A NEEDS ASSESSMENT OF SURGICAL RESIDENTS AS TEACHERS

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OBJECTIVE: To determine the needs of surgical residents as teachers of clinical clerks.

DESIGN: A needs assessment survey.

SETTING: Department of Surgery, University of Toronto.

PARTICIPANTS: Clinical clerks and surgical residents and staff surgeons.

METHODS: Three stakeholder groups were defined: staff surgeons, surgical residents and clinical clerks. Focus-group sessions using the nominal group technique identified key issues from the perspectives of clerks and residents. Resulting information was used to develop needs assessment surveys, which were administered to 170 clinical clerks and 190 surgical residents. Faculty viewpoints were assessed with semi-structured interviews. Triangulation of these 3 data sources provided a balanced approach to identifying the needs of surgical residents as teachers.

RESULTS: Response rates were 64% for clinical clerks and 66% for surgical residents. Five staff surgeons were interviewed. Consensus was noted among the stakeholder groups regarding the importance of staff surgeon role modelling and feedback, resident attitude, time management, knowledge of clerks' formal learning objectives, and appropriate times and locations for teaching. Discrepancies included a significant difference in opinion regarding the residents' capacity to address clerks' individual learning needs and to foster good team relationships. Residents indicated that they did not receive regular feedback regarding their teaching and that staff did not place an emphasis on their teaching role.

CONCLUSIONS: This study has, from a multi-source perspective, assessed the needs of surgical residents as teachers. These needs include enhancing residents' education regarding how and what to teach medical students on a surgical rotation, and a need for staff surgeons to increase feedback to residents regarding their teaching.

OBJECTIF : Déterminer les besoins des résidents en chirurgie qui enseignent à des stagiaires.

CONCEPTION : Questionnaire d'évaluation des besoins.

CONTEXTE : Département de chirurgie, Université de Toronto.

PARTICIPANTS : Stagiaires, résidents en chirurgie et chirurgiens membres du personnel.

MÉTHODES : On a défini trois groupes d'intervenants : chirurgiens membres du personnel, résidents en chirurgie et stagiaires. Des groupes de discussion utilisant la technique du groupe nominal ont défini les enjeux clés du point de vue des stagiaires et des résidents. Les résultats ainsi obtenus ont servi à élaborer des questionnaires d'évaluation des besoins qui ont été administrés à 170 stagiaires et 190 résidents en chirurgie. On a évalué les points de vue des enseignants en organisant des entrevues semi-structurées. La triangulation de ces trois sources de données a produit une façon équilibrée de définir les besoins des résidents en chirurgie comme enseignants.

RÉSULTATS : Les taux de réponse ont atteint 64 % chez les stagiaires et 66 % chez les résidents en chirurgie. On a interviewé cinq chirurgiens membres du personnel. Les groupes d'intervenants s'entendaient sur l'importance du rôle du chirurgien membre du personnel, de l'exemple qu'il donne et de ses commen-

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taires, de l'attitude des résidents, de la gestion du temps, de la connaissance des objectifs d'apprentissage structuré des stagiaires et des périodes et des endroits appropriés pour l'enseignement. Les écarts comportaient une importante divergence de vues au sujet des capacités des résidents de répondre aux besoins en apprentissage de chaque stagiaire et de favoriser de bonnes relations d'équipe. Les résidents ont indiqué qu'ils ne recevaient pas de rétroaction régulière sur la formation qu'ils donnent et que le personnel n'accordait pas d'importance à leur rôle d'enseignant.

CONCLUSIONS : Cette étude a permis d'évaluer, du point de vue de sources multiples, les besoins des résidents en chirurgie comme enseignants. Ces besoins comprennent notamment l'amélioration de l'information des résidents au sujet de leur façon d'enseigner à des stagiaires en chirurgie, et la nécessité pour les chirurgiens membres du personnel de fournir aux résidents davantage de commentaires au sujet de la formation qu'ils donnent.

Educating medical students is an important responsibility of surgical residents. During clerkship rotations, the contact between student and staff supervisor is often limited, and therefore the educational experience can be dependent on the residents' abilities as teachers.[1,2] Clinical clerks on a surgical service receive between 19% and 40% of their teaching from residents.[3,4] However, surgical residents typically receive little formal assistance or training in teaching and learning, and therefore the extent and quality of their teaching tends to be variable.[2,5,6] Students clearly confirm this variability.[7]

In their intermediate role between student and staff, surgical residents can appear unintimidating and approachable while possessing a great deal of knowledge and experience. Therefore, both faculty and students indicate that residents are highly valuable teaching members of clinical and surgical teams.[3,8,9] In contrast, residents themselves consistently express vagueness with respect to their teaching roles.[4,10] This sentiment may reflect their difficulties in working with an unstructured teaching role, a lack of awareness of the defined clerkship goals and the challenge they face in elucidating what role to play in evaluating the students.[5] There are also clear differences between resident and staff teachers; the latter are often perceived by students to be mentors and coordinators, whereas the former are far more involved in close-quarters teaching. As such, residents' teaching responsibilities are often blurred with those of the faculty and thus become unclear.[7]

To effectively address these problems, residents must know, without ambiguity, what and how to teach medical students and clinical clerks. Since residents represent the midpoint on an educational spectrum, with staff and students at the extremes, it is important to ascertain the insight of these 3 stakeholder groups when assessing the teaching needs of surgical residents.

METHODS

Information from the 3 defined stakeholder groups (clinical clerks, surgical residents and faculty) was collected and triangulated. Third-year clerks were excluded from the study, as the majority had not yet completed their surgery rotation. First-year surgical residents were excluded because they would only have had a brief experience in their teaching role.

A 3-step protocol was initiated to obtain data for the study's triangulation. First, background information was gathered from various sources in an attempt to place the question of residents' teaching needs in the general context of a clinical and educational environment. These sources included a review and summary of clerkship-debriefing forms from the 1995/96 academic year's surgical rotations (with respect to evaluations and comments relating to residents as teachers) and a series of MEDLINE searches. Second, group sessions were conducted, using the nominal group technique, to define more precisely the issues surrounding surgical residents as teachers. This information was then used in step 3 to construct the needs assessment surveys and interviews.

Focus groups

The utility and methodology of focus groups, and in particular that of the nominal-group technique, has been explained in detail previously.[11–14] Two focus groups were conducted with volunteer participants: one with 5 fourth-year clerks and the other with 7 surgical residents at the University of Toronto. Open-ended questions were posed to the participants at the beginning of each session. Clerks were asked to list some issues they would like to discuss about being taught by residents on surgical rotation. Similarly, residents were asked to list some issues they would like to cover regarding teaching medical students. According to the nominal protocol, each participant then generated a list of issues. These were collated and grouped into categories. Participants then ranked the categories individually, in order of importance. These rankings were collated to identify the overall priority of topics for the group and to determine areas of convergence and divergence. In the ensuing discussion these items were debated in order of priority. The category list was then ranked as before, and any variance or disparity from the previous ranking

was elaborated upon. This technique allowed for all members of the both groups to express opinions and gave a balanced view regarding the issues facing surgical residents as teachers.

Needs assessment surveys and interviews

The use of needs assessment surveys in general, and in particular to determine the teaching needs of surgical residents, has been described previously.[4,14,15] Survey design incorporated items derived from the literature review, nominal group sessions and a pilot study. Two separate surveys were developed: one for fourth-year clerks and the other for residents of postgraduate year 2 and above. The surveys were designed to mirror one another such that answers given by clerks could be quantitatively compared to those given by residents for the same question.

The surveys consisted of 2 major sections. First, respondents were asked to rate the importance of various teaching attributes on 7-point Likert scales, from 1 (most negative disagreement) to 7 (most positive agreement), with 4 as the midpoint (no opinion). The second section contained questions about teaching methods, and respondents were required to rank responses from 1 to 7, in descending order of personal importance. Items regarding teaching timing and location were addressed strictly to the clerks, and an item on methods of educating residents on teaching was posed exclusively to the residents.

Pilot surveys were done for 11 fourth-year clinical clerks and 10 residents of postgraduate year 2 and higher. The surveys were then revised and administered to 170 clinical clerks and 192 surgical residents. Surveys were mailed in August 1997, with return self-addressed stamped envelopes. A second follow-up mailing of nonresponders was conducted in December 1997. Follow-up phone calls were made in March and April 1998.

Information derived from the literature review and nominal group sessions was also used to develop a 4-question semistructured interview for faculty of the Department of Surgery. The interview questions addressed staff awareness of surgical resident teaching in general, and their respective involvement in improving residents' teaching abilities. Staff surgeons were selected on the basis of their current supervision of surgical residents and clinical clerks. Responses from the interviews were transcribed and summarized. Ranking of the responses was determined by noting in how many of the interviews a specific response or sentiment was expressed. Nine staff surgeons were approached to be interviewed.

Data analysis

A triangulation of these 3 data sources was used to establish the needs of surgical residents as teachers. *t*-tests were used to compare responses to mirroring questions on the surveys. Common responses from the faculty interviews were extracted, collated and tabulated. These responses were compared qualitatively to the responses of clerks and residents.

RESULTS

Surveys were completed by 123 (64%) of the 192 surgical residents, and 112 (66%) of the 170 clerks. Five of the 9 staff surgeons agreed to be interviewed.

Perspectives on general teaching needs

Clerks and residents were asked to rate the various teaching attributes of residents (Table I). Both groups felt that it was appropriate for residents to be teachers of clinical clerks, that there is a perceived lack of teaching time on surgical rotation and that residents are generally unaware of the clerkship surgery learning objectives. Clerks also indicated that in general they were satisfied with the teaching they received from their surgical residents and that the role of residents in this regard was very important. This was consistent with residents' indications of satisfac-

Table I

Clerks' and Residents' Ratings (Mean [and Standard Deviation]) Regarding Resident Teaching Attributes*

	Ranking of attribute	
Attribute	Clinical clerks	Surgical residents
Appropriateness of residents as teachers	5.3 (1.3)	4.9 (1.3)
Perceived importance of resident teaching role to clerks	6.1 (0.8)	5.8 (1.3)
Attitude toward teaching	4.9 (1.3)	5.9 (1.0)†
Awareness of surgical clerkship learning objectives	2.5 (1.4)	2.0 (0.2)
Ability to address clerks' individual learning needs	4.0 (1.4)	4.8 (1.3)†
Ability to foster good team relationships	4.8 (1.3)	6.4 (1.3)†
Possessing enough time to teach	2.2 (0.5)	2.8 (0.5)
Overall satisfaction with resident teaching skill	4.4 (1.4)	4.8 (1.2)

*7-point Likert scale (1 [most negative disagreement] to 7 [most positive agreement], with 4 as the midpoint [no opinion]
†$p < 0.01$.

tion with their teaching abilities and belief that their role as teachers was important to clerks.

Significantly, clerks gave lower ratings than residents did to the following: residents' abilities to address the individual learning needs of clerks, residents' abilities to foster good team relationships and residents' attitudes toward teaching.

Perspectives on teaching techniques

In ranking various teaching strategies in terms of their usefulness to the clerks (Table II), there was a general consensus between the groups, but 2 items in particular showed significant differences: clerks believed that discussions and clear explanations of surgical rationale were important, whereas residents did not; and although both groups felt that lecturing skills were the least important teaching skill, residents ranked them lower than clerks did.

Clerks' perspectives on timing and location of teaching

Clerks were asked to rank the usefulness of various potential teaching settings and situations. They indicated that teaching in the Emergency Department was the most useful (rank 1, mean [standard deviation] 2.0 [1.3]), with on-call teaching in general as a close second preference (rank 2, mean 2.3 [1.6]). They did not find teaching on rounds useful (rank 6, mean 3.7 [1.6]) or in the library (rank 7, mean 5.3 [1.8]). Teaching in the operating room was ranked at the midpoint (rank 4, mean 3.2 [1.8]).

Residents perspectives on the staff surgeons

Residents were asked 2 questions pertaining to their perception of staff involvement in their teaching. They felt their role as teachers was relatively unimportant to the staff surgeons (mean 4.8 [1.3]) and that they did not receive enough feedback from staff regarding their teaching (mean 2.4 [1.2]).

Perspectives of the staff surgeons

The most prevalent theme that arose from the staff surgeon interviews was that the teaching role of surgical residents is highly valued by the staff (rank 1, 100% of interviews). Other common responses were as follows: time management is a vital practical issue for surgical residents as teachers (rank 2, 80% of interviews); feedback for residents on their teaching is extremely important (rank 2, 80% of interviews); current methods of giving teaching feedback to residents are insufficient (rank 4, 60% of interviews); residents must give a proper service-to-education ratio to clerks (rank 4, 60% of interviews); residents should be given methods with which to improve their teaching (rank 6, 40% of interviews); and through faculty initiatives, residents should have an increased awareness of their role as teachers and role models (rank 6, 40% of interviews).

Table II

Clerks' and Residents' Rankings (Mean [and Standard Deviation]) of the Importance of Various Teaching Techniques

	Ranking of strategy	
Teaching strategy	Clinical clerks	Surgical residents
Giving clear explanations of surgical rationale	1 (2.5 [1.5])	5 (3.6 [1.8])†
Using probing questions	2 (2.6 [1.6])	1 (2.8 [1.8])
Demonstrating surgical techniques	3 (2.7 [1.7])	2 (3.0 [1.9])
Giving and receiving effective feedback	4 (2.8 [1.6])	3 (3.1 [1.8])
Resident verbalization of thinking process	5 (3.4 [2.0])	4 (3.5 [1.9])
Using teaching aids (e.g., writing, diagrams)	6 (3.6 [1.8])	6 (4.0 [2.0])
Using effective lecturing skills	7 (4.3 [1.9])	7 (5.5 [1.8])†

*7-point Likert scale (1 [most negative disagreement] to 7 [most positive agreement], with 4 as the midpoint [no opinion])
†$p < 0.01$.

Discussion

Although clearly a surgical resident's primary duty is to become competent in surgery and patient care, the teaching of clinical clerks is a major component of their residency. Residents perform this teaching role with a significant lack of instruction regarding teaching and learning. Our study showed that clinical clerks, residents and staff shared many common viewpoints regarding the surgical clerkship learning environment. However, we also demonstrated that many of the residents' needs as teachers are not being met.

The issue of time management for surgical residents as teachers was a recurring theme both in our study and in previous studies.[4] Time efficiency becomes even more important when considered with our study's demonstration that residents were generally unaware of clerks' formal surgery learning objectives. It is understandable that clerks would prefer to have this information taught in the limited time available to them on the service. If residents were to have an increased awareness of clerks' current objectives, effective teaching could be more efficiently accomplished, thereby freeing up time at other points in the day. A

second step in enhancing teaching efficiency would be for residents to teach the clerks at certain key times. The clerks in our study clearly indicated that their preferences for teaching times and settings were during on-call duty and in the Emergency Department.

Since a surgical team is continually changing, there are times when the student-to-resident ratio is high, and when it can be 1 to 1. As such, residents are sometimes required to integrate clerks into the team structure, while at other times they will be faced with individual students, each of whom has a particular learning style. Residents must be prepared to deal with this highly challenging teaching and learning environment. Previous studies have demonstrated that residents' teaching roles can include those of the expert, formal authority, role model, facilitator or delegator.[4,16] To be truly effective teachers, residents need to develop a repertoire of these styles and to be flexible in their deployment. However, the clerks and residents in our study indicated differences in their perception of residents' abilities to address clerks' individual learning needs.

What is the significance of this discrepancy? Perhaps residents and clerks approach the concepts of surgical teaching and learning from different paradigms. As teachers move away from the role of learner, they tend to adopt more fixed ways of thinking about teaching; this can affect learning outcomes.[17] Therefore, as residents advance in their training and concomitantly solidify their mental teaching constructs, they may find it more difficult to effectively accommodate the more diverse learning styles and needs of individual clerks. Residents need to be aware of this potential teacher–learner mismatch.

Although teaching strategies vary with the situational dynamics, clerks and residents were encouragingly in agreement on which techniques are the most useful. However, 2 mismatches were identified. Clerks desired insight into surgical rationale, but this was not high on the list of residents' teaching priorities. Clinical clerks may often use information regarding surgical rationale to achieve mental closure of a clinical problem. However, residents have indicated that they think detailed explanations of surgical rationale are beyond the scope of clerkship, and that it is sufficient for clerks to simply recognize and classify the surgical problems and understand basic principles of management. Hence, residents choose not to convey the specifics of the surgery. Residents need to be aware of clerks' learning needs and processes so that they can better tailor their teaching to these needs.

The second mismatch related to the low ranking of the importance of resident lecturing skills. Although both groups rated this least important, residents ranked this significantly lower than did the clerks. This correlates well with previous studies assessing the characteristics of effective versus ineffective resident teachers.[3,4,6,18] Given that residents' presentation skills are still salient to clerks, it is then important to help residents to learn the skills of effective teachers. Skills identified in the literature include those reflecting dynamic teaching, enthusiasm and role modelling.[18,19]

It is essential for surgical residents to know that teaching is viewed as valuable by their staff supervisors. Despite the small number of surgeons interviewed, all of them clearly stated that they viewed residents' teaching as invaluable. In contrast, residents stated that they did not feel their role as teachers was important to the staff, and that they did not receive enough feedback from staff regarding their teaching. Interestingly, the staff also indicated that there was a lack of feedback and that such feedback would be useful in enhancing residents' abilities as teachers. These findings question suggestions from previous studies which stated that residents themselves benefit from teaching and that this could be construed as feedback in itself.[4,20,21] It is clearly very important for institutions to develop mechanics that would provide regular and constructive feedback to residents on their teaching. This would necessitate increased staff observation of residents' teaching. Staff would then be in a position to comment directly on residents' teaching styles and techniques, thus meeting residents' needs for increased feedback while demonstrating staff recognition and awareness of their endeavours.

Mechanisms for observing resident teaching must take into account the various teaching settings and their perceived usefulness to the learners. An intuitively obvious setting is the operating room, since it is there that the staff, residents and clerks are consistently together. However, our data indicated that for clerks the operating room is only a moderately useful teaching site. This surprising discrepancy may be explained by the inherent complexity of the operating room as a teaching setting. Residents in the operating room, under the watchful eye of their supervisors, have as their primary roles those of being a surgeon and a learner. This leaves less time and attention for the teaching of clerks. At the same time, staff surgeons are busy with both the operation and addressing the very different learning needs of clerks as well as the residents, while also attempting to complete the case in a timely and efficient manner. Therefore the suitability of the operating room as a learning environment for clerks may be limited and, by extension, its utility in serving as a site to observe resident teaching would also be limited. Staff must find more fruitful settings in which to observe teaching. Our data show that such

sites include the Emergency Department and other on-call settings.

Although a question was posed to the surgical residents regarding methods of enhancing their teaching education, only a minority of responders answered it. A possible explanation for this is that the majority of our postulated methods were on a large scale (e.g., seminars, mentorships). Surgical residents may feel that they do not have time for these and would prefer informal education. In this light, possible suggestions for improving their teaching include increasing their accessibility to the clerkship objectives, giving them readings and guidelines on good teaching practices and, in particular, increasing informal ongoing feedback regarding their teaching from their staff supervisors. These are methods that could be incorporated into, rather than added to, existing resident surgical curricula.

Surgical residents, clerks and staff share common outlooks on the needs and abilities of residents as teachers. Most important is the fact that despite facing a significant lack of instruction regarding educational methods, residents are still doing a good job as teachers. However, we have found that there also exist discrepancies that should be addressed in order to increase the effectiveness and consistency of surgical resident teaching. Considering the impact that surgical residents have on the learning of clinical clerks on surgical rotations, these findings warrant intervention.

References

1. Patel VL, Dauphinee WD. The clinical learning environments in medicine, pediatrics and surgery clerkships. *Med Educ* 1985;19:54-60.
2. Pelletier MP. Undergraduate surgical education in the twenty-first century. *Can J Surg* 1995;38(1):42-5.
3. Brown RS. House staff attitudes toward teaching. *J Med Educ* 1970;45: 156-8.
4. Sheets KJ, Hankin FM, Schwenk TL. Preparing surgery house officers for their teaching role. *Am J Surg* 1991; 161(4):443-9.
5. Mangione CM. How medical school did and did not prepare me for graduate medical education. *J Med Educ* 1986;61(9 Pt 2):3-10.
6. Xu G, Bringham TP, Veloski JJ, Rodgers JF. Attendings' and residents' teaching role and students' overall rating of clinical clerkships. *Med Teach* 1993;15(2-3):217-22.
7. Tonesk X. The house officer as teacher: what schools expect and measure. *J Med Educ* 1979;54:613-6.
8. Byrne N, Cohen R. Observational study of clinical clerkship activities. *J Med Educ* 1973;48:919-27.
9. Meleca CB, Schimpfhauser FT. A house staff training program to improve the clinical instruction of medical students. In: *Proceedings of the 15th Annual Research in Medical Education Conference*. Washington: Association of American Medical Colleges; 1976. p. 267-73.
10. Lossing A, Groetzsch G. Instruction in basic technical skills. *Med Teacher* 1992;14(1):49-52.
11. Einsiedel AA, Brown LM, Ross FA. *How to conduct focus groups: a guide for adult and continuing education managers and trainers*. Saskatoon: University Extension Press; 1988.
12. Tipping J, Tenenbaum J. The use of focus groups as a tool for CME program evaluation. *J Contin Educ Health Prof* 1993;13(2):117-22.
13. Jones J, Hunter D. Consensus methods for medical and health services research. *BMJ* 1995;311:76-80.
14. American Statistical Association. *What is a survey?* Alexandria (VA): The Association; 1995.
15. Kerigan DC, Janes WW, Martin WA, Roe TJ. Physical medicine and rehabilitation residents' educational needs assessment. *Arch Phys Med Rehabil* 1993;74:687-90.
16. Grasha A. A matter of style: the teacher as expert, formal authority, personal model, facilitator and delegator. *Coll Teach* 1995;42(4):142-9.
17. Trigwell K. Increasing faculty understanding of teaching. In: Wright WA et al, editors. *Teaching improvement practices: successful strategies for higher education*. Bolton, (MA): Anker; 1995.
18. Sloan DA, Donnelly MB, Schwartz RW. The surgical clerkship: characteristics of the effective teacher. *Med Educ* 1996;30:18-23.
19. Notzer N, Stoffer S, Aronson M. Traits of the "ideal physician" as perceived by medical students and faculty. *Med Teach* 1988;10(2):181-9.
20. Steward DE, Feltovitch PJ. Why residents should teach: the parallel processes of teaching and learning. In: Edwards JC, Marier RL, editors. *Clinical teaching for medical residents: roles, techniques and programs*. New York: Springer Publishing; 1988.
21. Edwards JC, Plauche WC, Marier RL. Resident teaching: a critical review and future projections. In: Edwards JC, Marier RL, editors. *Clinical teaching for medical residents: roles, techniques and programs*. New York: Springer Publishing; 1988.