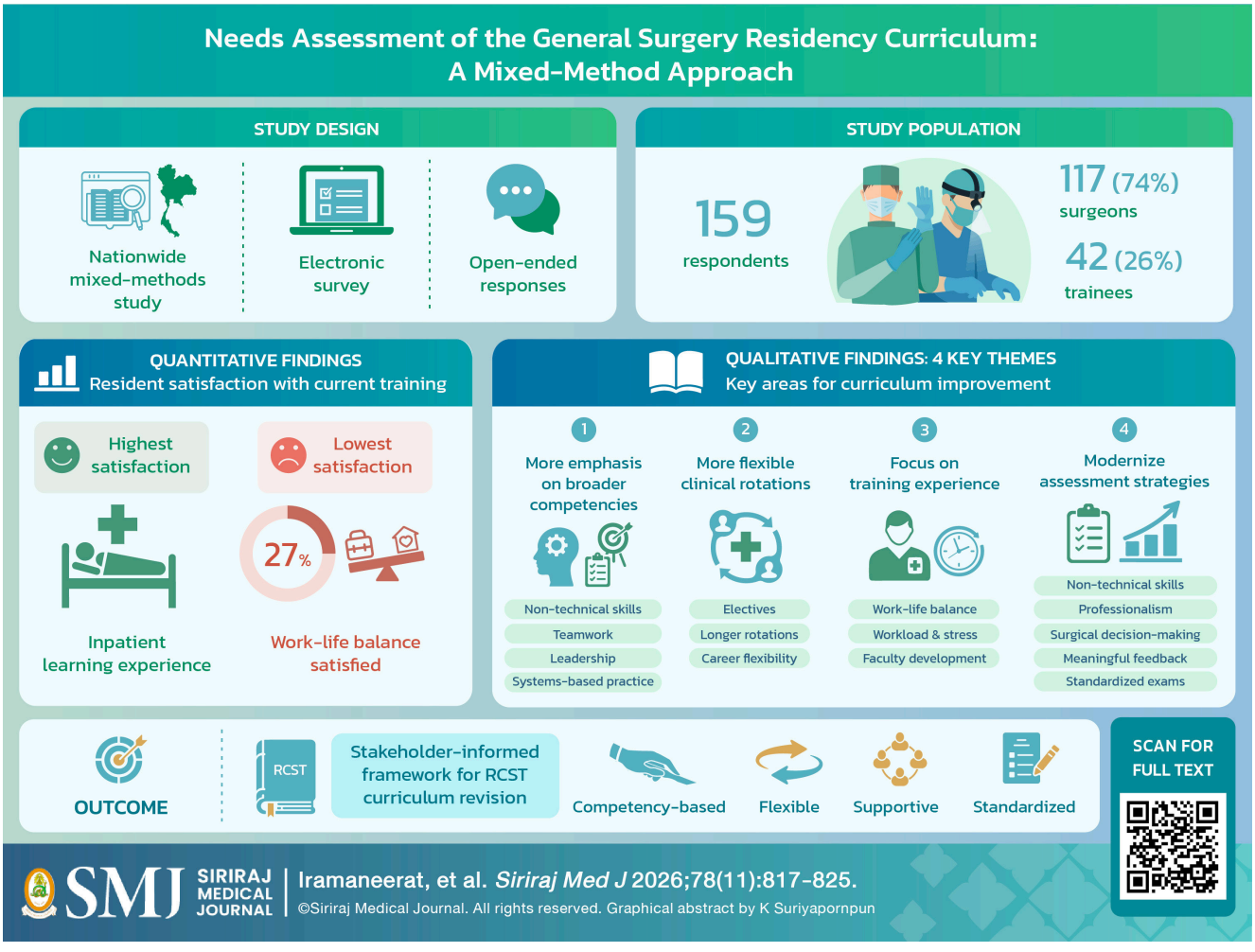
Needs Assessment of the General Surgery Residency Curriculum: A Mixed-Methods Approach

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ABSTRACT

Objectives: To explore stakeholders' perspectives on general surgery residency training in Thailand, and to provide a framework to inform our future curriculum revision by the Royal College of Surgeons of Thailand (RCST).

Materials and Methods: A nationwide mixed-methods study was conducted in 2023. An electronic survey was distributed to 1,916 potential respondents, encompassing general surgeons across all health sectors and surgical trainees enrolled in recognized programs throughout Thailand. Quantitative items focused on satisfaction with learning experiences, assessment practices, and achievement of training outcomes, while open-ended qualitative prompts elicited suggestions for curriculum improvement. Qualitative responses were analyzed using an inductive coding process to isolate core conceptual targets.

Results: A total of 159 completed questionnaires were collected (8.3% response rate), representing 117 (73.6%) practicing surgeons and 42 (26.4%) surgical trainees (mean age 42.4 ± 12.9 years; 73% male). Inpatient clinical service received the highest satisfaction rating. Only 27% of respondents expressed satisfaction with work-life balance. Qualitative thematic analysis revealed four major themes: (1) evolution of learning outcomes; (2) restructuring of clinical rotations; (3) improvement of the surgical training experience; and (4) modernization of assessment strategies.

Conclusion: This survey research addressed educational gaps in general surgery training in Thailand. Quantitative and qualitative data revealed several shortcomings in current programs. We proposed a few changes to the RCST general surgery resident curriculum to ensure adequate learning experience that can lead to the production of graduates who are equipped with all core competencies.

Keywords: Surgical education; curriculum revision; mixed-methods research; work-life balance; survey (Siriraj Med J 2026;78(11):817-825)

INTRODUCTION

Surgical education worldwide is undergoing a profound paradigm shift driven by evolving workforce expectations and the increasing complexity of surgical practice. For generations, postgraduate surgical training relied heavily on the time-honored Halstedian model of "see one, do one, teach one" — an apprentice-based approach in which competence was implicitly assumed upon completion of a predetermined period of training. However, contemporary patient safety standards, financial constraints within the operating room, and the emergence of Competency-Based Medical Education (CBME) have rendered time-based models increasingly obsolete.[1] Globally, leading organizations such as the American Board of Surgery (ABS) and the Royal College of Surgeons of England have adopted outcome-focused training frameworks to ensure that graduates demonstrate independent proficiency across essential clinical and operative domains prior to entering autonomous practice.[2-4]

In Thailand, general surgery residency training programs administered under the regulatory oversight of the Royal College of Surgeons of Thailand (RCST) face distinct localized challenges that reflect these global trends. Recruitment into general surgery has become increasingly difficult, with younger medical graduates expressing concerns regarding poor work-life balance, excessive workloads, and high rates of burnout. Furthermore, a stark educational dichotomy has emerged between different types of training institutions. University-based tertiary centers, while rich in academic resources and advanced technology, often struggle to provide trainees with sufficient exposure to core general surgical procedures because of competition from subspecialty fellowship programs. Conversely, non-university service centers, such as regional and provincial hospitals under the Ministry of Public Health, offer a high volume of surgical cases but often lack structured academic support, resulting in lower success rates on the high-stakes national written board examination.

To build a resilient curriculum that appeals to the incoming 'Generation Z' workforce while maintaining uncompromising clinical and operative standards, the RCST set up a taskforce in 2023 to review and revise the curriculum. Under the guidance of this taskforce, the investigators launched a comprehensive nationwide needs assessment. This study employed a mixed-methods approach to capture both quantitative measures of satisfaction and the qualitative 'voice' of the Thai surgical community. To ensure broad representation, the study included stakeholders across all levels of surgical training and practice, ranging from trainees to senior surgical staff from all regions of Thailand. Inclusion of a wide variety of personnel from the Thai surgical community was essential because previous studies have demonstrated

discordant perceptions of residency training experiences among individuals in different roles.[5] By contextualizing local stakeholder data within the current landscape of global literature, this paper outlines the current state of the training program in Thailand and provides empirical data to guide the direction of the RCST general surgery curriculum.

MATERIALS AND METHODS

Study design and population

A descriptive mixed-methods study was conducted between July and December 2023. A cross-sectional design was employed to integrate quantitative measures of stakeholder satisfaction with qualitative textual suggestions, thereby providing a comprehensive assessment of perceived strengths and deficiencies within the current curriculum. The target population comprised all registered members of the RCST, including board-certified general surgeons practicing in academic, public, and private healthcare settings, as well as all active general surgery residents and fellows across all training years in Thailand. The total eligible study population consisted of 1,916 individuals. The survey participation was voluntary with no incentives. Researchers sent out survey to eligible persons in paper form via mailing service and also in an electronic form via email. In the survey, participants were informed to send back the completed survey in only one method that was convenient for them.

Data collection instrument

A survey instrument was developed by surgical educators serving on the RCST Curriculum Task Force. The items on the instrument were developed based on the content on the RCST surgical curriculum. The survey consisted of three sections, all of which were presented in Thai language. The first section collected basic demographic information, including age, gender, current professional status (resident, fellow, or attending surgeon), geographic region of practice, and years of clinical experience. The second section assessed stakeholder satisfaction with the existing curriculum using 5-point Likert scales ranging from 1 for very dissatisfied, 2 for dissatisfied, 3 for neutral, 4 for satisfied, and 5 for very satisfied. Areas of evaluation included the extent to which graduates achieved core training outcomes and the curriculum's ability to support an acceptable work-life balance. The third section comprised open-ended, text-based qualitative prompts that invited respondents to provide detailed, unfiltered feedback and recommendations regarding training duration, rotation structures, assessment strategies, and professional development needs. There was no pilot testing of the instrument. The respondents had freedom to skip answering any items that they wanted.

Ethical considerations and data analysis

The study protocol was approved by the Institutional Review Board of the Faculty of Medicine, Siriraj Hospital, Mahidol University. Before doing the survey, participants reviewed the participant information sheet, which was provided as the front page of paper survey or the first webpage on an electronic survey. Participants did not need to sign an informed consent form. The survey did not ask for names or any information that could identify the identity of participants. Participation was entirely voluntary. The participants did not have to sign any written consent form. If they did not want to participate, they just did not return the questionnaire. The Quantitative data were analyzed as provided by respondents with no data imputation. Quantitative demographic and satisfaction data were analyzed using descriptive statistics, including computing frequencies, percentages, means, and standard deviations (SD). Qualitative responses were analyzed using an inductive thematic analysis approach. Two independent investigators meticulously reviewed all textual responses and performed line-by-line open coding. The unit of coding is a sentence. Conceptual codes were iteratively grouped into sub-themes and overarching themes. Any discrepancies in coding were resolved through collaborative consensus-building sessions with a third senior educational consultant. All the data obtained were kept confidential. All data were anonymous. The paper responses were transferred into digital form before destroying the paper. All electronic data were kept in a computer with password-protection. Only the investigators have access to the data.

RESULTS

Demographic characteristics

Of the 1,916 surveys distributed, 159 completed questionnaires were returned, representing a response rate of 8.3%. The respondents had a mean age of 42.4 ± 12.9 years and were predominantly male (n = 116, 73.0%). Female respondents accounted for 25.8% (n = 41), while 1.3% (n = 2) preferred not to disclose their gender. Attending general surgeons comprised 73.6% (n = 117) of the respondents, while active trainees constituted 26.4% (n = 42), broken down into junior residents (postgraduate years 1–2: 8.8%, n = 14), senior residents (postgraduate years 3–4: 8.2%, n = 13), and subspecialty fellows (9.4%, n = 15). Most respondents worked in tertiary hospitals (32%), followed by university hospitals (24%), provincial hospitals (22%), private hospitals (15%), and community

hospitals (7%), respectively. Responses were obtained from all regions of Thailand, including Bangkok (30%), the Northeastern region (27%), the Northern region (17%), the Central region (10%), the Eastern region (8%), the Southern region (7%), and the Western region (1%). The mean duration of surgical practice of respondents was 12.4 ± 12.1 years.

Quantitative data analysis

Most respondents considered a 4-year training duration to be the most appropriate length for general surgery residency (75%). In contrast, only 17% of respondents supported reducing the training duration to 3 years.

Respondents identified several clinical rotations as essential components of surgery training, including trauma, colorectal surgery, hepatobiliary surgery, head and neck surgery, breast surgery, vascular surgery, and intensive care medicine. Conversely, a substantial proportion of respondents perceived certain rotations as less relevant and did not support their inclusion in the core curriculum, including obstetrics and gynecology, orthopedic surgery, and pathology (Fig 1).

Table 1 summarizes respondents' satisfaction with their learning experiences during surgical training. Among the 11 domains evaluated, inpatient clinical service received the highest satisfaction rating (average 4.0), whereas work-life balance received the lowest rating (average 2.81). Notably, only27% of respondents reported being satisfied with their work-life balance during training.

Table 2 summarizes respondents' satisfaction with assessment methods used during surgical training. Among the eight assessment methods evaluated, clinical science

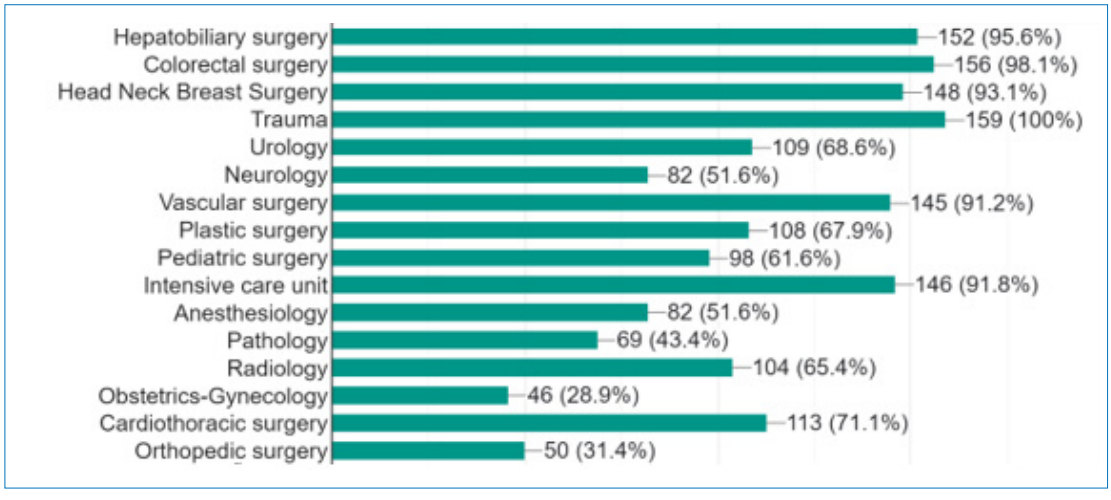


Fig 1. Clinical services suggested by respondents for inclusion in the general surgery training program.

TABLE 1. Satisfaction with the current learning experience in the general surgery residency program.

Learning experience	Average	SD
The number of rotations	3.50	0.75
Outpatient services	3.76	0.74
Inpatient services	4.00	0.67
Bedside academic activities	3.79	0.79
Academic conferences	3.87	0.82
Interdepartmental conferences	3.49	0.89
Supervision by surgical staff	3.68	0.89
Hands-on experience with patients	3.82	0.92
Collaboration with hospital staff	3.77	0.76
Work-life balance	2.81	1.02
Appropriate duration of training	3.81	1.08

TABLE 2. Satisfaction with the current assessment methods in the general surgery residency program.

Assessment methods	Average	SD
Oral examination	3.81	0.74
Basic science examination	3.78	0.73
Clinical science MCQ	3.91	0.65
MEQ	3.84	0.67
EPA	3.67	0.77
Surgical logbook	3.63	0.81
Research	3.55	0.79
In-training examination	3.73	0.74

TABLE 3. Perceived competency level of graduates from the current general surgery residency program.

Competency	Average	SD
Overall competency	4.00	0.64
Medical knowledge	3.98	0.67
Procedural skills	3.96	0.69
Interpersonal and communication skills	3.84	0.74
Practice-based learning and improvement	3.93	0.65
Systems-based practice	3.42	0.93
Professionalism	3.72	0.82

multiple-choice questions (MCQs) received the highest satisfaction rating (average 3.91), while research-related assessments received the lowest (average 3.55).

Regarding training outcomes, respondents expressed overall satisfaction with the competency of graduates. Among the six core competency domains, medical knowledge received the highest rating (average 3.98), whereas systems-based practice received the lowest score (average 3.42) (Table 3).

Qualitative thematic analysis

Analysis of the open-ended responses yielded rich qualitative data, illustrating a widespread desire to move past rigid academic paradigms toward a modern, context-sensitive training model. Four major themes emerged from the inductive coding workflow.

Theme 1: Evolution of learning outcomes

Some respondents emphasized that modern surgical competence must extend beyond pure technical skills. There was a strong call for the institutionalization of non-technical skills (NTS). Many respondents expressed concern that some newly trained surgeons lack necessary competency to manage patients in the current healthcare system. For instance, one survey stated:

Knowledge and technical skills do not appear to differ among graduates. However, non-technical skills are equally important, and many young surgeons struggle in this area, resulting in difficulties working with others.

Similarly, another survey stated:

Surgical service requires the ability to lead a team in taking care of emergency cases. Surgeons should have broad knowledge of healthcare systems, management

skills, and the ability to properly refer patients. Thus, the ability to collaborate with others is a critical competency that should be emphasized during training.

Another respondent emphasized the importance of systems-based practice:

Systems-based practice is one of the most important aspects of training. Unfortunately, many doctors do not understand it.

Theme 2: Restructuring of clinical rotations

A substantial number of respondents raised concerns regarding the current structure of clinical rotations, suggesting that it may not adequately support the development of surgical competence. Several respondents noted that training in university hospitals often limited hands-on surgical experience, whereas service-based hospitals have inadequate supervision and structured academic activities. Some advocated reducing the duration of certain subspecialty rotations and increasing time spent in service-based hospitals to maximize operative experience. Meanwhile, some surveys emphasized the importance of curricular flexibility to allow trainees to tailor their educational experiences according to their anticipated future practice settings.

For instance, one respondent stated:

Surgical rotations should be adjusted to provide flexible clinical experience that better prepares residents for their future practice environments. For example, residents planning to work in community hospitals should focus on mastering essential surgical procedures rather than learning about advanced laparoscopic procedures that may not be applicable in their workplace.

Another respondent emphasized the value of maintaining diversity among training programs:

We should preserve the difference among training centers, as these differences contribute to each institution's unique strengths. We should not force every training center to produce identical surgeons as if they were products from a factory, because training environments vary considerably.

A recurring recommendation was the expansion of elective rotations to accommodate the diverse career goals of trainees. Respondents also suggested extending the duration of individual rotations to allow residents sufficient time to gain hands-on surgical experience.

Theme 3: Improvement of surgical training experience

Concerns regarding poor work-life balance emerged as a dominant theme. Many respondents advocated reducing workload, increasing opportunities for personal time to explore other things, and alleviating work-related stress. Several respondents also highlighted inappropriate behaviors of staff that contributed to an unnecessarily stressful learning experience. Numerous comments underscored the imbalance between service-based hospitals and university hospitals. Service-based hospitals were perceived to provide rich surgical experience but limited supervision. In contrast, university hospitals were viewed as offering strong academic environments but lacking opportunities for first-hand surgical experience. Respondents consistently expressed a desire for a more balanced experience that would provide more hands-on surgical practice while maintaining academic activities.

Training programs should focus on providing more opportunities to practice surgical skills. Graduates from some institutions possess theoretical knowledge but lack operative competence, making the transition to independent practice difficult.

Faculty development was also identified as an important area for improvement. Several respondents suggested that all staff receive formal training in medical education to enhance the quality of resident supervision and teaching.

As one respondent stated:

Curriculum revision may not be as important as changing the attitudes of surgical faculty members. We need surgical faculty who possess a teacher's mindset for any new curriculum to work.

Theme 4: Modernization of assessment strategies

Respondents frequently criticized existing assessment methods as overly theoretical and disconnected from real-world, day-to-day operative care. Many advocated for a transition toward continuous workplace-based assessments that evaluate clinical decision-making and manual skills under direct supervision. Several respondents recommended reducing the emphasis on basic science examinations and increasing assessment of non-technical skills, professional behaviors, and surgical decision making. Others emphasized the importance of providing meaningful feedback to trainees. Concerns were also raised regarding the lack of standardization in in-training examinations. Respondents also noted that different training programs often employ different versions of in-training examinations and suggested the use of standardization across all training centers.

One respondent commented:

In-training examinations should be administered using the same examination and at the same time across all training centers. Allowing different training centers to conduct separate in-training examinations may compromise validity.

DISCUSSION

The results of this national survey provide important empirical evidence to inform revision of the RCST general surgery curriculum. The substantial gap identified between the high satisfaction with several training outcomes among graduates and low satisfaction with work-life balance highlights a potentially unsustainable training program. This finding is consistent with global observations of the growing crisis in the recruitment of general surgery trainees driven by a generational shift.[6,7] If the RCST does not make significant changes to the general surgery residency training program, it is unlikely that the current training program would be able to attract enough high-quality medical graduates to meet the demands of Thailand's aging population.

The quantitative findings identified work-life balance as the least satisfactory aspect during surgical training. This is the area that needs urgent intervention. Qualitative analysis revealed several potential strategies to improve training experiences, including restructuring rotations, reducing time spent in highly specialized units, increasing exposure to settings that provide opportunities for hands-on experience, and strengthening faculty development initiatives to enhance teaching effectiveness. Respondents also highlighted the contrasting strengths and weaknesses of university-based and service-based hospitals, which are consistent with findings from previous studies.[8] Service-based hospitals were perceived as providing greater hands-on surgical experience, whereas university hospitals offered stronger academic support. These findings suggest that an effective training program should combine the strengths of both settings.

The survey also identified opportunities to improve assessment strategies within the curriculum. Research-related activities received the lowest satisfaction ratings among assessment domains. Although research training remains an important component, trainees from some programs may not get adequate supervision and feedback as they handle a heavy workload on patient-care duties. Hence, our training program needs to improve supervision and assessment of research progress of trainees.

A major finding of this study was the perceived need to broaden the expected learning outcomes of the general surgery curriculum. Non-technical skills, systems-based practice, and professionalism should be emphasized in all training programs, and they need to be assessed concretely to ensure all graduates are equipped with these competencies. We suggested incorporating formal tools like the Non-Technical Skills for Surgeons (NOTSS) framework into the program, which may facilitate objective evaluation of these competencies within a competency-based educational model.[9] Initial implementation of NOTSS assessment generally started from formative evaluation, focusing more on giving feedback to improve trainees' skills and behaviors, but not on passing or failing trainees. Only after all trainers and trainees are familiar with the framework, summative evaluation can be implemented. We propose assessing NOTSS in the context of workplace-based assessment under the programmatic assessment framework, where high-stakes judgment of trainees would not be determined by their performance on one particular task in one specific case, but based on cumulative evidence obtained from several observations by several faculty members, with multiple opportunities to improve their skills after getting feedback.

One important finding from theme 4 is the lack of standardization in in-training examination. The authors propose development of a centralized national platform for in-training examination where all training programs help contribute test items to the same pool and RCST set up a regular centralized in-training exam for all programs. With the current capability of online platform, RCST can implement this centralized in-training exam through online learning management system, where each trainee can sit in the exam room in his/her training center, being proctored by the faculty member of each center, which will provide valid and reliable examination, while minimizing the cost.

Based on the findings of this study, two major areas for RCST general surgery curriculum revision were identified: (1) revision of surgical training outcomes, and (2) restructuring of surgical rotations.

First, the RCST general surgery residency program should be redesigned as a competency-based curriculum encompassing six core competency domains: medical knowledge, patient care, non-technical skills, research, professionalism and professional development, and systems-based practice. Each trainee should be provided with structured learning opportunities in each domain and be required to demonstrate competencies prior to graduation.

Second, a revised rotational structure has been proposed: The proposed structure retains the 48-month duration preferred by most respondents and includes a longer period for specialty electives. The curriculum was divided into a 42-month standard training component and a 6-month specialty elective component, allowing residents to customize part of their training according to their intended career path. The standard component would include 28 months of core general surgery rotations and 14 months of mandatory electives. The proposed structure

is summarized in Table 4. This revised structure has a significant period of specialty elective. This is a paradigm shift where trainees with diverse needs should not be forced to go through the exact same clinical experience, but should allow to tailor-made their experience to fit their needs. Added benefit to this design is the impact on how faculty members provide training experience for trainees. If a training center wants to attract trainees to come to work in their center during this specialty elective period, faculty members must improve the working condition.

A key feature of the proposed curriculum revision is the standardization of training experience during the 28-month core general surgery rotation. During this period, trainees should rotate through both academic and service-based training centers, with a recommended duration of 10 – 18 months in each setting. Academic centers should provide comprehensive subspeciality services, access to advanced medical technologies, and regular academic activities. In contrast, service-based centers should ensure sufficient operative and clinical exposure through defined minimum case volumes. Proposed requirements include at least 20 outpatient encounters per week, and 15 major surgical procedures per month. These benchmarks were developed with intention to guarantee operative exposure to reach approximately 170 cases per year (equivalent to the standard of 850 cases in five years established by the Accreditation Council for Graduate Medical Education (ACGME) for general surgery residency training.[10] Despite maintaining the training duration at 4 years, we hope that this revised curriculum could improve work-life balance among trainees because of the clear focus of their training between academic and service-based training centers. We hypothesized that the clear training focus could allow better control of duty hours. Furthermore, the new curriculum mandates more time in specialty elective to serve their career path. This part would serve their life goal and improve their satisfaction. Additional benefit of the separation of academic and service-based centers is to address the low satisfaction in research-related assessment. We hypothesized that most residents will use their academic center rotation to focus on their research. Working in a setting that has less clinical responsibilities, while surrounding themselves with highly specialized academic staff would provide them with focus on their research project with lots of faculty members to supervise them. However, these hypotheses would need prospective evaluation when implemented.

Several limitations should be considered when interpreting the findings of this study. First, despite our attempt to include as many people as possible from the Thai surgical community, the response rate was relatively low (8.3%). Practicing surgeons and surgical residents are busy and persuading them to voluntarily participate in surveys was difficult. Hence, it is possible that those who did not participate in this study may have different opinions about surgical training. The response rate from residents was 5.25% (distributed equally in junior residents (33%), senior residents (33%) and fellows (33%)), while response rate from practicing surgeons was 10.48%. The result might have more voice from practicing surgeons, compared to surgical trainees. Second, the qualitative findings of this survey relied on written responses rather than in-depth interviews. This has limited probing and lack of contextual depth. Furthermore, no formal member-checking process was conducted following thematic analysis. Hence, despite the best effort of researchers to remain neutral, our interpretation may not fully capture the opinions of respondents. This limitation might have significant impact on certain aspect more than others, such as theme 3 that respondents mentioned about

TABLE 4. Proposed structure of the RCST general surgery residency program.

Rotation	Old curriculum (Months)	New curriculum (Months)
General Surgery Core Rotation	36	28
Related Surgical Specialties	6 – 8	6
General Elective	6 – 8	6
Mandatory Provincial Hospital Elective	0 (None)	2
Advanced Specialty Elective	0 (None)	6

inappropriate behaviors among staff, which should be explored more if an in-depth interviewed was conducted in person. Thus, written responses on this aspect have limited our understanding of how we could improve training experience.

CONCLUSION

This research study represents an attempt of researchers to understand stakeholders needs in general surgery training program in Thailand. By combining quantitative metrics with qualitative stakeholder insights, the investigators have built an educational framework that prioritizes trainee wellness, ensures high-volume clinical exposure, and integrates non-technical skills. This modernization process ensures that Thai surgical education remains aligned with global competency-based standards while staying highly practical and effective for the country's healthcare needs.

Data Availability Statement

The datasets generated and analyzed in this study are not publicly available. However, they can be accessed upon reasonable request made to a corresponding author.

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DECLARATIONS

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Conflict of Interest

All the authors confirm that they have no personal or professional conflicts of interest to declare relating to any aspect of this research study.

Registration Number of Clinical Trial

Not applicable.

Author Contributions

Conceptualization and methodology, C.I. and N.O.; Data collection T.S.; Data analysis, C.I. and T.S.; Manuscript preparation, C.I.; Visualization, C.I.; Critical review and editing, C.I. and N.O. All authors reviewed the results and approved the final version of the manuscript.

Use of Artificial Intelligence (AI)

Conceptualization, survey development, data collection, and data analysis were all conducted by researchers. All data analysis and interpretation were carried out without any assistance from AI. Artificial Intelligence was used for final review of the manuscript for English language editing.

Institutional Review Board Statement

This study has been reviewed and approved by the IRB of the Faculty of Medicine Siriraj Hospital (IRB No. COA: Si 214/2023).

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