



# A Case for Horizontal Distribution of Activities between General Surgery and Surgical Super Specialties

Vivek R. Minocha<sup>1</sup> Sanjay Gupta<sup>2</sup> Arun Gupta<sup>2</sup>

<sup>1</sup> Former Professor and Head, Department of Surgery, University College of Medical Sciences (University of Delhi) & GTB Hospital, Delhi, India

<sup>2</sup> Director Professor, Department of Surgery, University College of Medical Sciences (University of Delhi) & GTB Hospital, Delhi, India

**Address for correspondence** V.R. Minocha, MBBS, MS (Surgery), 20 A, S.D.F., Sector 15A, Noida 201301, Uttar Pradesh, India (e-mail: vrminocha@yahoo.co.in).

Ann Natl Acad Med Sci (India) 2023;59:83–89.

## Abstract

Under the current practice in organizing surgical services, proportionate representation of disciplines is provided in the curricular planning and in corresponding clinical functions. This is based on the level of competence expected by the end of training period. The disciplines as a “whole” are placed in general surgery or super specialty. The system of vertical arrangement has some serious concerns. Paradoxically, patients with diseases of simple and routine nature of discipline categorized as super specialty are neglected. Super specialist is unable to attend on account of preoccupation with serious challenging problems. The general surgeon hesitates because of privileging issues, fear of allegations of negligence and litigation. The system of vertical division is based on premise that some disciplines deal with complex procedures and others with only simple and routine nature. This premise is incorrect. Each discipline is a mix of simple and complex cases requiring specialized treatment. Alternate modified organization of surgical service is proposed. Activities of all disciplines are scrutinized according to the level of expected competence by the end of training. Categorization is shifted from the “discipline” to “activities.” Criteria applied for classification of activities are as follows: on completion, the trainee is capable to assume full responsibility-category 1; has gained sufficient experience-category 2; and is conversant with broad understanding of management-category 3. Activities of category 1 from all disciplines are assigned to general surgery and those of category 3 from all disciplines are assigned to respective super specialty. Those in the middle, comprising difficult cases but not requiring specialized training or heavy inputs in equipment, are in category 2. They are assigned to general surgery as additional/optional items, or super specialty, guided by local factors. The scope and practice of general surgery are

## Keywords

- ▶ surgery
- ▶ general surgery
- ▶ comprehensive surgery
- ▶ surgical super specialties
- ▶ rational organization
- ▶ surgical services

article published online  
April 11, 2023

DOI <https://doi.org/10.1055/s-0043-1763271>.  
ISSN 0379-038X.

© 2023. National Academy of Medical Sciences (India). All rights reserved.

This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

broadened with a shift from “residual” to “comprehensive” discipline. Advantages, concerns, collateral issues of horizontal distribution of activities, its positive impact on research and education are discussed. It is concluded that the proposed organization of surgical services is a rational, logical, and practical strategy for good-quality surgical care in the society. The super specialists need to be convinced that “taking load off” is good for the specialty.

## Introduction

Over the past few decades, we have witnessed vast expansion of knowledge and emergence of technologies in medical science. It has resulted in widening the scope of surgical management of complicated cases and undertaking complex procedures. Dedicated departments are established to provide services and for training purposes. The super specialty services achieve better outcomes in complex cases and are here to stay. A number of disciplines have emerged and recognized as surgical super specialty for some disciplines. There is justifiable increasing demand for similar status for more disciplines.

In the back drop of glamour of super specialties, status accorded to the discipline of general surgery does not commensurate with the responsibility bestowed on it. Quite often, opinions are articulated that there is no place for general surgery in the era of specialization and the discipline is dead.<sup>1</sup> On the contrary, it has been opined that the general surgeons have to play much more important and complex role.<sup>2</sup> Occasionally, these disciplines are referred to as sub-specialties. The nomenclature whether super or sub is not relevant. Important issue is relative positioning of different disciplines in the overall organization of surgical services with optimal utilization of trained manpower.

The aim of organizing care services for surgical diseases is a challenging task and is dependent on utilization pattern of trained surgical work force. It is contended that assignment of activities/responsibilities between different disciplines is the major issue.

## Current Scenario

The department of general surgery is the parent department for conducting training programs for basic certification in surgery for both undergraduate and post graduate studies. The clinical functions are organized to meet the teaching requirements. Teaching/learning activities are carried out as part of patient care, thus ensuring adequate exposure and hands-on-experience. Separate staff for teaching only is not provided. With emergence of multiple surgical super specialties, though not clearly defined, surgical disciplines are assigned to general surgery or superspecialties based on the level of competence expected of the trainees at the end of training. Influenced by this vertical arrangement, there is a trend of reflex referral of patients to superspecialty services without any attempt at initial evaluation or basic investiga-

tions. By and large, superspecialty departments do not restrict intake to only referred patients. Usually, there is no facility for prehospital screening. Also, there is no effective linkage between primary care providers and hospitals.

General surgery as a discipline includes knowledge of and management of diseases of organs of wide spectrum of systems. The universities/teaching institutions and the examining bodies follow proportionate representation of different disciplines in their curricular planning. The aim of general surgery training is to address the issue of surgical manpower to best serve the public good.<sup>3</sup> Breadth of training in general surgery is essential for all branches of surgical practice.<sup>4</sup> System of rotation to other disciplines is practiced wherever needed for comprehensive coverage of learning objectives. There are variations in disciplines for and duration of rotation across institutions. Appropriate educational technology is utilized in all disciplines.

There are diverse motivating factors for opting for super-specialties. The prime mover is desire of individuals in accepting challenges of undertaking difficult and complex procedures. Aspirants are willing to devote extra time and finances for further higher training. However, apart from the legitimate reason, there are other important considerations for opting for super-specialties arising from lifestyle and financial issues, and the number of residents opting for careers in general surgery are getting reduced.<sup>5,6</sup>

## Shortcomings

The widely practiced current system classifies surgical disciplines as a “whole” comprising care of both complex procedures and those of routine nature. Such a scheme of vertical arrangement of surgical disciplines has certain limitations. A surgeon who has undertaken special training to acquire essential advanced skills in superspecialty discipline is likely to be involved, rightly so, in the care of patients with complicated diseases and complex procedures to the point of exclusion of patients requiring procedures of routine nature, for which no additional training is required but which is involving an organ of superspecialty discipline. In contrast, involvement with routine and simple cases may overwhelm the superspecialist, which may not permit adequate time and attention to complicated cases and challenging problems, for which the super-specialty department is established in the first place. General surgeons may be handicapped in care of such patients with diseases of routine and simple nature belonging to the super-specialty discipline, even though they have the requisite

competence and confidence for the management on account of privileging, professional liability concerns, fear of allegations of negligence and litigation.

Thus, paradoxically, patients with simple diseases of routine nature are likely to be neglected. Overwhelming trend for superspecialization resulting in the shortage of manpower in general surgery has serious implications for the health care delivery.<sup>7-9</sup>

Is there an alternative? Yes. There is.

## Alternative

The system of vertical arrangement of disciplines is based on the premise that there are some disciplines dealing with complex procedures and others with procedures of only a simple and routine nature. However, this premise is not correct. Each discipline is a mix of simple routine as well as of complex nature cases requiring specialized treatment.

It is therefore incumbent to consider modification of organization of services to achieve the learning objectives for the purpose providing trained surgical manpower. Activities/procedures within each discipline may be scrutinized to classify according to the level of competence expected from trainees. Criteria applied for the classification of activities are as follows: on completion, the trainee is capable to assume full responsibility-category 1; has gained sufficient experience-category 2; and is conversant with broad understanding-category 3. It may be emphasized that there is a shifting of categorization from “discipline” to “nature/character of the activities of each branch as per defined criteria.” Every discipline will have components of category 1, 2, or, 3 in variable proportion.

Activities of simple and routine nature requiring no more than usual training and equipment of all discipline are put in category 1, those requiring additional advanced dedicated training, sophisticated equipment, and infrastructure are categorized as category 3. Those in the middle comprising some difficult cases, which may require some additional orientation but not requiring heavy inputs in equipment or specialized training, are categorized as category 2.

Activities of category 1 of all disciplines are part of general surgery and those of category 3 are in the respective superspecialty. Category 2 activities are assigned to either general surgery as additional/optional activities or superspecialty depending on local factors comprising case load, infrastructure, interest of staff, etc.

The clinical services are organized accordingly aimed at meeting educational requirements. The proposed rational organization is schematically represented in ► **Fig. 1**.

Due attention is merited for authorization for clinical functions including operative work to the staff as per the proposed organization. Privileging is a managerial tool granting permission to staff of the department basically aimed at quality assurance. The process of privileging is not a part of certification or examining bodies but is the responsibility of institutions.<sup>10</sup> A list of privileged specific procedures needs to be reviewed regularly. Addition of new procedures in privileges list is based on careful objective evaluation of

competence. Maintaining acceptable level of quality of care is a difficult and challenging task requiring continuing education and organizing workshops, etc. This is true for all branches of surgery. It is to be appreciated that quality and safety issues addressed voluntarily are more effective and reduce chances of intrusive actions.<sup>11</sup>

**Changing Scenario: Shift from “general” to “comprehensive” discipline**

The activities in category 1 across all disciplines are included in general surgery as primary constituents of general surgery forming “essential core service,” which is indispensable for basic certification. The scope of general surgery is thus broadened. The practice and concept of general surgery are shifted from “residual” to what could be termed “comprehensive” discipline.

Primary responsibilities of parts from each surgical discipline help achieve harmonious synthesis of constituents, leading to integrated comprehensive teaching/learning and training instead of collage of fragments. There may not be necessity for rotation to superspecialty for orientation to basic aspects of the concerned specialty. This arrangement will have desirable impact on undergraduate medical and post graduate studies in surgery, for training of “family physician” and “surgical specialist.” It may also provide opportunity for making informed decision in choosing superspecialty training, having been exposed to some aspects of all the disciplines, albeit of simple nature. It is a common observation that candidates apply for more than one superspecialty course.

In addition to discharging responsibility to “core essential,” general surgeons may take interest and participate in some of activities in category 2 included as additional/optional activities in general surgery. This will be intellectually and professionally satisfying experience and should be encouraged. However, due caution is needed to ensure that responsibility of essential core primary constituents is not diluted in any way. It is possible that same activity may be opted by more than one staff as per individual's interest. This merits to be accommodated. All staff members may be persuaded to participate in one or more activities of category 2 so as to have maximal coverage of optional items. Desirably, the aim should be to attempt to include all category 2 activities in general surgery in the true spirit of broad-spectrum service.

Planning of infrastructure requirement comprising hospital beds, operation theatres, OPD facilities, office space, staff, ancillary services, etc. should take into account additional commitment.

Progressive specialization of optional category 2 activities within the constituents of general surgery is feasible and will provide breadth of services expected of general surgery.<sup>12,13</sup> Shortened integrated training strategy has been recommended, which may require logistic and financial considerations.<sup>14</sup>

Distribution of activities among disciplines is dependent on many factors such as case load, infrastructure, and training opportunities. Each institution is expected to formulate the list of “core essential” and “advanced/additional” topics. Professional associations/regulatory bodies may provide guidelines. A list of suggestion of some activities/topics is included as example in the proposed curriculum for postgraduate training in surgery submitted to the Medical Council of India.<sup>15</sup>

## HORIZONTAL DISTRIBUTION OF ACTIVITIES IN ALL DISCIPLINES

Activities categorized as per level of expected competence by end of training

Three categories :

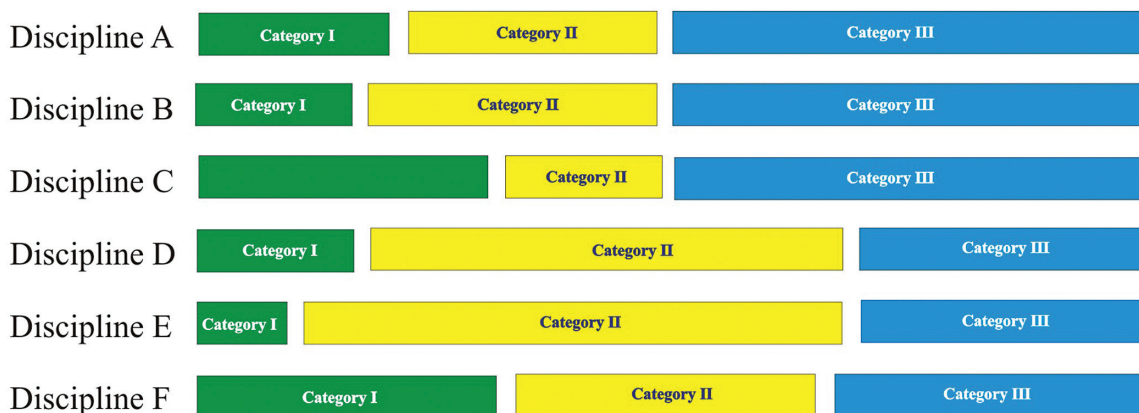
Category I : Trained to assume full responsibility

Category II : Gained significant experience

Category III : Orientation and broad understanding of management

Categorization shifted from discipline to activities

Size of each category is variable across the disciplines



Overlap in different categories :



Assignment :

Category 1 : General surgery

Category 2 : Either - Local factors : General surgery as optional OR Super speciality

Category 3 : Super specialty

**Fig. 1** Horizontal distribution of activities in all disciplines.

### Advantages

There are distinct advantages of such horizontally placed activities. The superspecialty departments may be able to

devote more attention and time to complex procedures, for which the superspecialty was established in the first place. Patients needing attention of routine nature are taken care of by trained surgeons, and unnecessary referrals are avoided.

The suggested system is useful for providing satisfactory service as well as training commitments. The discipline of general surgery is expected to play an important role in the health care delivery system,<sup>16</sup> and proposed organization of surgical service will facilitate this role.

## Collateral Issues

Under the proposed organization, the general surgical practitioners in whatever setting, teaching, community, charity, corporate hospital, or private clinics, are likely to deal with more variety of cases. One direct result is the number of patients in any one condition is small and consequently of reduced experience in every item. This limited experience in a particular procedure may have some apprehension about the competence of the surgeon. This apprehension, however, is unfounded as basic surgical skills are same across all disciplines.

Also, the possibility of large personal/institutional series is reduced, which may be perceived as a negative feature. It actually is a positive feature for satisfactory comprehensive patient care and clinical research. Under the proposed scheme, the research is undertaken by multi-institutional collaborative data collection, and the patient care follows practice guidelines/protocols developed for decision making in the management instead of personal anecdotal observations. It is increasingly being recognized to develop and follow clinical pathways and practice guidelines for efficient and cost-effective patient care.<sup>17</sup>

Advancement within the primary constituents of general surgery will provide breadth of services expected of general surgery requiring complex manpower planning.<sup>12</sup> Shortened integrated training may need logistic and financial support. It must be ensured that “essential core” topics are not compromised while paying attention to acquiring additional skills for optional items.

The aim of surgical research is to encourage curiosity and critical appraisal and helps achieving open and interdisciplinary problem solving approach in improving patient care.<sup>18,19</sup> Research activities by trainees enhance chances for career progression. Properly supervised research reinforces education of future surgeons.<sup>20</sup> Modified organization of surgical services as “comprehensive surgery” departments will have opportunities to engage in relevant research activities to address a wider range of surgical issues prevalent in the society.

Advanced Trauma Life Support (ATLS) course initially designed for rural practitioners is recommended to be included as part of training objectives of general surgery.<sup>21</sup> It is desirable to extend the application of ATLS protocols to all emergency surgical cases or may even be to all patients attending casualty/emergency department pertaining to all departments. It may be worthwhile to modify the term “ATLS”-“Advanced Trauma Life Support” to “ALS”-“Advanced Life Support.”

Though trauma is not on focus in this presentation, it may briefly be mentioned that establishing separate “standalone” trauma centers, which are being advocated widely, are of

doubtful value in the context of serving all trauma victims in a given community, notwithstanding improved outcomes in the institutional statistics of “Trauma Centre,” which may as well be due to better infrastructure and availability of equipment. It may briefly be mentioned that care of trauma victims in the community is likely to be improved more by establishing multi-specialty hospitals not trauma centers, network of peripheral centers for stabilizing, and well-equipped ambulance service. Trauma victims need to be treated as any other emergency patients. Surgeons with broad-spectrum training are better placed in dealing with such situations.

It may briefly be mentioned that establishing specialty of “Traumatology,” “Emergency Medicine/Surgery,” etc., independent of main discipline does not appear logical. Trauma victims are likely to have involvement of multiple organs and are best attended to by a broadly trained surgical team. Experience in elective cold routine cases is useful in emergency situations. Referral to other departments are made selectively for specific problems and advanced interventions to the respective superspecialty service.

Departments of surgery in teaching institutions are mandated to train suitable manpower for future general surgeons, surgical superspecialists, and family physicians. Teaching program of the department is directed to undergraduate medical students, interns, postgraduate students and senior residents in surgery, continuing education, incorporating new procedures, and maintaining learnt skills. Curriculum planning and strategy to address the wide spectrum of teaching role needs to be planned holistically. The challenging task for the academic departments is to train manpower in general surgery for mentoring medical students and residents may require opportunities for acquiring teaching skills and technologies.<sup>22</sup>

Separate staff for teaching exclusively is not required, and the teaching is carried out as part of regular clinical responsibility. Proper infrastructure is required to ensure that both functions are carried out without disturbing each other.<sup>23</sup> Unfortunately, teaching is accorded low priority and the faculty is not rewarded adequately for the time and effort in teaching. It needs to be emphasized that patient care is not an addendum to but essential constituent of medical teaching. It has rightly been pointed out that teaching activities contribute to patient care.<sup>24</sup>

Practice currently in vogue for holding an all India examination aimed at reducing stress of multiple examinations, with objective-type question system, for uniformity for admission to MS/MD during internship and to M.Ch/DM during senior residency has serious implications on training opportunities.<sup>25,26</sup> Admission process to these courses for candidates with wide variations in the qualifying examinations merits to be revisited.

The system of rotation to superspecialties departments currently in vogue for exposure to diseases in category 3 activities with expected competence of “only broad understanding of management” is dispensed with. Cognitive aspects of specialized disciplines can easily be covered by lectures/discussions and other educational tools. The learner

gets more time in the main department and has larger opportunity for observation, hands-on experience, and participation in the management of wide range of surgical diseases including from the disciplines of subspecialty sections. Innovations and application of modern educational technology contribute to improving educational outputs. There are programs for providing adequate exposure and competence in medical educational technology in distance learning and institutional formats.<sup>27</sup>

Simulation as a teaching and assessment tool for imparting skill training is being recognized.<sup>28,29</sup> The aim is that the learner acquires minimal level of competence on simulators before actually performing on human patients. Wide range of skills can be practiced including basic clinical skills of injections, blood sampling; dressing and splinting, etc.; essential surgical skills of knotting, suturing, anastomoses etc.; advanced surgical procedures such as endoscopy and laparoscopy etc. Simulators consisting of models and mannequins, synthetic material mimicking tissues, animal tissues, training boxes for laparoscopy, virtual reality, etc. are being increasingly used for skill learning and assessment for core competencies.<sup>30</sup> Surgical skill laboratory, which may be considered an essential component of teaching department, is still underutilized.<sup>31</sup>

Training in general surgery is a pre-requisite for recruitment to superspecialty courses. Approximately less than half of the trainees are estimated to continue in the discipline of general surgery.<sup>32</sup> Organization of services with inclusion of parts of all disciplines provides opportunity to prospective candidates for informed decision in identifying area of interest and choosing courses for further training. It is a common observation that most candidates apply for more than one course.

## Apprehensions and Critiques

The scheme of broadening the scope of general surgery by including some activities from disciplines recognized as super/subspecialization is feared with apprehensions. It may be perceived as a retrograde step and is not considered a viable proposition. It may be alleged that surgical care is being provided by semi-/untrained surgeons, which may have serious professional liability concerns. Nevertheless, it is emphasized the scheme is a step in right direction. Broad-based surgical training is effective in achieving high-quality surgical services without compromising on the overall quality and containing costs. It is good not only for developing countries such as India but also has a global appeal.

It is perceived by some that surgical care in the hands of general surgery is not cost-effective or efficient in quality.<sup>33</sup> These criticisms are unfounded and are based on the consideration of territorial interests of the “super specialty” departments instead of adopting an appropriate problem-solving approach; utilizing the talent is in the best interest of care. Perception that general surgeon is a multiple superspecialist rolled into one is erroneous. As explained earlier, only some selected items are included in the general surgery, which do

not require special equipment or detailed further training, and the trained general surgeon is competent to discharge the responsibility. Superspecialists need to be convinced that “taking off load” is good for the specialty.

Objective of better outcomes and reducing defective service is a reasonable goal; however, the concern is how to achieve this. Super specialization may appear to be an obvious simple solution intuitively. However, fragmentation and lack of continuity are not in the best interest of patient care.<sup>34</sup>

A part of resistance in accepting the concept arises from the use of value-loaded term “super,” indicating higher status to some disciplines as compared to others in terms of social hierarchy and financial compensation in both organized service and self-employed. This distortion needs to be corrected.

## Conclusion

Horizontal distribution of activities between general surgery and surgical super specialties is a rational, logical, and practical strategy for organizing good-quality surgical services covering full-spectrum of surgical diseases with wide reach out in the community.

### Authors' Contributions

V.R.M.: Contributed to initiating the concept, developing it further, drafting manuscript, revising to include comments, finalizing, and submission. S.G.: Contributed to concept, comments on the draft and finalizing manuscript. A.G.: Contributed to concept, comments on the draft and finalizing manuscript.

### Conflict of Interest

None declared.

## References

- 1 Silen W. Where have the general surgeons (doctors) gone? *Am J Surg* 1992;163(01):2–4
- 2 Decker MR, Kwok AC, et al. Specialization and the current practice of general surgeons. *J Am Coll Surg* 2014;218(01):8–15
- 3 Ritchie WP Jr. Basic certification in surgery by the American Board of Surgery (ABS): what does it mean? Does it have value? Is it relevant? A personal opinion. *Ann Surg* 2004;239(02):133–139
- 4 Richardson JD. The role of general surgery in the age of surgical specialization. *Am Surg* 1999;65(12):1103–1107
- 5 Henningsen JA. Why the numbers are dropping in general surgery: the answer no one wants to hear—lifestyle!. *Arch Surg* 2002;137(03):255–256
- 6 Borman KR, Vick LR, Biester TW, Mitchell ME. Changing demographics of residents choosing fellowships: longterm data from the American Board of Surgery. *J Am Coll Surg* 2008;206(05):782–788, discussion 788–789
- 7 Bass BL. Fundamental changes in general surgery residency training. *Am Surg* 2007;73(02):109–113
- 8 Stain SC, Biester TW, Hanks JB, et al. Early tracking would improve the operative experience of general surgery residents. *Ann Surg* 2010;252(03):445–449, discussion 449–451
- 9 Lyng DC, Larson EH, Thompson MJ, Rosenblatt RA, Hart LG. A longitudinal analysis of the general surgery workforce in the United States, 1981–2005. *Arch Surg* 2008;143(04):345–350, discussion 351

- 10 Dent TL. Training and privileging for new procedures. *Surg Clin North Am* 1996;76(03):615–621
- 11 Rhodes RS, Biester TW. Certification and maintenance of certification in surgery. *Surg Clin North Am* 2007;87(04):825–836, vi
- 12 Stitzenberg KB, Sheldon GF. Progressive specialization within general surgery: adding to the complexity of workforce planning. *J Am Coll Surg* 2005;201(06):925–932
- 13 Loeffler IJP. Are generalists still needed in a specialised world? The renaissance of general surgery. *BMJ* 2000;320(7232):436–440
- 14 Coleman JJ, Esposito TJ, Rozycki GS, Feliciano DV. Early subspecialization and perceived competence in surgical training: are residents ready? *J Am Coll Surg* 2013;216(04):764–771, discussion 771–773
- 15 Minocha VR. Proposed curriculum for postgraduate training in surgery. Document prepared for the Medical Council of India. 2001.
- 16 Rhodes RS. Defining general surgery and the core curriculum. *Surg Clin North Am* 2004;84(06):1605–1619, xi
- 17 De Allegri M, Schwarzbach M, Loerbroks A, Ronellenfitsch U. Which factors are important for the successful development and implementation of clinical pathways? A qualitative study. *BMJ Qual Saf* 2011;20(03):203–208
- 18 Sitges-Serra A. Research during higher surgical training: a luxury or a must? *Ann R Coll Surg Engl* 1995;77(01):1–2
- 19 Anonymous. Does research make for better doctors? *Lancet* 1993;342(8879):1063–1064
- 20 Taylor I, Cooper A. Surgical research: is it important for training? *Br J Surg* 1987;74(12):1073–1074
- 21 Esposito TJ, Kuby A, Unfred C, Gamelli RL. General surgeons and the advanced trauma life support course: is it time to refocus? *J Trauma* 1995;39(05):929–933, discussion 933–934
- 22 Debas HT, Bass BL, Brennan MF, et al; American Surgical Association Blue Ribbon Committee. American Surgical Association Blue Ribbon Committee Report on Surgical Education: 2004. *Ann Surg* 2005;241(01):1–8
- 23 Bulstrode C, Holsgrove G. Education for educating surgeons. *BMJ* 1996;312(7027):326–327
- 24 Jain AK. Teaching-learning: an integral component of sound patient care. *Indian J Orthop* 2008;42(03):239–240
- 25 Minocha VR. National Medical Commission Bill: a note for consideration by the Parliamentary Standing Committee. *MAMC J Med Sci* 2018;4:1–3
- 26 Minocha VR. Reform for examinations for Delhi University's Faculty of Medical Sciences—a paper for discussion. *J High Educ (Columb Ohio)* 1996;19:579–584
- 27 Buyske J. The role of simulation in certification. *Surg Clin North Am* 2010;90(03):619–621
- 28 Minocha VR. Surgical Skill Laboratory- an essential component of educational infrastructure. *Surg J North India* 2002;18:56–61
- 29 Minocha VR. Role of clinical skill laboratory in surgical training. Dr. S.K. Sen Memorial Oration at Surgicon. Paper presented at -Annual Conference of Delhi State Chapter of Association of Surgeons of India, 2004
- 30 Sachdeva AK, Bell RH Jr, Britt LD, Tarpley JL, Blair PG, Tarpley MJ. National efforts to reform residency education in surgery. *Acad Med* 2007;82(12):1200–1210
- 31 Whitcomb ME. Competency-based graduate medical education? Of course! But how should competency be assessed?. *Acad Med* 2002;77(05):359–360
- 32 Richie WP. What the future may hold for general surgery. A position paper of the American Board of Surgery. *J Am Coll Surg* 1995;180(04):481–484
- 33 Dunnington GL, DaRosa DA. Changing surgical education strategies in an environment of changing health care delivery systems. *World J Surg* 1994;18(05):734–737, discussion 733
- 34 Klingensmith ME, Potts JR, Merrill WH, et al. Surgical training and the early specialization program: Analysis of a national program. *J Am Coll Surg* 2016;222(04):410–416