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Bridging the Gap: A Mixed-Methods Study of a Structured Near-Peer Transition Program for Otolaryngology Emergencies

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Abstract

Background

Otolaryngology (ENT) emergencies, such as epistaxis, airway obstruction, and deep neck infections, are high-stakes scenarios requiring rapid assessment and procedural competence. For junior residents, transitioning to independent on-call duty is a critical but anxiety-provoking milestone. Near-peer teaching (NPT) has demonstrated benefits in medical education, yet its application in real-world acute clinical settings remains underexplored. This study aimed to evaluate the feasibility and educational impact of a structured Near-Peer Transition Program (NPTP) designed to bridge this gap.

Methods

We conducted a single-center, mixed-methods pilot study at Peking Union Medical College Hospital (PUMCH). A structured NPTP was implemented, consisting of pre-duty workshops followed by a one-month supervised transition period where junior residents (JRs) were paired with senior residents (SRs) during emergency shifts. Evaluation included pre- and post-transition surveys for JRs, surveys for SRs and faculty (FAC), retrospective faculty global ratings of readiness (F-GAJR), and semi-structured interviews.

Results

Twenty participants completed the study (10 JRs, 5 SRs, 5 FACs). JR survey scores improved significantly from 36.8 ± 10.1pre-transition surveys (T0) to 50.5 ± 7.1 post-transition surveys(T1). Significant gains were noted in independent assessment, prioritization, anterior nasal packing, abscess drainage, airway crisis recognition, and handover (all $p < 0.05$). Senior residents reported clear improvements in junior performance, enhanced teaching and leadership skills, and minimal additional workload. FAC surveys confirmed safety (4.8 ± 0.4), feasibility (4.6 ± 0.5), with 80% of juniors rated as "ready" for independent duty (≥ 4/5). Qualitative analysis identified three themes: Self reported confidence building, improvement of safety net and reciprocal learning.

Conclusion

The structured NPTP proved to be a feasible and effective model for ENT emergency training. It enhanced junior resident preparedness and confidence while maintaining patient safety through a graded responsibility framework and supervision. By bridging the gap between simulation-based preparation and independent clinical practice, this model provides a practical, theory-informed strategy that may be transferable to other high-stakes medical specialties.

Introduction

Otolaryngology (ENT) emergencies, such as airway obstruction, severe epistaxis, are high-stakes clinical situations requiring rapid assessment, procedural competence, and timely decision-making(1, 2). For junior residents, the transition to independent on-call duty represents a critical milestone in professional development. However, this transition is frequently associated with heightened anxiety and variable preparedness(3, 4). Ensuring patient safety while granting residents the autonomy necessary for skill consolidation remains a fundamental tension in residency education(5).

Traditional training models typically rely on faculty-led lectures, simulation workshops, or observation-based learning. While these methods provides a safe environment for skill acquisition, it lacks the unpredictability, emotional pressure, and sense of sole responsibility inherent in real-world emergency encounters(6). Consequently, a "preparedness gap" often persists between theoretical competence in the classroom and actual performance in the clinical environment. There is a pressing need for educational scaffolds that bridge this gap before residents assume full on-call responsibility(7).

Near-peer teaching (NPT) has emerged as an effective educational strategy in medical education, defined as instruction delivered by trainees who are only slightly more advanced than their learners(8). Its effectiveness is underpinned by theories of cognitive congruence (shared knowledge frameworks) and social congruence (reduced hierarchy)(9). In high-stress emergency settings, these attributes foster a psychologically safe environment where juniors feel comfortable asking questions and receiving immediate, relatable feedback—a dynamic that may be less achievable with attending faculty(10).

To address this gap, we developed and implemented a structured Near-Peer Transition Program (NPTP) in the Department of Otolaryngology at Peking Union Medical College Hospital (PUMCH). The program was designed to support junior residents during the transition to independent emergency duty through a supervised near-peer model embedded in routine clinical practice. This study evaluates the feasibility, educational impact, and safety of this model using a mixed-methods design, aiming to provide a reproducible framework for bridging the gap between simulation and independent practice.

Methods

Study design and setting

We conducted a single-centre, retrospective mixed-methods study to evaluate a structured Near-Peer Transition Program (NPTP) in otolaryngology emergency training at Peking Union Medical College Hospital (PUMCH), a tertiary academic teaching hospital in Beijing, China.

Participants

Participants included three groups:

Junior residents (JR, n=10): PGY-1/2 residents who had not yet begun independent on-call duty at the time of data collection.

Senior residents (SR, n=5): PGY-3/4 residents with ≥3 years of independent ENT emergency experience and documented teaching roles.

Faculty (FAC, n=5): Attending physicians responsible for second-line supervising emergency care and resident training.

All participants had completed the department's standard emergency training curriculum and participated in the NPTP as part of routine educational practice.

Program description

The Near-Peer Transition Program (NPTP) was integrated into the existing residency training structure without modification to routine clinical workflows. Its primary aim was to support junior residents' transition from supervised learning to independent emergency duty while maintaining patient safety**.**

The program consisted of three sequential phases:

1. Pre-duty training: lectures, simulation workshops (epistaxis packing, airway emergencies, abscess drainage), and case-based discussions familiarized residents with protocols and escalation pathways.

2. Near-peer transition (1 month): juniors residents shadowed seniors during emergency on-call shifts for a one-month transition period, progressing from observing → assisting → performing under supervision.

3.Independent duty: After completing the transition period, juniors undertook independent calls with faculty backup available for escalation.

The NPTP was implemented uniformly for all residents scheduled for emergency rotations during the study period.

Survey instruments and validity

Survey instruments were developed following established frameworks in near-peer teaching and residency transition. Item generation was informed by literature review and the departmental emergency training curriculum, covering four domains: self-efficacy, procedural readiness, communication and teamwork, and overall satisfaction.

Content validity was ensured through a multi-step process. Draft items were reviewed by three otolaryngology faculty members with medical education expertise, who rated relevance and clarity using a four-point scale. Items with a content validity index (I-CVI) below 0.80 were revised or removed. Two

residents not involved in the study participated in pilot testing to confirm clarity and response process validity. Minor adjustments were made to phrasing to enhance interpretability.

The final instruments comprised:

JR scale (12 items):administered before (T0) and after (T1) the transition phase.

SR scale (9 items): assessing perceptions of junior progress, tutor development, workload, and satisfaction.

FAC scale (11 items): evaluating patient safety, feasibility, and overall program appropriateness.

Each questionnaire consisted primarily of closed-ended items rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), supplemented by open-ended questions designed to elicit qualitative feedback on learning experiences, perceived benefits, and areas for improvement.

The Faculty Global Assessment of Junior Readiness (F-GAJR) was used for retrospective rating of each junior's readiness (1 = not ready, 5 = fully independent), reflecting faculty recall of performance at the start of independent duty.

All questionnaires used in this study were self-developed based on the competencies required for independent otolaryngology emergency duty. The full English versions of the questionnaires are provided in Supplementary File 1 (Appendix A–C).

Qualitative data collection

Qualitative data were collected through open-ended survey responses and semi-structured interviews with junior residents, senior residents, and faculty members. Interview prompts explored experiences of supervision, perceived learning gains, confidence development, and safety during the transition phase. Interviews were audio-recorded, transcribed verbatim, and anonymized prior to analysis.

Data analysis

Quantitative data were analyzed using SPSS (version 26.0). Pre–post junior resident survey scores were compared using paired t tests or Wilcoxon signed-rank tests, as appropriate. Senior resident and faculty survey results were summarized using descriptive statistics (mean ± standard deviation). Internal consistency reliability of the survey instruments was assessed using Cronbach's α. Faculty global readiness ratings were summarized as mean ± standard deviation, with the proportion of junior residents rated ≥4 considered indicative of readiness.

Qualitative data were analyzed using thematic analysis. Two investigators independently coded transcripts, followed by iterative discussion to resolve discrepancies and refine themes. Data triangulation across participant groups was used to enhance credibility.

Results

Participants:

Twenty residents and faculty completed the evaluation: 10 JRs, 5 SRs, and 5 FACs.

Psychometric properties of the survey instruments

Internal consistency reliability was assessed using Cronbach's α. All scales demonstrated high reliability (JR α = 0.88 at T0, 0.92 at T1; SR α = 0.85; FAC α = 0.96), indicating strong internal consistency across domains. Construct validity was supported by moderate correlations between JR post-transition scores and faculty global assessments of readiness (ρ = 0.48, p = 0.04), consistent with theoretical e xpectations of progressive readiness.

Junior residents' outcomes (JR-S)

Junior residents' total self-reported readiness scores increased significantly following participation in the Near-Peer Transition Program, rising from 36.8 ± 10.1 at baseline (T0) to 50.5 ± 7.1 after the one-month transition phase (T1) ($p < 0.01$).

Significant improvements ($p < 0.05$) were observed across multiple domains, including independent emergency assessment, prioritization of life-threatening conditions, anterior nasal packing, peritonsillar abscess drainage, airway crisis recognition, and completion of handover. Effect size analysis demonstrated moderate to large responsiveness across these items (Cohen's d_z = 0.60–1.00), indicating meaningful educational change beyond statistical significance. Detailed item-level results are presented in Table 1.

Qualitative comments from junior residents supported these quantitative findings, highlighting increased confidence, reduced anxiety, and improved perceived readiness for independent emergency duty.

Representative JR quote:
"At first, I felt unprepared and anxious about airway emergencies. After shadowing seniors, I became more confident and less fearful of handling real cases."

Senior residents' feedback (SR-S)

Senior residents reported clear improvements in junior residents' clinical performance, decision-making, and procedural competence during the transition period. In addition to perceived junior progress, senior residents noted gains in their own teaching effectiveness and leadership confidence. The additional workload associated with near-peer supervision was rated as minimal (mean workload score 1.8 ± 0.7). Summary results of the senior resident survey are shown in Table 2.

Representative SR quote:
"Tutoring juniors reminded me of my own early challenges, and it improved my ability to give structured

feedback.”

Faculty evaluation (FAC-S and F-GAJR)

Faculty evaluations indicated high levels of perceived patient safety (mean 4.8 ± 0.4), feasibility and sustainability (4.6 ± 0.5), and overall satisfaction with the program (4.4 ± 0.5). On the Faculty Global Assessment of Junior Readiness (F-GAJR), 80% of junior residents were retrospectively rated as ready (score ≥ 4) for independent emergency duty at the start of their on-call responsibilities. Faculty survey results and global readiness ratings are summarized in Table 3.

Representative FAC quote:
“The transition period provides a safety net—patients are protected while juniors gain the confidence to manage emergencies.”

Qualitative findings

Three overarching themes emerged:

Progressive confidence building: Juniors described a gradual reduction in anxiety and increased autonomy.

Enhancement of the safety net: Both SRs and FACs highlighted that the near-peer structure maintained patient safety while providing immediate support and feedback for juniors.

Reciprocal learning: SRs and JRs reported bidirectional benefits—senior residents refined teaching and leadership skills, while juniors modeled communication and teamwork from their near peers.

Summary of findings

Across quantitative and qualitative analyses, the NPTP demonstrated multidimensional educational benefits. Junior residents showed significant gains in preparedness and confidence, senior residents experienced professional development with minimal added workload, and faculty confirmed the safety and feasibility of the program during the transition to independent emergency practice.

Discussion

This study demonstrates that a structured near-peer transition program embedded in routine otolaryngology emergency training is feasible, educationally valuable, and perceived as safe. Junior residents demonstrated significant pre–post gains in self-reported readiness for independent emergency assessment, prioritisation, and core procedures. Senior residents described reciprocal benefits in teaching and leadership development with minimal additional workload, and faculty respondents rated the model highly for safety and feasibility. Collectively, these findings support near-peer supervision as a pragmatic educational scaffold for the first period of graded autonomy in high-acuity clinical work.

Our principal contribution is the focus on the emergency transition phase within authentic clinical practice. Previous near-peer teaching (NPT) initiatives in otolaryngology have primarily been conducted in classroom or simulation-based settings, often focusing on undergraduate learners rather than residents preparing for independent on-call duty. For instance, Schuster-Bruce et al. reported improved engagement and perceived learning through a near-peer ENT teaching module for medical students(11). Liu et al.described a junior doctor–led acute ENT and head and neck surgery workshop that enhanced short-term confidence using simulation-based instruction(12). Similarly, otolaryngology boot camp programs have demonstrated benefits in procedural familiarity and preparedness but remain largely confined to controlled, non-clinical settings(13). While these approaches are valuable, they provide limited insight into how trainees function when confronted with real-time uncertainty, time pressure, and patient risk. In contrast, the present study extends existing NPT literature by embedding structured near-peer supervision within authentic emergency workflows, allowing junior residents to assume graded responsibility under real clinical conditions. Rather than replacing simulation-based preparation, this near-peer transition model functions as an intermediate educational scaffold between simulation and independent practice, addressing a key gap in residency education for high-acuity specialties such as otolaryngology(14).

The educational effectiveness of this NPTP model extends beyond simple peer instruction and can be explained by the interplay of specific theoretical mechanisms. The significant reduction in junior residents' anxiety and the qualitative theme of a "safety net" are best illuminated by social congruence, whereby reduced hierarchical distance fosters psychological safety in high-stakes emergency settings(10, 15). In this environment, juniors felt empowered to voice uncertainties and seek timely support without fear of negative judgment. Concurrently, the marked improvement in procedural skills, such as nasal packing and abscess drainage, reflects the power of cognitive congruence. Senior residents, having recently mastered these skills themselves, could deconstruct complex tasks into accessible and contextually relevant steps, whereas faculty experts may overlook intermediate components due to unconscious competence and the tacit nature of expert knowledge(14, 16). Furthermore, the structure of the program—progressing from shadowing to supervised performance — operationalizes Situated Learning Theory(17). The NPTP allowed juniors to engage in "legitimate peripheral participation," gradually moving from the periphery to the center of clinical responsibility as their competence matured(18).

The educational value of the near-peer transition model can also be understood within the framework of competency-based medical education (CBME) and entrustable professional activities (EPAs)(19, 20). Within CBME, progression toward independent practice is grounded in explicit entrustment decisions linked to real clinical work, rather than time-based advancement(7). EPAs operationalize this process by translating abstract competencies into observable professional activities that can be entrusted once sufficient capability is demonstrated(21). Our findings suggest that structured near-peer supervision provides the necessary longitudinal observation data to support these high-stakes decisions. Specifically, the Faculty Global Assessment of Junior Readiness (F-GAJR) served as a proxy entrustment decision, with 80% of juniors deemed "ready" for unsupervised practice. By embedding this assessment

at the end of a graduated responsibility phase, the NPTP supports evidence-based and safety-verified decisions regarding independent on-call duty, rather than automatic progression based solely on rotation schedules, consistent with contemporary CBME approaches to entrustment and programmatic assessment(22).

Several limitations of this study should be acknowledged. First, this was a single-centre study with a relatively small sample size, which may limit the generalizability of the findings. Second, outcomes relied primarily on self-reported measures and retrospective faculty global readiness ratings, which are inherently subjective and may be influenced by recall or social desirability bias. In addition, objective workplace-based assessments and patient-level outcomes were not consistently available for systematic analysis. The one-month transition period may also not be optimal for all learners, and individualized pacing based on demonstrated competence may further enhance the model's effectiveness.

Future research should focus on multi-centre studies with larger cohorts to improve generalizability and incorporate objective workplace-based assessments aligned with EPA frameworks. Longitudinal investigations examining downstream outcomes—such as escalation patterns, on-call error rates, or patient safety indicators—would further clarify the impact of near-peer transition models on clinical practice. Integrating simulation-based preparation with structured near-peer transitions may represent a promising blended approach to supporting safe and effective progression to independent practice in high-acuity specialties.

Conclusion

This study provides real-world evidence that a structured near-peer transition program can be safely and effectively implemented in otolaryngology emergency training. By embedding graded near-peer supervision within routine emergency practice, the program enhanced junior residents' preparedness, confidence, and clinical decision-making during the transition to independent on-call duty, while maintaining patient safety. Senior residents also benefited through the development of teaching and leadership skills with minimal additional workload.

Beyond its immediate educational outcomes, this near-peer transition model addresses a critical and underexplored phase of residency training by bridging the gap between simulation-based preparation and fully independent clinical practice. Aligned with principles of competency-based medical education and entrustment, the model offers a practical, theory-informed approach to supporting graded autonomy in high-acuity clinical settings. As such, it may be transferable to other specialties in which safe progression to independent practice is essential.

Declarations

Ethics approval and consent to participate:

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval for this study was granted by the Institutional Review Board of Peking Union Medical College Hospital, which waived the requirement for informed consent. Participation was voluntary, and all data were collected and analyzed in a de-identified manner.

Consent for publication:

Not applicable.

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Author Contribution

SA and TK contributed equally to this work and share first authorship. SA, TK, and YZ contributed to the study conception and design. SA and TK were responsible for data collection and quantitative analysis. SA and TK conducted the qualitative interviews and thematic analysis. WL and YW provided supervision, contributed to the interpretation of data, and critically revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

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Data Availability

The datasets used and/or analysed during the current study are available from the corresponding authors on reasonable request.

References

1. Yiannakis CP, Hilmi OJ. Evaluation and management of acute upper airway obstruction. Surg Oxf 2024 Sept 1;42(9):675–83.

2. Tunkel DE, Anne S, Payne SC, Ishman SL, Rosenfeld RM, Abramson PJ, et al. Clinical practice guideline: nosebleed (epistaxis). Otolaryngol–Head Neck Surg Off J Am Acad Otolaryngol-Head Neck Surg. 2020;162(1suppl):S1–38.
3. Janicki AJ, Frisch SO, Patterson PD, Brown A, Frisch A. Emergency medicine residents experience acute stress while working in the emergency department. West J Emerg Med. 2020;22(1):94–100.
4. Bérubé S, Ayad T, Lavigne F, Lavigne P. Resident's preparedness for independent practice following otorhinolaryngology-head and neck surgery residency program: a cross-sectional survey. Eur Arch Oto-Rhino-Laryngol Off J Eur Fed Oto-Rhino-Laryngol Soc EUFOS Affil Ger Soc Oto-Rhino-Laryngol -. Head Neck Surg. 2021;278(11):4551–6.
5. Oliver JB, Kunac A, McFarlane JL, Anjaria DJ. Association between operative autonomy of surgical residents and patient outcomes. JAMA Surg. 2022;157(3):211–9.
6. Elendu C, Amaechi DC, Okatta AU, Amaechi EC, Elendu TC, Ezeh CP et al. The impact of simulation-based training in medical education: a review. Medicine (Baltimore). 2024 July 5;103(27):e38813.
7. ten Cate O, Scheele F. Competency-based postgraduate training: Can we bridge the gap between theory and clinical practice? Acad Med J Assoc Am Med Coll. 2007 June;82(6):542–7.
8. Bulte C, Betts A, Garner K, Durning S. Student teaching: Views of student near-peer teachers and learners. Med Teach. 2007 Sept;29(6):583–90.
9. Lockspeiser TM, O'Sullivan P, Teherani A, Muller J. Understanding the experience of being taught by peers: the value of social and cognitive congruence. Adv Health Sci Educ Theory Pract. 2008;13(3):361–72.
10. Edmondson A. Psychological safety and learning behavior in work teams. Adm Sci Q. 1999 June;1(2):350–83.
11. Schuster-Bruce J, Davies A, Conchie H, Penfold O, Wilson E, Waddell A. A near-peer teaching module to supplement current undergraduate teaching in ENT surgery. Med Sci Educ. 2020 June;30(2):689–93.
12. Liu W, Preda T, Hargreaves W, Lord RV. A junior doctor led near-peer acute ENT/head and neck surgery workshop for medical students. Surg Open Sci. 2024;20:7–13.
13. Bondzi-Simpson A, Lindo CJ, Hoy M, Lui JT. The otolaryngology boot camp: a scoping review evaluating commonalities and appraisal for curriculum design and delivery. J Otolaryngol - Head Neck Surg J Oto-Rhino-Laryngol Chir Cervico-Faciale. 2022 June 4;51(1):23.
14. Eraut M. Non-formal learning and tacit knowledge in professional work. Br J Educ Psychol. 2000;70(Pt 1):113–36.
15. Lockspeiser TM, O'Sullivan P, Teherani A, Muller J. Understanding the experience of being taught by peers: the value of social and cognitive congruence. Adv Health Sci Educ Theory Pract. 2008;13(3):361–72.
16. Higgs J, Jones MA, Loftus S, Christensen N. Clinical reasoning in the health professions E-book: clinical reasoning in the health professions E-book. Elsevier Health Sciences; 2008. p. 519.

17. Lave J, Wenger E. Situated learning: legitimate peripheral participation. Cambridge University Press; 1991. p. 144.
18. O'Brien BC, Battista A. Situated learning theory in health professions education research: a scoping review. Adv Health Sci Educ Theory Pract. 2020;25(2):483–509.
19. Frank JR, Snell LS, Cate OT, Holmboe ES, Carraccio C, Swing SR, et al. Competency-based medical education: Theory to practice. Med Teach. 2010;32(8):638–45.
20. ten Cate O. Entrustability of professional activities and competency-based training. Med Educ. 2005;39(12):1176–7.
21. Nuts. bolts: entrustable professional activities. Acad Pediatr. 2023;23(7):1307–8.
22. Ten Cate O, Chen HC, Hoff RG, Peters H, Bok H, van der Schaaf M. Curriculum development for the workplace using entrustable professional activities (EPAs): AMEE guide 99. Med Teach. 2015;37(11):983–1002.

Tables

Table 1 to 3 are available in the Supplementary Files section.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryFile1AppendixAC..docx
- Tables.docx