovative staffing solutions for medical staffing using annualisation and clinical fellows.
- October 2017: Winner of RCEM Quality Improvement Project, Award in celebrating 50 years of Emergency Medicine. Transforming A&E Clinical care by revolutionising medical staffing using annualisation, self-rostering and clinical fellow posts.
- August 2017: RCEM Excellence Award in celebrating 50 years of Emergency Medicine. Transforming A&E Clinical Care.

As part of the evaluation of HealthRota used for the paper: "HealthRota; an evaluation of a digital rostering platform and managing doctors' rota and leave", published in Future Healthcare Journal by the Royal College of Physicians (see next page), anonymous feedback was obtained from the doctors in A&E and medicine about their experience of using HealthRota in the annualised way described. Below are some of the comments shared:

Feedback

This is a very attractive feature when recruiting consultants to our department. I am constantly asked about it by other departments and colleagues in other hospitals. We are in a specialty that is prone to burnout, traditionally under-resourced, low status and with a high emotional burden. It makes a massive difference for those who are full-time clinical but also for those part-time or clinical academics as it allows flexibility and ensures fairness across the rota. It has really changed things for the better - our full-time consultants now consistently get one day-off per week. This has never happened before HealthRota. Our previously very understaffed department is now much better staffed than neighbouring Trusts' and I think this is (at least in part) down to the implementation of HealthRota for our consultants. (Consultant Geriatrician, RSCH)

Having access to HealthRota had a tremendous positive impact on organising my clinical and non-clinical time. Since moving to a new Trust without HealthRota, the issues of more conventional rota management are all too apparent again and it has made me feel less in control of my schedule. I'm hopeful for widespread adoption of HealthRota across Trusts, so more can benefit from this system. (Clinical Fellow 2019-2021)

I was able to ensure I had my wedding off this year! If I had not been able to do this, I would have had to locum for a year as I couldn't guarantee the time off in any other job.

Easy to use, brilliant way of swapping shifts and picking up locum shifts. (IMT2)

HealthRota meant I was able to have a great work-life balance, got the time off for study/annual leave when I needed it and protected me from inevitable burnout. I would recommend HealthRota to any future trusts I work in - it is a huge asset to a Trust, and particularly to the Emergency Department.

HealthRota was the main reason I applied for this job.

I have just moved on to the consultant rota and it has revolutionised the way the consultant jobs are organised. It has made me consider taking a consultant job at RSCH.

The annualisation of the rota has really helped me in this job to be able to see my long term partner, who lives in another region. It has also helped me get the study leave I needed for my exams and courses.

Feedback

This is such a great system - I have received 100% of the annual leave and unavailable days I have requested in both my clinical fellow job and my current training job. It makes such a difference not feeling that sense of dread when trying to get annual leave granted for important life events and marking unavailable days where you actually want your zero days is so much better than having them randomly allocated to days that are not useful. It is an excellent system and a massive selling point.

Amazing app and great for locums !

HealthRota and the flexibility/annualisation and transparency that comes with it, the work/life balance my colleagues experience following the introduction into our department have all been instrumental in recruiting recently appointed new consultants and current senior registrars being attracted to working at RSCH/PRH and applying for jobs in the near future.

The use of an app that both fairly and clearly allocates shifts is vital. I have previously had rota patterns go wrong and ended up working extremely unfairly and software like HealthRota reassures me that the system is fair and it is easy to get study leave off.

The HealthRota app is easy to use, makes getting desired time off easier and improves overall doctors' morale compared to other rotas I have used.

HealthRota has allowed me to have a much better work/life balance while pursuing a career in Emergency Medicine. It is refreshing to have much more control over when you work and how you fill your hours with self-rostering and HealthRota. I got married during my attachment in ED and there was minimal hassle getting the stag, wedding and honeymoon off. This would have been a nightmare without HealthRota. As well as ensuring departmental safety, I believe systems like HealthRota will reduce personal burnout in ED and increase job satisfaction.

Excellent system. I found it very helpful for allocating the department juniors appropriately. As a consultant, it’s great to be able to document our session time and being an app, it’s accessible from anywhere.

I enjoyed the flexibility that the HealthRota app provided. For the first time in my career was i able to have annual leave when i wanted it without complex rota swaps. It definitely made my working life better!

Feedback

HealthRota has revolutionised my experience of working in medicine. It allows me to indicate unavailability months in advance for future rotations for known plans and life events e.g., family weddings etc, without having the stress and worry of tracking down the specific specialty's rota coordinator to discuss an advance request for time off which may get lost under the wealth of requests they receive between now and the formulation of the next rota.

I have found HealthRota to be really helpful in terms of having a rota whereby I can plan for important events in my life and also in taking study leave without having to jump through multiple administrative hoops. In comparison to the previous system of having a pre-allocated line on a spreadsheet, HealthRota is far superior.

It's such an improvement on classical binding rotas to be able to plan leave and unavailability upfront - I don't know anyone who has complained about this system compared to traditional methods. The rota team that supports the app are EXCELLENT and have only been very helpful and supportive!

Being able to see who is/will be in the working team alongside me for a given shift/shifts is helpful for fostering a team atmosphere in the absence of true "firms" and contributes to wellbeing.

I did not know about the HealthRota app before coming to RSCH/PRH but I really was amazed with the system. Having all our entitled leave allocated when organising our rota was extremely helpful, compared to other trusts where it would be so difficult to use up all your annual and/or study leave due to staffing difficulties (and therefore contributed to burnout and decreased wellbeing). It is one major aspect that has made me want to consider staying at this trust next year.

The app is fantastic, very easy to use, great for getting the time off you need for AL/SL (e.g. able to get onto an ALS revalidation course and not worrying about swapping night shifts so I could attend!) and so useful for knowing who is working at any one time in the hospital (particularly during on-calls). It is definitely something that should be implemented at other trusts both to improve junior doctors' wellbeing and improve patient safety with easier adaptability for unexpected sickness and awareness of who is working at any one point in the hospital across many teams.

The rotas are easy to view on the app and you can see how good the cover is on any given day. It is also very useful being able to request annual leave whenever you want to rather than having to fit it in between on-calls.

Feedback

This is such a great system - I have received 100% of the annual leave and unavailable days I have requested in both my clinical fellow job and my current training job. It makes such a difference not feeling that sense of dread when trying to get annual leave granted for important life events and marking unavailable days where you actually want your zero days is so much better than having them randomly allocated to days that are not useful. It is an excellent system and a massive selling point.

HealthRota and the flexibility/annualisation and transparency that comes with it, the work/life balance my colleagues experience following the introduction into our department have all been instrumental in recruiting recently appointed new consultants and current senior registrars being attracted to working at RSCH/PRH and applying for jobs in the near future.

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In 2022, the first paper demonstrating the benefits of HealthRota was published in the Future Healthcare Journal published by the Royal College of Physicians. Below is a copy of the paper:

ORIGINAL RESEARCH Future Healthcare Journal 2022 Vol 9, No 2: 166–70

DIGITAL TECHNOLOGY

HealthRota: An evaluation of a digital rostering platform for managing hospital doctors' rotas and leave

Authors: Rob Galloway,[A] Ogechifina Onyiriuka,[B] Amy Brown,[C] Colin Fitzpatrick[D] and Daniel Richardson[E]

ABSTRACT

Background

In order to provide safe, high-quality hospital care, it is essential that doctors are optimally deployed. Digital platforms for rostering doctors improves both the quality of hospital care and the wellbeing of doctors. We evaluated the usability and acceptability of the HealthRota® e-rostering system.

Methods

We circulated an electronic survey among doctors with current/previous experience of using HealthRota, and measured usability (with a system usability score (SUS)) and acceptability. We collected data on how doctors believed HealthRota affected wellbeing, patient safety and training.

Results

There were 209 responses (67 non-training clinical fellows, 114 training doctors and 27 consultants) from an estimated 350 doctors who have used HealthRota. Overall, the median SUS score was 86/100 (interquartile range (IQR) 75–97), and there were no differences by role ($p=0.118$), age ($p=0.632$) or years of experience ($p=0.963$). The median Likert score for recommending HealthRota to a colleague was 5/5 (IQR 4–5). There were no differences in role ($p=0.477$), age ($p=0.904$) or years of experience ($p=0.930$). Doctors suggested that HealthRota improves patient safety (4/5 (IQR 3–5)), junior doctor training (4/5 (IQR 3–5)), doctor wellbeing (4/5 (IQR 3–5)) and out-of-hours cover (4/5 (IQR 3–5)).

Conclusion

HealthRota is usable and acceptable to doctors and improved the quality of patient care and doctor wellbeing. This serves as evidence to broaden the use of HealthRota.

KEYWORDS: rostering, hospital medicine, e-rostering, digital rostering

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Introduction

In order to provide safe, high-quality hospital emergency and inpatient care, it is essential to ensure that medical staff are optimally deployed.[1] The European working time directive, annual leave, out-of-hours cover, unscheduled time off (including sick leave), vacant training posts, continuing professional development and, more recently, the COVID-19 pandemic need to be taken into consideration when planning hospital doctors' rotas.[2] Timetabling doctors to ensure these requirements are met is challenging for many reasons, including ensuring adequate training opportunities.[3] A hospital doctor's overall timetable is often a composite of several timetables that encompasses the emergency department or base ward clinical duties, outpatients responsibilities, on-call duties, non-clinical duties (including teaching, medical management and research time) and leave. The status quo in many departments is to keep track of these individual timetables using spreadsheets that are often managed in silos by different departments and members of staff within a single hospital setting. Clearly, this is inefficient and time consuming and can lead to unsafe staffing levels. Furthermore, inadequate rota processes lead to poor morale, reduced wellbeing and health among doctors, and further staffing issues.[4,5] The recent COVID-19 pandemic and redeployment of doctors has meant that more robust and flexible hospital-wide systems are required to maintain safe hospital care across specialties and departments.[6] There exist many off-the-shelf electronic rostering systems that aim to streamline doctor rotas, however, these systems are rarely able to manage multiple teams (including specialty on-call rotas in addition to acute medicine and the emergency department) with joint on-call commitments, doctors working less than full time and working across multiple hospital sites.[1,7] Furthermore, the changes occurring in acute medical training from August 2022 in the UK mean that other medical specialties (genitourinary medicine, palliative medicine, neurology and renal medicine) will be contributing to the acute medical take and, therefore, more integrated hospital-wide rota systems will be needed.

Similar to other settings, locally, we have reduced locum spend by filling vacancies in training posts with non-training (clinical fellow) posts who spend up to 25% of their time teaching in our medical school or participating in research and innovation projects.[8] There are examples demonstrating that using digital platforms for

rostering doctors improves both the quality of hospital care and the morale and wellbeing of medical staff and, thus, may reduce the requirement for locums.[9–11] More integrated and automated medical workforce management is needed to future-proof and maintain safety and quality of medical hospital rotas providing flexibility and bespoke elements for the needs of individuals and teams. Doctors, particularly junior medical staff, value rota systems that are flexible and provide timely notice of duties and the ability to request leave easily.[4]

HealthRota© is a digital e-rostering system designed for doctors, accessible via an android or IOS application (app), or a desktop version, which creates 'traditional' templated rotas but also has the ability to create annualised rotas; it is are being used at the Royal Sussex County Hospital, Brighton, and the Princess Royal Hospital, Haywards Heath. Annualised rotas work in reverse from standard rotas where, rather than needing to request leave, actual clinical hours are calculated and rostered when doctors are available to work, within the confines of what is needed for service. All non-clinical time (such as annual leave, study leave, consultant non-clinical time (sPA) and professional development time) are included in the doctor's time off and only the correct numbers of clinical hours are rostered. Doctors can mark themselves as available or unavailable to work via their HealthRota app, allowing bespoke, flexible rotas to be created. The HealthRota software calculates annualised hours based on individual user contracts and job plans, allowing workforce planning based on actual clinical hours available; importantly, annualised rotas are not depleted by annual leave or study leave requests made once rotas are published. Therefore, rotas can be created that are locum free even after all types of leave have been taken. In addition, clinical fellow posts with 25% non-clinical time can easily be created allowing dedicated time for clinical work and non-clinical work. HealthRota has in-built features to optimise rostering doctors; for example, highlighting rota non-compliance across multiple rotas, in real time, allowing for easy shift swapping and more efficient use of available staff on complex rotas, rather than fixed inflexible templates traditionally used for standard rotas. Other features of HealthRota include shift swapping via the app, requesting leave via app, real-time rota compliance checks in line with contract rules, working across multiple rotas compliantly, self-rostering via the HealthRota app, a locum module that can support the booking of locum shifts directly via the HealthRota app, a template builder that analyses hours and checks rota compliance, and a work schedule and pay document generation based on annualised rota templates or individualised rotas.

The aim of this study was to evaluate the usability (using the system usability scale (SUS)) and acceptability of the HealthRota digital platform among doctors who are current and former users.

Method

We distributed an electronic survey using MS Forms via an email link to doctors working in the trust and those who previously worked in the organisation as part of a medical rota evaluation and needs assessment. We gathered information on the doctor's role (consultant, doctor in training or doctor in non-training post), age in years and years of experience. We measured usability using a modified SUS tool to evaluate the usability of the HealthRota platform.[12] SUS is widely regarded as the industry standard for accurately assessing the usability of a digital system due to the robust nature and structural design of the tool, and regarded as the most 'accurate' compared with other commonly used usability tools.[13] Previous work has shown that a modified SUS tool can be used where appropriate as the tool has enough robustness to sustain mild modification without affecting the overall interpretation.[12] The modified SUS comprises nine statements that are directly related to the system being assessed and aimed at users who have experience of using the system within the context for which it is was designed. Each statement within the SUS tool has a five-part Likert scale ranging from 'strongly disagree' to 'strongly agree'. Four statements were selected that were associated with 'strongly agree', and five statements were selected that were associated with 'strongly disagree'. Questions were alternated between 'strongly agree' and 'strongly disagree' to prevent biases / reduce response acquiescence biases and encourage more careful consideration of each response. Each response has a numerical value assigned based on a complex scoring algorithm, resulting in an overall usability score. As only nine statements out of the 10 are scored, the overall scores range from 0–36 (rather than 0–40). The absolute SUS score can be calculated by multiplying the final score by 2.78 (100/36), instead of 2.5 (100/40).

We measured acceptability by asking doctors if they would recommend HealthRota to a colleague (using Likert score out of 5 where 5 is 'definitely' and 1 is 'not at all'). We also asked doctors (using Likert scores out of 5) how easy they found requesting annual leave and study leave; if they believed HealthRota improved patient safety, junior doctor training, doctor wellbeing and out-of-hours cover; and whether HealthRota was a factor in recommending or accepting a post in our hospital. We stratified the results by age, using four groups broadly representing the age of doctors throughout their careers 24–30, 31–35, 36–40 and over 40 years. We used the Kruskal–Wallis test to compare median SUS scores and Likert scales within 95% confidence intervals. This was a local quality improvement project and, therefore, research ethical approval was not required.

Results

There were 209 responses from an estimated 350 doctors working in the emergency department and medical specialties including acute medicine who had used the HealthRota platform. The respondents identified themselves as either non-training doctors (clinical fellows; n=67), training doctors (n=114) or consultants (n=27). The median age of respondents was 30 years (IQR 27–35) and 46 had 0–2 years of experience, 83 had 3–5 years of experience, 38 had 6–10 years of experience and 41 had >10 years of experience. Overall, the median SUS score was 86 (IQR 75–97): consultants 86 (IQR 39–49), training doctors 92 (IQR 76–97) and non-training doctors 81 (IQR 72–92). There were no differences in SUS score by role ($p=0.118$), age ($p=0.632$) or years of experience ($p=0.963$). The median Likert score for recommending HealthRota to a colleague was 5/5 (IQR 4–5). There were no differences in recommending HealthRota to a colleague by role ($p=0.477$), age ($p=0.904$) or years of experience ($p=0.930$). Respondents scored the ease of requesting annual leave using HealthRota (using a median Likert scale) as 5/5 (IQR 4–5) and the ease of requesting study leave as 5/5 (IQR 4–5). They suggested that HealthRota improves patient safety (4/5 (IQR 3–5)), improves junior doctor training (4/5 (IQR 3–5)), improves doctor wellbeing (4/5 (IQR 3–5)) and improves out-of-hours cover (4/5 (IQR 3–5)). The respondents suggested that HealthRota was

Table 1. System usability scale, acceptability and other attributes of the HealthRota© digital platform among doctors

	Age, years, median (IQR)	SUS out of 100, median (IQR)	p-value	HealthRota: Would you recommend it to a colleague, median (IQR)	p-value	HealthRota: How easy is requesting annual leave, median (IQR)	HealthRota: How easy is requesting study leave, median (IQR)	HealthRota: Does it improve patient safety, median (IQR)	HealthRota: Does it improve doctor training, median (IQR)	HealthRota: Does it improve doctor wellbeing, median (IQR)	HealthRota: Does it improve out-of-hours cover, median (IQR)	HealthRota: Is it a factor in recommending a post, median (IQR)	HealthRota: Is it a factor in accepting a post, median (IQR)
All, n=209	30 (27–35)	86 (75–97)		5 (4–5)		5 (4–5)	5 (4–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	3 (1–4)
Role													
consultant, n=27	44 (39–49)	86 (74–97)	0.118	4 (4–5)	0.477	5 (4–5)	5 (4–5)	4 (3–5)	4 (3–5)	4 (4–5)	4 (3–5)	4 (4–5)	4 (4–5)
training, n=114	29 (26–32)	92 (76–97)		5 (4–5)		5 (4–5)	5 (4–5)	4 (3–4)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	3 (1–4)
non-training, n=67	28 (27–32)	81 (72–92)		4 (4–5)		5 (4–5)	5 (4–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (4–5)	4 (3–5)
Age													
24–30 years, n=122		89 (75–97)	0.632	5 (4–5)	0.904	5 (4–5)	5 (4–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	3 (1–4)
31–35 years, n=38		81 (75–95)		5 (4–5)		5 (4–5)	5 (4–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (4–5)	3 (2–4)
36–40 years, n=20		83 (74–97)		4 (4–5)		5 (4–5)	5 (4–5)	4 (3–4)	3 (2–4)	4 (4–5)	4 (4–5)	3 (3–4)	3 (2–4)
>40 years, n=28		86 (72–98)		5 (4–5)		5 (4–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–4)	5 (4–5)	3 (3–5)
Years of experience													
0–2 years, n=46		86 (76–94)	0.963	5 (4–5)	0.930	5 (4–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–4)	4 (3–5)	2 (1–3)
3–5 years, n=83		86 (75–96)		5 (4–5)		5 (4–5)	5 (4–5)	3 (3–5)	4 (3–5)	5 (4–5)	4 (3–5)	4 (4–5)	3 (2–4)

Table 1. System usability scale, acceptability and other attributes of the HealthRota® digital platform among doctors (Continued)

	Age, years, median (IQR)	SUS out of 100, median (IQR)	p-value	HealthRota: Would you recommend it to a colleague, median (IQR)	p-value	HealthRota: How easy is requesting annual leave, median (IQR)	HealthRota: How easy is requesting study leave, median (IQR)	HealthRota: Does it improve patient safety, median (IQR)	HealthRota: Does it improve doctor training, median (IQR)	HealthRota: Does it improve doctor wellbeing, median (IQR)	HealthRota: Does it improve out-of-hours cover, median (IQR)	HealthRota: Is it a factor in recommending a post, median (IQR)	HealthRota: Is it a factor in accepting a post, median (IQR)
6–10 years, n=38	88 (75–97)			5 (4–5)		5 (4–5)	5 (4–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	4 (3–5)	3 (1–5)
>10 years, n=41	86 (75–97)			4 (4–5)		5 (4–5)	5 (3–5)	4 (3–5)	3 (3–4)	4 (3–5)	4 (3–5)	4 (4–5)	3 (2–4)

HealthRota answers on a Likert scale out of 5, p-values calculated using the Kruskal–Wallis test. IQR = interquartile range; SUS = system usability scale.

a factor in recommending the post to a colleague (3/5 (IQR 3–5)) and HealthRota was a factor in accepting the post (3/5 (IQR 1–4; Table 1).

Discussion

We have shown that among the 209 doctors who responded to our survey, the HealthRota platform has a 'best imaginable' SUS (86/100) and is highly acceptable (doctors would recommend HealthRota to a colleague (Likert score 5/5)). Furthermore, we found that respondents using the HealthRota platform found it easy to request annual leave and study leave; and suggested HealthRota improves patient safety, doctor wellbeing and out-of-hours cover, and is a factor in recommending a post to a colleague and accepting a post in our hospital.

We believe that this is the first time a digital rota platform for hospital doctors has been evaluated using a modified SUS score. A SUS score of above 86 is described as 'the best imaginable' and compares with other digital platforms very favourably (eg PowerPoint scored 74, iPhone scored 78, amazon.com scored 82 and an ATM scored 83).[3,4] Although the SUS score was not intended to be used to assess digital rota platforms for doctors, previous work has shown the score to be resilient when used in diverse settings and can be modified for use in different settings.[3,10] It is reassuring to know that HealthRota is usable for the doctors using the platform that will facilitate further development of the platform for other specialties (eg surgery, obstetrics and gynaecology). Furthermore, we have shown that the usability transcends doctors with varying roles, age and experience.

Our data suggest that HealthRota was highly acceptable as doctors would recommend the platform to a colleague and that there were no differences in acceptability by role, age or years of experience. Previous studies have shown that when there is resilience and flexibility in doctors' rotas with inbuilt functionality to organise annual leave and on-call swaps, the rota system is more acceptable.[1] There is no validated tool for assessing acceptability of a digital rota platform and we adapted a patient reported experience measure (PREM) used universally within healthcare to broadly assess the experience and acceptability doctors have of using the platform. Ideally, validated tools should be developed to be able to assess acceptability of digital rostering platforms for doctors.

Given the challenges of managing and maintaining the quality of care of patients in the emergency department and hospital inpatients, it is reassuring to see that the users of HealthRota who responded to our survey believed that HealthRota improved patient safety and out-of-hours cover. Other studies have shown that optimising medical staffing configurations and reducing the need for locum doctors to cover vacancies improved patient care.[1] We also found that HeathRota provides flexibility for doctors when booking leave (including study leave) and was believed to improve doctor training and wellbeing. To our knowledge, there haven't been any assessments of rostering systems on the quality of hospital inpatient care to date. There are data showing how ensuring rotas and systems managing rotas affect the wellbeing of the doctors involved.[4] Interestingly, doctors responding to the survey suggested that HealthRota was a factor in recommending our hospital as a place to work and, to a lesser extent, accepting a position in our hospital. Furthermore, there are no published data on the implementation and evaluation of other digital health

rostering systems to compare with HealthRota; more research is needed focusing on the evaluation, effect on patient care and doctor wellbeing on systems being used.

The strength of our study is that we were able to include over 200 hospital doctors of varying roles and years of experience who have used the HealthRota digital e-rostering platform as part of their working lives. There were several limitations including being a single-centre study without a control group. The survey was managed and circulated by the clinicians who manage the junior doctors' rota rather than an independent researcher, which may have introduced some bias. Due to the rotational nature of most of the doctors using HealthRota, we did not collect information on the current specialty they were working on and were not able to compare different specialties or departments.

Overall, we have shown that HealthRota is usable and acceptable to doctors working in the emergency department and internal medicine, provides flexibility and is perceived as improving the quality of patient care and doctor wellbeing. This serves as evidence to be able to broaden the use of HealthRota to other specialties and grades of doctor in our hospital and beyond. ■

Conflicts of interest

Rob Galloway originally turned the concept of annualised and self-rostering rotas into a product alongside developers at HealthRota. He is a non-paid consultant to the company but owns a 10% stake in the company.

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