

Clinical Rotation Handbook Promotes Orthopaedic Resident Wellness: A Quality Improvement Study

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ABSTRACT

Introduction. Transitioning from one clinical rotation to the next may be particularly stressful for orthopaedic residents attempting to navigate new work environments with new faculty mentors and new patients. The purpose of this quality improvement (QI) project was to determine if resident stress could be improved by using a handbook to disseminate key rotation-specific data during quarterly rotation transition periods.

Methods. A comprehensive electronic handbook was created by residents to describe each rotation in our orthopaedic training program in terms of: (1) faculty and staff contact data, (2) daily clinic and surgery schedules, (3) resident responsibilities and faculty expectations, and (4) key resources and documents. At rotation transition, a session in the academic schedule was dedicated for outgoing residents to update the handbook and to sign-out to incoming residents. Pre- and post-handbook questionnaires were administered to assess resident perceptions of stress or anxiety, preparedness, and confidence before commencing the new rotation. Nonparametric data derived from the surveys were analyzed using the sign test choosing $p < 0.05$ for a two-tailed test as the level of statistical significance.

Results. Most residents perceived improvements in stress/anxiety, preparedness, and confidence understanding rotation expectations after the handbook was implemented. Changes in these three outcome parameters were statistically significant.

Conclusions. This rotation transition QI initiative consisting of a resident-authored, rotation-specific electronic handbook and dedicated verbal sign-out session enhanced resident wellness by decreasing stress, increasing preparedness, and improving confidence among residents starting a new rotation. Similar online resources may be useful for trainees in other specialties. *Kans J Med* 2022;15:331-335

INTRODUCTION

In 2017, the Accreditation Council for Graduate Medical Education (ACGME) mandated physician wellness education for all residency programs regardless of specialty.¹ Since wellness is crucial to the delivery of optimal healthcare, residents and faculty members must be committed to maintaining a learning and work environment where respect for physician well-being is paramount.² In the recently revised

Common Program Requirements, the ACGME emphasized that all physician mentors and trainees not only bear responsibility for their own physical and mental health and for managing their own life stressors, but also share responsibility for the well-being of their physician colleagues.

Failure to cope with the stresses and demands of training during orthopaedic surgery residency has been associated with burnout, a work-related distress syndrome of emotional exhaustion, depersonalization, and a reduced sense of accomplishment.³ In a survey study of orthopaedic residents from a large university training program by Sargent et al.³, respondents exhibiting greater levels of burnout also reported increased levels of anxiety about their own clinical competence. Such feelings of inadequacy are common among residents in training.

In this context, our residents identified the start of a new rotation as a particularly stressful time owing to the overwhelming amount of new information they are expected to assimilate. This data compendium included fundamental knowledge about the orthopaedic subspecialty, faculty preferences on various patient issues ranging from in-office injections to surgical indications to preoperative patient positioning, faculty expectations regarding resident performance, and relatively mundane matters such as personnel contact information, clinic assignments, and operating room schedules. Typically, this information was passed from one resident rotator to the next by verbal communication on an informal and sometimes inconsistent basis. This oral sign-out often was lacking in detail and/or clarity, which may amplify resident anxiety and compromise the quality of patient care.

The resident staff chose to focus on this shortcoming in transition of patient care by creating a handbook to transmit key information from outgoing to incoming resident rotators. This resident handbook, organized by post-graduate year, clinical rotation, and faculty mentor, was designed to minimize stress and to maintain resident well-being during the transition to a new rotation. In addition, time was allocated in the academic calendar at the beginning of each rotation for outgoing residents to update the handbook and sign-out to their incoming colleagues.

The purpose of this QI project was to assess the impact of handbook utilization on resident wellness. It was hypothesized that use of the handbook would decrease stress/anxiety, increase preparedness, and improve confidence for orthopaedic residents starting a new rotation.

METHODS

Setting and Participants. This QI study was conducted at the University of Kansas School of Medicine-Wichita in the Department of Orthopaedic Surgery. Our five-year training program has four residents in each post-graduate year (PGY) for a total of 20 residents. After PGY-1, all clinical rotations are three months in duration except for the PGY-4 six-month rotation in pediatric orthopaedics (Table 1). For PGY-1 residents, the duration of rotations varies from one month to three months. The five-member QI team managing this project was comprised of one resident from each PGY level.

Table 1. Orthopaedic resident rotations, academic year 2021-22.

PGY-1	Faculty
Orthopaedic Trauma, Service 1	2
VA, Adult Orthopaedics	2
Orthopaedic Research	2
Orthopaedic Basic Science	2*
Off-service rotations (6 months)	
PGY-2	
Orthopaedic Trauma, Service 2	2
Hand & Wrist, Foot & Ankle, Service 1	4
Sports Medicine, Service 1	3
Hip & Knee Arthroplasty	3
PGY-3	
VA, Adult Orthopaedics	2*
Shoulder & Elbow (including arthroplasty)	3
Sports Medicine, Service 2	2
Spine	1
PGY-4	
Hand & Wrist, Service 2	2
Hip & Knee Arthroplasty	3*
Shriners Children's Hospital, Saint Louis (6 months)	
PGY-5	
Orthopaedic Trauma, Service 1	2*
Orthopaedic Trauma, Service 2	2*
Foot & Ankle, Service 2	2
Elective rotation, Academic Chief Resident	

*Some faculty members overlap on services; 28 orthopaedic faculty serve as resident mentors.

As a preliminary step to assess the potential value of an orthopaedic resident handbook, the QI team administered a resident questionnaire by email in January 2021. The survey consisted of six multiple choice items requiring a Likert scale response and three yes/no items (Figure 1). Since the questionnaire also measured resident perceptions of stress, preparedness, and confidence prior to starting a new rotation, the responses also served as a baseline against which later survey results could be compared. Because the survey documented favorable resident sentiment regarding handbook utility, the department authorized the resident team to move forward with the project as a QI study.

Quality Improvement Intervention. From January to June 2021, using the initial survey results and input from residency leadership, faculty, and residents, a comprehensive handbook was created for our five-year residency program. Contributions to the handbook for each rotation were made by residents who already had completed the rotation. All entries were edited by the QI team to assure handbook accuracy.

1. Upon starting your new rotation, how stressed do you feel during the first two weeks getting to know the new rotation and schedule?
Very Stressed, Somewhat Stressed, Almost Never Stressed, Never Stressed
2. Upon starting your new rotation, how prepared do you feel to fully meet the expectations of the rotation?
Very Unprepared, Somewhat Unprepared, Somewhat Prepared, Very Prepared
3. Prior to your new rotation, how confidently did you know the expectations of the rotation?
Very Unconfident, Somewhat Unconfident, Somewhat Confident, Very Confident
4. Prior to your new rotation, did you have any contact with the previous resident about the rotation schedule and expectations?
Yes, No
5. Prior to your new rotation, how much time did you spend with the previous resident discussing your rotation?
No Time, Very Little Time, Adequate Time, Extensive Time
6. In your opinion, would a transition guide including general overview of schedule, important numbers, and attending expectations be helpful in transitioning to a new rotation?
Yes, No
7. How much would a transition guide be helpful?
Very Helpful, Somewhat Helpful, Somewhat Unhelpful, Very Unhelpful
8. In your opinion, would a standardized face-to-face transition with the previous resident on service help better prepare you for your new rotation?
Yes, No
9. How much would a standardized face-to-face transition be helpful?
Very Helpful, Somewhat Helpful, Somewhat Unhelpful, Very Unhelpful

Figure 1. Resident questionnaire (condensed) administered before creating the handbook.

For each rotation, the handbook was organized into four major categories: (1) primary contact information, (2) general rotation schedule, (3) resident responsibilities and faculty expectations, and (4) useful resources and documents (Table 2). Primary contact information included names and telephone numbers for each staff member, such as attending surgeons, physician assistants, nurse practitioners, medical assistants, and secretaries. The handbook also included the preferred method of contact for these personnel. The general schedule outlined the clinic schedule (location and start time) and the operating room schedule (location and start time) for each day of the week. Information on parking, codes for restricted access doors, how to obtain scrubs, location of cafeteria/lounge also were included in this section. Faculty expectations and the responsibilities of resident rotators in both the clinic and operating room were specified in the third section of the handbook entry for each rotation. Lastly, valuable resources and documents, such as surgeon instrument preference lists, were included.

Table 2. Handbook organization.*

Contact Information
All faculty members, clinical assistants, and key staff members
Telephone numbers, pager numbers
Preferred method of contact for each
Rotation Schedule
Clinic assignments (days of the week, times)
Operating room venues (days of the week, times)
Where to park, where to enter various locations
Access to locker rooms, scrub attire
Responsibilities and Expectations
Interview and examine all new patients in clinic, formulate diagnosis
Assist with preoperative positioning of patients
Dictation of clinic notes, operative reports, discharge summaries
Special communication requirements, sign-out of on-call patients
Resident clinical competency expectations at completion of rotation
Resources and Documents
Protocols for administering in-office injections
Preferences for preoperative imaging
Surgical instrument preferences for specific cases

*By resident year level, clinical rotation, and faculty member.

As part of this QI initiative, time in the academic schedule was designated to facilitate resident transition to a new rotation. During the week before the start of a new rotation, 15- to 30-minute periods were dedicated for incoming residents to discuss rotation expectations with outgoing residents. This formal transition period allocated time for residents to review the handbook, to familiarize themselves with the requirements of the new rotation, and to ask questions of outgoing residents.

After the electronic resident handbook was completed, the document was uploaded to a secure, cloud-based, data storage platform (Google Drive). On June 30, 2021, one day before the start of the new academic year and new rotations, all residents were given access to the handbook, which was available on computer platforms or mobile devices. At the end of each rotation, the handbook was updated by the resident completing the rotation to assure the most current information was documented and available for resident consumption.

Evaluating the Intervention. In January 2022, six months after implementing the resident handbook, a new survey was administered by email to assess the efficacy of the QI initiative. The inquiry consisted of seven multiple choice items requiring a Likert scale response, one yes/no item, and one simple multiple-choice item (Figure 2). Importantly, the questionnaire evaluated resident perception of stress/anxiety, preparedness, and confidence prior to starting a new rotation after using the handbook. These follow-up responses permitted comparison to the resident responses obtained during the initial survey administered one year earlier.

Data Analysis and Reporting. Standard statistics were used to describe the data collected in this study. Changes in the three key parameters of perceived resident stress, preparedness, and confidence were analyzed using the sign test for nonparametric data. The level of statistical significance was set at $p < 0.05$ for a two-tailed test. This manuscript was prepared in accordance with the Standards for Quality Improvement Reporting Excellence (SQUIRE) guidelines for quality improvement reporting.⁴

1. Did you have access to the handbook prior to the start of the rotation? Yes, No
2. After reading and having access to the handbook, how stressed did you feel during your first two weeks of your new rotation? Very Stressed, Somewhat Stressed, Almost No Stress, No Stress At All
3. After reading and having access to the handbook, how prepared did you feel to fully meet the expectations of the rotation? Very Unprepared, Somewhat Unprepared, Somewhat Prepared, Very Prepared
4. After reading and having access to the handbook, how confident did you know the expectations of the rotation? Very Unconfident, Somewhat Unconfident, Somewhat Confident, Very Confident
5. In your honest opinion, how helpful was the rotation handbook in helping you prepare for your new rotation? Very Helpful, Somewhat Helpful, Somewhat Unhelpful, Very Unhelpful
6. In your honest opinion, how helpful was the rotation handbook in helping alleviate any stress at the beginning of the rotation? Very Helpful, Somewhat Helpful, Somewhat Unhelpful, Very Unhelpful
7. In your honest opinion, how helpful was having dedicated face-to-face transition in preparing you for your new rotation? Very Helpful, Somewhat Helpful, Somewhat Unhelpful, Very Unhelpful
8. How helpful would it be to update the rotation handbook after each quarter with new pertinent information for the incoming resident? Very Helpful, Somewhat Helpful, Somewhat Unhelpful, Very Unhelpful
9. How often did you use the guidebook during the first month? 1 to 2, 3 to 4, 5 to 6, > 6

Figure 2. Resident questionnaire (condensed) administered 6 months after using the handbook.

RESULTS

Pre-Handbook Survey. Seventeen of 20 residents had contact with the outgoing resident to discuss specifics of the rotation, but only four believed that sufficient time was devoted to that discussion. Nineteen of 20 residents experienced stress or anxiety during the first two weeks of a new rotation, while 12 believed they were somewhat unprepared and 14 expressed limited confidence regarding expectations. All 20 residents responded that a rotation-specific handbook would be helpful, with 14 stating that such a resource would be very helpful. Fourteen of 20 residents favored a standard face-to-face debriefing by the outgoing resident on service.

Post-Handbook Survey. For the 2021-22 academic year, all 20 residents had access to the handbook. Nineteen residents stated this source of information was either very helpful (n = 13) or somewhat

helpful (n = 6) in preparing them for the new rotation. One resident opined that the handbook was very unhelpful. As a resource to help alleviate stress, 18 responded that the handbook was very helpful (n = 12) or somewhat helpful (n = 6), whereas two responded that it was very unhelpful. Nineteen residents stated the face-to-face session with the outgoing resident was very helpful (n = 17) or somewhat helpful (n = 2). Only one resident stated the face-to-face debriefing was very unhelpful. Ten residents used the handbook one to two times, eight used it three to four times, one used it five to six times, and one used it more than six times during the first month of a new rotation.

Change in Wellness Perception. Matched pair responses of 16 residents who had completed both pre- and post-handbook questionnaires were available for review and analysis (Table 3). Most residents perceived improvements in stress, preparedness, and confidence understanding expectations after the handbook was implemented compared to before this resource was available. Using the sign test with $p < 0.05$, the changes in all three outcome parameters were statistically significant.

Table 3. Change in resident perception of wellness after handbook implementation.

Resident Perception	Better	Worse	Unchanged	p Value*
Stress during first two weeks of rotation	12	1	3	0.002
Preparedness to meet expectations	13	1	2	0.001
Confidence knowing expectations	12	0	4	< 0.001

*Sign test used to determine p value with statistical significance at $p < 0.05$ for two-tailed test. Matched paired responses before and after handbook use were available for 16 residents.

DISCUSSION

This QI project demonstrated that the intervention of a rotation-specific handbook combined with a designated sign-out period was well received by the residents in our orthopaedic program, facilitating resident transition to a new rotation. By comparing pre- and post-handbook questionnaire responses, statistically significant improvements were found in resident stress/anxiety, preparedness, and confidence understanding their responsibilities and mentor expectations prior to the start of a new rotation. Insofar as the measured parameters served as surrogates for overall well-being, this intervention promoted resident wellness.

The findings were consistent with similar resident handbook QI projects published in the literature. At the Aintree University Hospital in Liverpool, UK, Davies et al.⁵ found that 70% of junior doctors endorsed using the trainee-created handbook to ease their transition from one rotation to the next. After implementing a junior doctors' handbook at the National Health Service in Tayside, Scotland, Ross et al.⁶ reported that 22 of 23 survey respondents believed the resource was beneficial to have starting their new jobs and 16 of 23 (70%) stated it improved their efficiency. However, neither report indicated the specialties of these doctors in training.

Over a decade ago, a comprehensive analysis of stress among orthopaedic residents, faculty, and spouses in the United States was conducted using data from a nationwide survey of 64 ACGME-

accredited residency training programs. This study found high levels of burnout in 56% of the 384 orthopaedic residents surveyed.⁷ Burnout risk was greatest among PGY-2 level residents, female residents, and those in larger training programs with six or more residents per year level. The recent pandemic has imposed additional stress on trainees, falling disproportionately on the shoulders of junior orthopaedic residents, some of whom were temporarily reassigned to provide direct care of patients with COVID-19.⁸ In this high-stress environment, program directors and faculty members, who themselves were subject to the negative effects of chronic stress,^{3,7,9} must be cognizant of their obligation to train residents not only to be competent clinicians and surgeons, but also to maintain a healthy work-life balance.

Recent interventions to enhance well-being have focused on empowering residents with control over certain aspects of their work environment,¹⁰ such as establishing call schedules and delineating duties and responsibilities according to their level of experience. Consistent with this concept, the present QI initiative permitted trainees to create, edit, and maintain their own resident handbook specifying daily schedules and clinical duties. In so doing, the project improved resident sense of control over their workplace, thereby enhancing wellness. The pre-handbook survey indicated that most residents were stressed somewhat about their upcoming rotation, whereas a small minority reported being stressed post-handbook. Similarly, most residents perceived that they were prepared better for their new assignments and more confident understanding rotation expectations after the handbook was made available. Consequently, trainees transitioning to a new service immediately were able to focus more on patient care and adapting to their new clinical environment, rather than on learning routine details about the rotation now specified in the resident handbook.

The biggest challenge encountered during this initiative was having residents update handbook entries at the end of each rotation. This problem was addressed by designating specific sign-out periods during our academic calendar for residents to update the handbook. This time also was used to answer questions of incoming residents prior to starting their new rotation. Overall, residents were very satisfied with these changes to our program, but about half accessed the handbook only once or twice during the first month of their new rotation. To improve handbook utility throughout the rotation, some suggested inclusion of additional information about surgeon preferences such as treatment methods for specific diagnoses, surgical approaches or techniques, and key literature citations.

This study had several limitations. First, the questionnaire used to assess wellness parameters has not been validated. Second, internal validity of the study may have been influenced adversely by resident confirmation bias in responding to the survey. Third, since the study evaluated only orthopaedic surgery residents, the results may not be generalized to other specialties, thereby negatively impacting the study's external validity. Fourth, because the resident handbook and mandatory sign-out session were implemented simultaneously, it

cannot be determined which intervention was more beneficial to residents.

This QI intervention was a low-cost endeavor requiring the initial investment of resident time and effort and the nominal expense of having web-based access to the electronic data. The handbook should be updated continually and ideally should be modified as described above to assure its ongoing utility as a resident resource. Maintaining the documented wellness gains may be difficult without residents continuing to champion this QI initiative in the future.

CONCLUSIONS

The rotation transition QI initiative consisting of resident-authored, rotation-specific handbook and dedicated verbal sign-out session was well received and well supported in our orthopaedic surgery training program. Overall, well-being was enhanced as evidenced by decreased stress/anxiety, increased preparedness, and improved confidence among residents during the first month of a new rotation. Trainees are now more familiar with their clinical duties and expectations, allowing them to focus on patient care rather than routine details regarding the new rotation. Similar online resources may be useful for residents in other surgical or medical specialties depending on the number of subspecialties, clinical rotations, and faculty mentors associated with the specific training program.

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