

Competency-based Radiology Residency: A Survey of Expectations from Singapore's Perspective

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Abstract

In response to the demands of an ageing nation, the postgraduate medical education in Singapore is currently in the early stage of transition into the American-styled residency programme. This study assessed the expectations of both radiology trainees and faculty on their ideal clinical learning environment (CLE) which facilitates the programme development. A modified 23-item questionnaire was administered to both trainees and faculty at a local training hospital. All items were scored according to their envisioned level of importance and categorised into 5 main CLE domains—supervision, formal training programme, work-based learning, social atmosphere and workload. ‘Supervision’ was identified as the most important domain of the CLE by both trainees and faculty, followed by ‘formal training programmes’, ‘work-based learning’ and ‘social atmosphere’. ‘Workload’ was rated as the least important domain. For all domains, the reported expectation between both trainees and faculty respondents did not differ significantly. Intragroup comparison also showed no significant difference within each group of respondents. This study has provided valuable insights on both respondents’ expectations on their ideal CLE that can best train competency in future radiologists. Various approaches to address these concerns were also discussed. The similarities in findings between ours and previous studies suggest that the ‘supervision’, ‘formal training programmes’ and ‘work-based learning’ domains are crucial for the success of a postgraduate medical training and should be emphasised in future curriculum. ‘Workload’ remains a challenge in postgraduate medical training, but attempts to address this will have an impact in future radiology training.

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Introduction

Postgraduate medical education in Singapore is currently in a state of transition from a British “apprenticeship” model, to an American-styled residency programme accredited by the Accreditation Council for Graduate Medical Education-International (ACGME-I). This is in response to the healthcare demands of an ageing and increasing population, where it is hoped that the structured competency-based programme will help to produce more specialists within a fixed period of time, without compromising the quality of training provided.¹

The prior apprenticeship specialist training model had served the nation’s healthcare industry well historically. However, concerns were raised on the final competency of the exiting trainees. A “years-in-training” approach, whereby competency was arbitrarily derived by time spent

in specific institutions/postings,² resulted in a diversity in clinical experience and skill set even for trainees with similar rotation cycles. Compounded by the lack of standardised measures for assessing trainees’ proficiency, it was inevitable that a small percentage of specialists with questionable competency would exit from the system.² A structured programme emphasising regular and standardised competency assessment would address several of these issues.

The newly introduced ACGME-I residency programme focuses on achieving competency in a step-wise progression from that of a basic practitioner, to an intermediate and subsequently expert practitioner, specific to the chosen discipline.² In contrast to the “years-in-training” approach, which assumes that all trainees progress at the same speed and attain the required skills within a specific time frame,

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the acquisition and application of skills and knowledge to medical practice under the new residency programme is tailored to the individual's learning capability and is not dependent on the simple duration of clinical experience.² Under the new ACGME-I curriculum, specialist trainees will be trained and evaluated for 6 “core” competencies achieved, namely ‘patient care’, ‘medical knowledge’, ‘professionalism’, ‘interpersonal communication’, ‘practice-based learning’ and ‘system-based learning’. Trainees, now designated as ‘residents’, are required to complete between 3 to 6 years of training under a sponsoring healthcare institution such as SingHealth or the National Healthcare Group. The overall training duration has been shortened in general, with greater involvement of more established specialists designated as faculty.

The clinical learning environment (CLE), as described by Mulrooney,³ describes the psychosocial experience that residents undergo throughout their course of training. This has been known to influence training outcomes. The CLE inventory refers to a survey questionnaire that has often been used to assess the quality of learning experience and teaching curriculum in various clinical settings.³⁻⁸ This tool has also been utilised by Bloomfield and Subramaniam⁸ in their practice to gain insights specific to radiology residents' actual training experiences to facilitate programme improvement.

In contrast, we aim to utilise this tool to assess attitudes and expectations of both residents and faculty towards the “ideal” CLE. Little is known about the trainees' and faculty members' attitudes towards the new format of radiology training, and the ACGME-I programme is still in its infancy (i.e. 2 years into the programme). Our sponsoring institution also has trainees from the prior apprenticeship programme, who can lend a contrasting perspective to the envisioned ideal. The information obtained can be applied immediately to improve our current programme.

Materials and Methods

An institutional review board waiver was obtained prior to this study. We adopted the 24-item questionnaire that had been previously validated and developed for assessments on radiology trainees under radiology training centres in Australia, New Zealand and Singapore⁸ by Bloomfield et al. Minor modifications to the wordings were made to the original questionnaire to be used for faculty member assessment. Minimal modifications were made for the trainees. These modified questionnaires were then distributed among faculty members who volunteered to participate in an iterative process to check for relevance. Based on their responses, 23 items were selected and reviewed by a sub-sample of the faculty members. One item was removed due to the complex and ambiguous nature of the question, “I am aware of whom I should report,

in a variety of circumstances”. The finalised Diagnostic Radiology (DR)-CLE questionnaire contained questions about the CLE, which were to be answered as most to least important to the ideal, as well as demographic information, including undergraduate medical school, gender, traineeship and appointment (see Appendices 1 and 2).

The modified 23 item DR-CLE was administered to all radiology trainees and faculty members of the Department of Diagnostic Radiology at a local hospital during a research meeting in February 2013. The 23 items were scored on a 10-point forced choice Likert scale (1-2, least important; 3-4, not so important; 5-6, neutral; 7-8, important; and 9-10, most important), categorised under 5 CLE domains namely ‘supervision’, ‘social atmosphere’, ‘work-based learning’, ‘formal training programme’ and ‘workload’.⁸ The Mann-Whitney rank sum test and unpaired t-test were used to analyse the survey findings on SPSS Statistics 17.0 (SPSS Inc., Chicago, IL).

Results

Demographics

All 22 trainees currently undergoing radiology training at the department responded to the survey, with 100% response rate. Among these 22 trainees, 7 were from the new ACGME-I residency programme; 15 were from the prior apprenticeship-style programme, with 7 designated as Basic Specialist Trainees (BSTs), and 8 designated Advanced Specialist Trainees (ASTs), reflecting different phases in seniority under the old programme.

Out of a total of 43 staff radiologists, 21 teaching faculty members responded to the survey, with a response rate of 48%. Of these 21 faculty members, 5 were associate consultants, 8 were consultants and 8 were senior consultants, in order of increasing seniority and number of years in radiology practice. The rest of the faculty members were either unavailable (on leave) for survey or were excluded as they are part time faculty. A summary of the demographic information for both groups of respondents is shown in Table 1.

Expectations on the Ideal CLE for Training Competency in Future Radiologists

Amongst all 5 CLE domains studied, ‘supervision’ was identified as the most important domain with regards to the ideal CLE, with the highest overall mean score of 8.04 given by the faculty members, and 8.20 by the trainees out of a maximum of 10. In contrast, the domain ‘workload’ was scored as the least important among all CLE domains by both groups, with overall mean scores of 6.56 and 7.12 given by the faculty members and trainees respectively. No

statistically significant difference was found between both groups of respondents in all CLE domains studied (Table 2).

More than 70% of both faculty members and trainees indicated all items classified under the domain ‘supervision’ as important (Table 3). Both groups of respondents agreed that emphasis on teaching and training (item 2) is crucial for radiology training in future programme (85.7% faculty; 90.9% trainees). There were significantly more faculty members than trainees (100% compared to 86.4%) who indicated the provision of ‘direct supervision and feedback from an experienced colleague when doing a task for the first time’ (item 11, $P = 0.030$) as an important factor for training competency in future radiologists. Similarly, more than 90% of the trainees expected ‘supervision and feedback

from experienced colleagues to be provided to trainees at all times’ (item 17). In short, training factors involving supervision and feedback were indicated as important factors for instilling competency in future radiologists by both groups of respondents.

‘Social atmosphere’ and ‘work-based learning’ were also identified as important CLE domains by both groups. In both domains, trainees awarded a slightly higher mean score as compared to the faculty (overall mean score of 7.80 compared to 7.22). Under the ‘social atmosphere’ domain, both agreed that being ‘part of the team’ (item 12) is important for training competent radiologists. In terms of interpersonal relationship within the department, more trainees than faculties (95.5% compared to 66.7%) indicated a ‘sense of cooperation and mutual respect in the department’ (item 18, $P = 0.038$) as important in an ideal CLE for competency training.

For ‘work-based learning’, both groups of respondents scored the ‘access to a variety of patients and presenting problems’ (item 4) and ‘opportunities to acquire the skills’ (item 13) appropriate to the trainee’s level of training as important for the training of competency in future radiologists. Interestingly, expectations on allowing trainees to have ‘the freedom to set their own work priorities’ (item 1, $P < 0.001$) differs significantly between the faculty members and trainees (28.6% and 72.7%, respectively).

With regard to the domain ‘formal training programmes’, more than 80% of both respondents indicated that future trainees need to be given relief from duties to participate in formal educational programmes (item 6). A smaller number of trainees and faculty indicated ‘access to valuable social support through formal educational programmes’ (item 20) as important for training competency in future radiologists.

Among all the domains described, ‘workload’ was identified as the least important, with the lowest mean scores given among all 5 CLE domains studied i.e. 6.56

Table 1. Demographics for Faculty and Trainees

	Frequency	
	Faculty (n = 21)	Trainees (n = 22)
Medical school		
Local	12	9
Overseas	9	13
Gender		
Male	18	17
Female	3	5
Traineeship		
Residency	NA	7
BST	NA	7
AST	NA	8
Appointment		
Associate consultant	5	NA
Consultant	8	NA
Senior consultant	8	NA

AST: Advanced Specialist Trainee; BST: Basic Specialist Trainee; NA: Not applicable

Table 2. Comparison of Expectations between Trainees and Faculties Across the Various Domains of CLE

Domain	Items	Faculty		Trainees		Confidence Interval
		Overall Mean Score	Overall SD	Overall Mean Score	Overall SD	
1. Supervision	2, 7, 11, 17, 19, 23	8.04	0.49	8.20	0.33	(-3.83, 0.71)
2. Social Atmosphere	5, 12, 16, 18, 22	7.22	0.38	7.80	0.66	(-0.24, 1.41)
3. Work-based learning	1, 4, 9, 13, 15, 21	7.22	1.20	7.80	0.59	(-0.71, 1.86)
4. Formal training programmes	6, 10, 20	7.44	0.80	7.27	1.31	(-2.84, 2.51)
5. Workload	3, 8, 14	6.56	0.26	7.12	0.68	(-0.89, 2.02)

CLE: Clinical learning environment; SD: Standard deviation

Note: No significant difference was found in either domains of the CLE between both groups of respondents.

Table 3. Comparison of Clinical Learning Environment Expectation from Both Trainees and Faculty (Most Important + Important Cumulative Percentage, i.e. Score ≥ 7)

	Faculty Score ≥ 7 , n (%) (n = 21)	Trainees Score ≥ 7 , n (%) (n = 22)
Work-based Learning		
1. The trainees have freedom to set their own work priorities*	6 (28.6)	16 (72.7)
4. The trainees have access to a variety of patients and presenting problems appropriate to their level of training	18 (85.7)	20 (90.9)
9. The trainees have a level of autonomy appropriate to their level of training	13 (61.9)	17 (77.3)
13. The trainees have opportunities to acquire the skills appropriate to their level of training	20 (95.2)	20 (90.9)
15. The time at work is utilised productively by the trainees	13 (61.9)	15 (68.2)
21. The trainees have access to up-to-date learning resources at work when they need them	17 (81.0)	20 (90.9)
Social Atmosphere		
†5. The trainees do not receive mixed messages about duties and responsibilities	13 (61.9)	15 (68.2)
†12. The trainees feel they are part of the team	16 (76.2)	17 (77.3)
16. The trainees have a good sense of rapport with senior people in the department	13 (61.9)	18 (81.8)
18. There is sense of cooperation and mutual respect in the department‡	14 (66.7)	21 (95.5)
22. The trainees are clear of the work relationships with staff in the department	15 (71.4)	18 (81.8)
Formal Training Programmes		
6. The trainees are given relief from duties to participate in formal educational programmes	17 (81.0)	19 (86.4)
10. The formal educational programmes targeted to trainee's learning needs are provided	17 (81.0)	15 (68.2)
20. The trainees are given access to valuable social support through formal educational programmes (e.g. communication and ethics courses)	13 (61.9)	10 (45.5)
Supervision		
2. Teaching and training are emphasised in this department	18 (85.7)	20 (90.9)
7. Job teaching in specialty areas targeted at specific learning needs is provided to trainees	15 (71.4)	19 (86.4)
11. Direct supervision and feedback from an experienced colleague are provided to trainees when doing a task for the first time‡	21 (100)	19 (86.4)
17. Advice and back up from more experienced colleagues is readily available to trainees at all times	18 (85.7)	21 (95.5)
19. Direct supervision and feedback are sufficiently provided to trainees according to their level of training	18 (85.7)	19 (86.4)
23. The supervision and feedback given to trainees are clear, specific and supportive	16 (76.2)	18 (81.8)
Workload		
3. Sufficient time is provided for trainees to reflect on their learning experiences‡	15 (71.4)	20 (90.9)
†8. A trainee's work is not routine and repetitious	10 (47.6)	11 (50.0)
†14. The trainees do not often feel swamped with work	11 (52.4)	13 (59.1)

*Indicates $P < 0.01$ by Mann-Whitney rank sum test for items with significant difference between both trainees and faculty

†Items 5,8,12 and 14 were worded negatively in the original questionnaires. Since the scoring is based on the level of importance, these items are expressed in positive and the scores are reversed.

‡Indicates $P < 0.05$ for items with significant difference between both trainees and faculty.

Note: Item, 'I am aware to whom I should report, in a variety of circumstances (Social)' is excluded.

from the faculty members and 7.12 from the trainees out of maximum score of 10. Only ~50% of both trainees and faculty members expected workload in radiology training not to be 'routine and repetitious' (item 8) as important for training competency in radiology. Both groups of respondents also expected training not to involve 'swamping trainees with work' (item 14), with slightly more trainees

indicating this as an important training factor than faculty members (52.4% faculty, 59.1% trainees). Consistent with these findings, there were significantly more trainees than faculty members who placed importance on the expected provision of time for trainees to reflect on their learning experience (item 3, $P = 0.028$).

Intragroup comparisons within the trainee and faculty

respondents such as different traineeships (i.e. between residents, BSTs and ASTs) and undergraduate medical schools attended indicated no significant ($P > 0.05$) cultural differences in expectations on the level of importance of training factors involved in the CLE as a whole or in any domains. The study involved more male than female respondents i.e. 86% male faculty members and 77% male trainees, hence the numbers are too small for a statistically robust analysis on gender differences.

Discussion

Clinical supervision plays a vital role in radiology training. Kilminster and Jolly¹ described supervision as “a process of professional support and learning which enables individual practitioners to develop knowledge and competence, assume responsibility for their own practice, and enhance safety of care in complex situations”. Without adequate supervision, the clinical training standards of trainees are likely to be lowered as proper practices were not imparted to them from senior clinicians, leading to reduced standards of care.¹

In our present study, the CLE domain ‘supervision’, which includes training factors such as the provision of ‘direct supervision and feedback by experienced colleagues’ (item 11), was deemed the most important contributing factor to the success of competency training in radiology by both trainees and faculty members. The roles and responsibilities of the senior radiologist as a clinical teacher to the trainee is deeply rooted in the apprenticeship traditions of clinical medicine in Singapore. With the establishment of a formal curriculum structure under the ACGME-I competency-based residency programme, faculty members can now better supervise and assess trainees’ performance, provide regular feedback and gradually increase the trainees’ responsibilities according to their level of competency. Learning and assessment tool such as the 360° evaluation, direct observed procedural skills (DOPS) and mini clinical evaluation exercise (mini-CEX) have been introduced to enhance direct supervision and allow for greater feedback (both formal and informal) between faculty and trainees. A structured curriculum with sequential progression allows trainees to better cope and plan their own learning. In recognition of the need to ‘train the trainers’ for optimised clinical supervision, our sponsoring institution has also created a Centre for Resident and Faculty Development (CRAFD). This support centre facilitates training for faculty in several aspects of clinical teaching, in addition to organising courses to educate residents in important non-medical aspects of clinical training (e.g. medico-legal issues, communication skills).

Formal training programmes are recognised to play an important role in medical education by raising standards of residents’ performance and improving knowledge.

Consistent with earlier studies, our results also showed ‘formal training programmes’ as an important domain recognised by both trainees and faculty members.^{9,10} In our programme, the core faculties in charge of the various radiology subspecialties have devised specific syllabus and milestones, catered for the trainees’ step-wise progression throughout all 5 years. The new programme also ensures that trainees are given mandatory protected time to be ‘given relief from duties to participate in formal educational programmes’ (item 6) such as didactic lectures. Various online training tools such as RADPrimer (RADPrimer, Utah, US) and STATdx (STATdx, Utah, US) are also provided. Past didactic lectures recordings, notes, and sample self-assessment multiple choice question (MCQ) tests, are also available online through service like Blackboard (Blackboard Inc., Washington, US). These measures ensure that residents have adequate time and abundant resources to facilitate learning.

In medical training, the level of independence and autonomy trainees receive during their course of training are often not well defined. In our present study, there was a significant difference in opinions between both trainees and faculty with regard to the extent of autonomy given to trainees in setting their own work priorities (item 1). This result can likely be attributed to faculty having been trained in a past setting where independence and autonomy was historically limited in this country. With their subsequent success in becoming medical specialists, they may not see these factors as prerequisites for an ideal training situation, unlike the young trainee. However, Li et al¹¹ previously described that residents were generally less confident and do not have the appropriate knowledge and skills required for planning self-directed learning as compared to the faculty members. Therefore, it remains to be seen if greater independence for residents will result in better training outcomes, and further study is required.

Heavy workload is a common problem in medical practice. Similar to Bloomfield and Subramaniam,⁸ the domain ‘workload’ was also identified as one of the main challenges in designing an ideal programme. Despite the split in opinions (~50% of the respondents identified the item as important) within both trainees and faculty members on the importance of ‘routine and repetitious work’ (item 8), we feel that routine work is still key in postgraduate training. Postgraduate training encompasses an element of apprenticeship, on-job training and learning.¹² The budding radiologist needs to have adequate clinical exposure to a large number of cases, including “normal” studies, before he can readily recognise what is out of the ordinary. This can only be provided by reading large numbers of routine cases. However, a balance must be struck and this must not cause excessive resident fatigue or take away valuable

teaching time. Our programme manages this by closely monitoring residents' duty hours via the New Innovations Residency Management Suite (New Innovations, Ohio, US). Excessive workloads resulting in duty hour violations are electronically flagged for immediate corrective action.

Self-reflection is also an integral part of clinical learning.¹³ A large percentage of trainees and faculty from our present study emphasised the importance of 'having sufficient time for self-reflection' (item 3) in training a competent radiologist. In a review by Mann et al,¹⁴ the authors described reflective practice as an important attribute of competent health care professionals. Reflection is not only a learning strategy that allows one to identify their learning needs, but also prepares the trainees for their participation in a multidisciplinary team through feedback and discussion amongst the members.¹⁴ Given its importance in clinical learning, we believe that reflective practice would be beneficial in training competent radiologist and should be encouraged in future curriculum. With protected time for learning allocated in the new programme, residents have an opportunity to self-reflect which is crucial for their learning.¹³

Consistent with Bloomfield and Subramaniam,⁸ the CLE domain 'social atmosphere' has also been identified as important for good clinical learning by trainees. However, a lower percentage of faculty members as compared to trainees indicated having 'a sense of good rapport and cooperation within the department' (item 16) as important for training competency in future radiologists. A potential reason for this disparity in attitudes towards trainee-supervisor relationship could be due to the cultural and generational differences between faculty members and trainees.¹⁵ At present, a hierarchy still exists within the department, with trainees at the bottom of the ladder. The local culture of respect for seniority and reluctance to "lose face" by more senior members as previously described by Tan et al¹⁵ instils a certain degree of isolation and hierarchy within the social framework. The Asian concept of "face" is an abstract term that encompasses descriptors of honour, prestige, and reputation. This may be a significant barrier in a new training programme that requires deep interpersonal interaction in teaching and feedback sessions, and requires a paradigm shift in mindset of senior faculty. In a recent review on local diagnostic radiology education by Tan et al,¹⁵ an interview with trainees indicated unfamiliarity with the new residency programme and absence of protected time for supervisors due to heavy routine clinical duties. This results in further inability for faculty to maximise the trainee-supervisor relationship. More protected time for teaching and mentoring of trainees is probably the main solution to improve the quality of trainee-supervisor relationship.

Although our study is limited by small sample size, as a

major centre/sponsoring institution in the local fraternity, we feel that the data is generally representative of the attitudes of the Singapore radiological community at the current point in time towards the ideal training programme. Our institution has adopted several of these insights as points for improvement. Future longitudinal study will help to assess the impact of these interventions to our training programme.

Conclusion

Our present study has provided valuable insights towards trainees' and faculty members' expectations on the ideal CLE to best train competent future radiologists. Among all 5 CLE domains surveyed, supervision was identified as the most important factor and should be emphasised in all future curriculums. Other domains such as formal training programmes, social atmosphere and work-based learning were also important for the success of the training programme, although several barriers were observed. Heavy workload is a double-edged sword and only a fine balance between sufficient clinical exposure and protected time will lead to a successful training programme in the future.

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**Appendix 1
Faculty Survey Form**

DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAMME

Thank you for participating in this survey. Your responses will remain anonymous. Neither the department nor your supervisor will have access to your identified information. The purpose of this study is to determine your expectation on the level of importance of each training factor in helping trainees to become competent radiologists. The outcome from this survey will assist in the development of future radiology specialist training programme. Please tick the appropriate box to indicate the score of each factor on the 10 point scale, i.e. the least important factor -1 to the most important -10.

Medical School (i.e. Local/Overseas)	
Gender	
Appointment (Please Circle)	Assoc Consultant/Consultant/Senior Consultant

	Least Important 1	2	3	4	5	6	7	8	9	Most Important 10
1. The trainees have the freedom to set their work priorities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Teaching and training are emphasised in this department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Sufficient time is provided for trainees to reflect on their learning experiences.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The trainees have access to a variety of patients and presenting problems appropriate to their level of training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The trainees received mixed messages about their duties and responsibilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The trainees are given relief from duties to participate in formal education programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Job teaching in specialty areas targeted at specific learning needs is provided to trainees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Least Important 1	2	3	4	5	6	7	8	9	Most Important 10
8. A trainee's work is routine and repetitious.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. The trainees have a level of autonomy appropriate to their level of training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. The formal educational programmes targeted to trainee's learning needs are provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Direct supervision and feedback from an experienced colleague are provided to trainees when doing a task for the first time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. The trainee feels that they are not part of the team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. The trainees have the opportunities to acquire the skills appropriate to their level of training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. The trainees often feel swamped with work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. The time at work is utilised productively by the trainees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. The trainees have a good sense of rapport with senior people in the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Advice and back up from more experienced colleagues is readily available to trainees at all times.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. There is sense of cooperation and mutual respect in the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 Direct supervision and feedback are sufficiently provided to trainees according to their level of training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. The trainees are given access to valuable social support through formal educational programmes (e.g. communication and ethics courses).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. The trainees have access to up-to-date learning resources at work when they need them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. The trainees are clear about their work relationship with staff in the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. The supervision and feedback given to trainees are clear, specific and supportive.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments
Please give us your thoughts as to how the specialist training programme can be improved in the future:

**Appendix 2
Trainee Survey Form**

DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAMME

Thank you for participating in this survey. Your responses will remain anonymous. Neither the department nor your supervisor will have access to your identified information. The purpose of this study is to determine your expectation on the level of importance of each training factor in helping trainees to become competent radiologists. The outcome from this survey will assist in the development of future radiology specialist training programme. Please tick the appropriate box to indicate the score of each factor on the 10 point scale, i.e. the least important factor -1 to the most important -10.

Medical School (i.e. Local/Overseas)	
Gender	
Traineeship (Please Circle)	Residency/Basic Specialist Training/Advanced Specialist Training

	Least Important 1	2	3	4	5	6	7	8	9	Most Important 10
1. I have freedom to set my own work priorities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Teaching and training are emphasised in this department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I have sufficient time to reflect on my learning experiences.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I have access to a variety of patients and presenting problems appropriate to my level of training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I get mixed messages about duties and responsibilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I am given relief from duties to participate in formal educational programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I receive on the job teaching in specialty areas targeted at my learning needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Least Important 1	2	3	4	5	6	7	8	9	Most Important 10
8. My work is routine and repetitious.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I have a level of autonomy appropriate to my level of training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. The formal educational programmes are targeted to my learning needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I receive direct supervision and feedback from an experienced colleague when doing a task for the first time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I do not feel part of the team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I have opportunities to acquire the skills appropriate to my level of training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I often feel swamped with work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. My time at work is utilised productively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I have a good sense of rapport with senior people in the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Advice and back up from more experienced colleagues is readily available to me at all times.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. There is a sense of cooperation and mutual respect in the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. I receive direct supervision and feedback that is sufficient for my level of training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. The formal educational programmes give me access to valuable social support (e.g. communication & ethics courses).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. I have access to up-to-date learning resources at work when I need them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. I am clear about my work relationships with staff in the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. The supervision and feedback given to me is clear, specific and supportive.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

Please give us your thoughts as to how the specialist training programme can be improved in the future: