Influence of Trainer Role, Subspecialty and Hospital Status on Consultant Workplace-based Assessment Completion

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OBJECTIVE: Performance assessment is challenging to administer and validate, yet remains central to patient safety and quality of care. The aim of this study was to evaluate Consultant Surgeon trainer performance with respect to Workplace Based Assessment (WBA) completion.

DESIGN: All WBAs for 60 Core Surgical Trainees (n = 2932) recorded in one academic year were analyzed using the Intercollegiate Surgical Curriculum Progamme. Primary outcome measures were numbers of WBAs performed related to trainer role (Assigned Educational Supervisor vs. Clinical Supervisor vs. No Training Role), gender, surgical subspecialty, hospital status (teaching vs. district general), and trainer RCSEng. TrACE course accreditation.

SETTING: A core surgical training program serving a single UK (Wales) deanery.

PARTICIPANTS: Sixty consecutively appointed core surgical trainees.

RESULTS: Median WBA number performed irrespective of trainer role was 6 (range 0-51), consisting of CBD 2 (0-18), mini-CEX 2 (0-22), DOPS 2 (0-32), and PBA 0 (0-10). Assigned Educational Supervisor trainers were more likely to complete the full range of WBAs compared with Clinical Supervisor and No Training Role assessors; WBA 17 vs. 6 vs. 3; CBD 5 vs. 2 vs. 1; mini-CEX 5 vs. 2 vs. 1; DOPS 4 vs. 2 vs. 1; and PBA 0 vs. 0 vs. 0 ($p < 0.001$). WBAs completed varied by subspecialty; first quartile performance: ENT, Plastic Surgery, (median 12, interquartile range 13), compared with fourth quartile: OMFS, Urology, T&O, and Cardiothoracic Surgery (median 5, interquartile range 11, $p = 0.016$). Hospital status, gender, and TrACE accreditation were not associated with WBA performance.

CONCLUSIONS: Important variations in trainer WBA completion were apparent; training programme directors and trainees alike should be aware of this when agreeing educational contracts. (J Surg Ed 76:1068−1075. © 2019 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Surgical training, Trainer quality, Workplace based assessment, Core surgical training

COMPETENCIES: Medical Knowledge, Professionalism, Practice-Based Learning and Improvement

INTRODUCTION

Performance evaluation has long been central to medical practice in all of its clinical, clerical, and political arenas. Contentious, complex, and challenging to execute, yet alone validate, quality assurance of performance is fundamental to patient safety in the modern National Health Service.[1] The concept of competence-based progression was introduced to the United Kingdom in 2004, following the implementation of Modernising Medical Careers, which proposed that the knowledge, skills, and attitudes of trainees should be assessed to a satisfactory standard before progression.[2,3] Workplace Based Assessments (WBAs) were introduced in 2007 and provide both formative and summative assessment to support learning.[4]

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Within the Intercollegiate Surgical Curriculum Programme (ISCP) platform, a mandatory online portfolio, trainees are assessed with a variety of WBAs; ranging from reflective clinical encounters (Case Based Discussions [CBDs] and Mini-Clinical Evaluation Exercises [Mini-CEXs]), to technical Procedure Based Assessments (PBAs) and Direct Observation of Procedural Skills (DOPS).[5] All trainees are required to have a formal review of the evidence relating to their performance in key speciality specific domains, termed Annual Review of Competence Progression (ARCP).[6] Satisfactory ARCP outcome is determined by a broad sweep of factors but a defined minimum WBA number and competence level is core in the decision process, yet no consensus exists regarding specific targets or their overall value.[7–9]

Trainees often cite poor trainer engagement with ISCP and likewise, misunderstanding of the assessment tools themselves as key factors in driving a negative perception regarding WBAs.[10–13] The desirable attributes that define a successful surgical trainer have been widely reported and reinforced by General Medical Council guidance, these include positive engagement with WBAs.[14–17] Moreover, the Royal College of Surgeons of England (RCSEng) has developed Training and Assessment in the Clinical Environment (TrACE),[18] a full-day course mapped to GMC standards for the recognition and approval of trainers,[19] and aimed at raising the standard of clinical and educational supervision. Although not mandatory, it has been strongly recommended for training assessors in all United Kingdom (UK) deaneries since its inception in 2015. The aim of this study was to evaluate Consultant Surgeon trainer performance with respect to WBA completion. Outcome measures evaluated were numbers of WBAs performed related to trainer status (Assigned Educational Supervisor [AES] vs. Clinical Supervisor [CS] vs. No Training Role [NTR]), gender, surgical subspecialty, hospital status (teaching vs. district general), and RCSEng TrACE accreditation.

METHODS

UK postgraduate surgical training structure is illustrated in Figure 1. After an initial 2 year foundation programme potential surgeons are appointed to either a run-through training programme lasting 8 years, in a surgical specialty (Neurosurgery, Cardiothoracics and Trauma & Orthopedics). If performance is satisfactory then this leads to completion of training. Alternatively trainees in most surgical specialties are appointed to Core Surgical training (CST), a 2 year programme after which a further round of competitive selection leads to appointment to a higher surgical training programme, a 5 or 6 year programme in their chosen specialty. Throughout training, supervision is provided by consultant surgeons who have 1 of 2 formal roles: AES or CS; alternatively the supervising surgeon may have NTR. The AES has overall educational and supervisory responsibility for the trainee including setting objectives for the placement, completing assessments, mentoring and providing pastoral support. Guidance suggests that approximately 1 hour per week per trainee should be allocated in a consultant's job plan to fulfil this role. The CS is responsible for delivering training under the delegation of, and in liaison with the AES; they also complete WBAs to facilitate trainee evaluation and progression.[20] A trainer with no formal role may still undertake these tasks but with no mandatory requirement. No additional contracted time is allocated to clinical supervisors or those with no training role. If a trainer does not fulfil their obligations

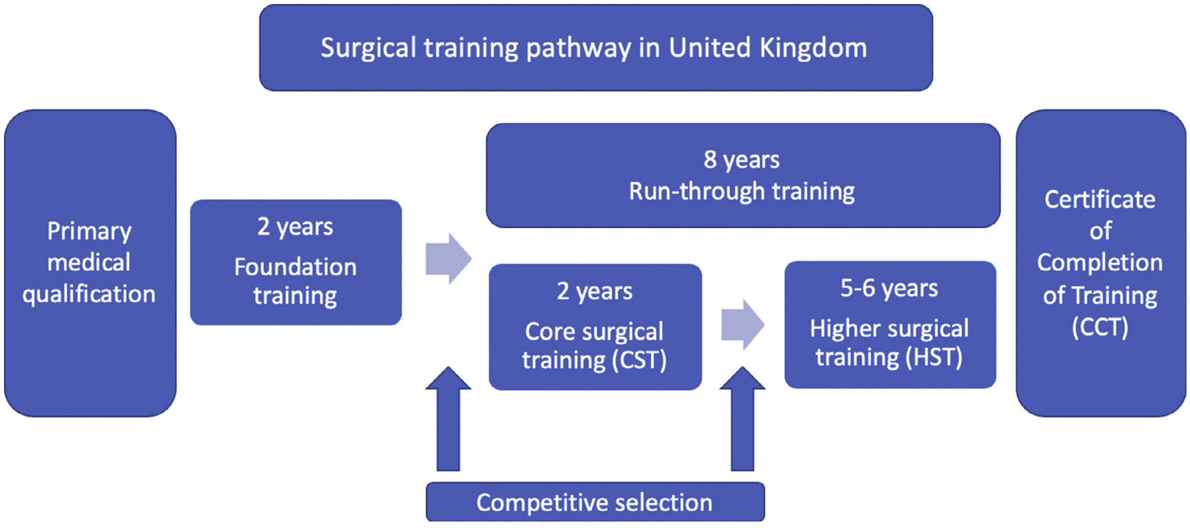

FIGURE 1. Structure of surgical training in the United Kingdom.

they may have their trainee reassigned by the local training programme director.

Training placements take place in both teaching and district general hospitals (DGHs). Teaching hospitals will likely be the primary hospital for a medical school with higher numbers of academic clinicians and provide tertiary services on a regional basis. A DGH provides secondary care services for its local population and will also host medical students.

Consecutive, nationally appointed CSTs enrolled on the Core Surgical Training programme between August 2016 and August 2017 in a single UK deanery were identified from the Deanery roster and ISCP. Formal permission under the ISCP Data Governance Structure was not required because the study was in keeping with a Deanery training service evaluation. All WBAs (mini-CEX, CBD, DOPS, and PBA) submitted by the trainees and validated by a Consultant trainer were identified using the ISCP Head of School report function. Submitted WBAs without consultant-validation were excluded from the analysis. Deanery records were used to identify trainers with a designated training role (AES or CS) and further demographics including gender, surgical specialty, hospital status, and completion of the RCSEng TrACE course.

Statistical Analysis

The primary outcome measure was the number of WBAs performed related to trainer status (AES vs. CS vs. NTR). Secondary outcome measures included numbers of WBAs performed and level of WBA awarded, related to surgical subspecialty, hospital training status (teaching vs. district general), trainer gender, and completion of the RCSEng TrACE course. Differences in the number and type of WBA completed by different groups were compared with Mann-Whitney U tests or Kruskal-Wallis H tests. Associations between categorical variables were tested using Pearson's chi-square test. Statistical analysis appropriate for nonparametric data was conducted using IBM SPSS Statistics 25 (IBM, Armonk, NY) and GraphPad Prism 7 (GraphPad Software, La Jolla, CA). A p value of less than 0.050 was considered significant.

RESULTS

Consultant Profile

WBAs were submitted by 60 CSTs and validated by 273 consultant surgeons (male 241 [88.3%], female 32 [11.7%]), working across 9 surgical specialties and 13 hospital sites (2 teaching and 11 DGHs). Designated training roles were identified for 180 consultants (65.9%), comprising 78 AES (28.6%), and 102 CS (37.4%). The remaining 93 consultants (34.1%) were assessors with no specified training role. Trainer profiles and demographics are shown in Table 1.

Workplace Based Assessments

There were 2932 validated WBAs completed comprising: 936 mini-CEX (31.9%), 923 DOPS (31.4%), 910 CBDs (31.0%), and 163 PBAs (5.6%). The highest number of WBAs were completed by trainers designated as AES, followed by CS and NTR clinicians (median [IQR] 17[19]) vs. 6[12] vs. 3[4], $\chi^2[2] = 56.254$, $p < 0.001$; Fig. 2). The range of WBAs related to trainer role is shown in Table 2. A total of 18 trainers did not complete a single WBA, this varied according to trainer role: AES 3/78 (3.8%), CS 13/102 (12.8%), and NTR 2/93 (2.2%), $\chi^2[2] = 9.725$, $p < 0.008$.

TABLE 1. Trainer Role Related to Gender, Hospital Status and Specialty

		Consultant Trainer Role			
		Total	AES	CS	No Training Role
		273	78	102	93
Gender	Male	241	64	96	81
	Female	32	14	6	12
Hospital status	Teaching	150	38	68	44
	District general	123	40	34	49
Specialty	Orthopedic surgery	74	24	24	26
	General surgery	81	24	29	28
	ENT surgery	29	9	10	10
	Urology	28	4	14	10
	Plastic surgery	19	1	11	7
	Vascular surgery	17	8	4	5
	Neurosurgery	12	5	5	2
	OMFS	10	2	4	4
	Cardiothoracic surgery	3	1	1	1

AES, Assigned Educational Supervisor; CS; Clinical Supervisor; ENT, Ear, nose and throat; OMFS, Oral and maxillofacial surgery.

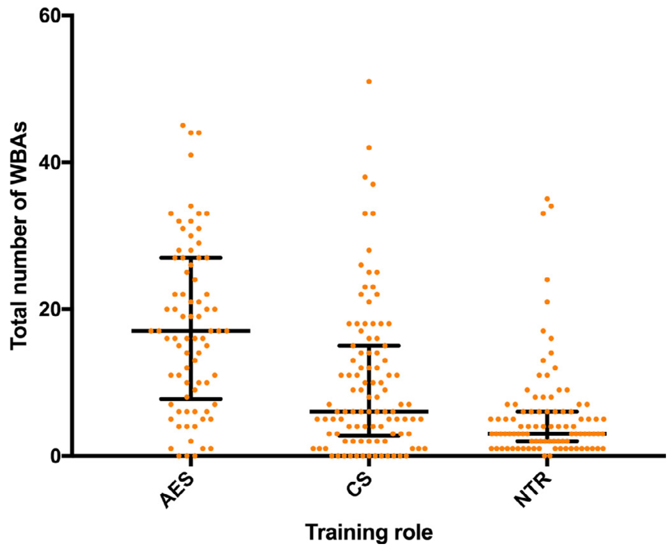

FIGURE 2. Scatterplot of total number of WBA completed by training role. Bars are medians with interquartile range. AES, Assigned Educational Supervisor; CS, Clinical Supervisor; NTR, No training role.

TABLE 2. Number of Work-Based Assessments (WBA) Completed Related to Training Role

	All Trainers	AES	CS	No training role
Total WBA	6 (14)	*17** (19)	6 (12)	3 (4)
CBD	2 (5)	*5** (6)	2 (4)	1 (2)
Mini-CEX	2 (5)	*5** (6)	2 (4)	1 (2)
DOPS	2 (5)	*4** (6)	2 (5)	1 (2)
PBA	0 (1)	*0** (6)	0 (5)	0 (2)

All values median (interquartile range).
AES, Assigned Educational Supervisor; CS, Clinical Supervisor; CBD, case based discussion; mini-CEX, clinical evaluation exercise; DOPS, direct observation of procedural skill; PBA, procedural based assessment.
*Significant to <0.001.

The median level of WBA awarded was 2 (IQR 0). There was no significant difference in the median level of WBA by trainer role $\chi^2(2) = 2.608$, p = 0.271.

Influence of Surgical Subspecialty

Consultant surgeons worked across 9 surgical subspecialties, namely Cardiothoracic Surgery, Ear, Nose, and Throat (ENT), General Surgery, Neurosurgery, Oral and Maxillofacial Surgery (OMFS), Plastic Surgery, Trauma and Orthopedic Surgery (T&O), Urology, and Vascular Surgery. The number of AES, CS, and NTR clinicians working within each subspecialty are shown in Table 1. The total number of WBA numbers completed varied significantly by surgical subspecialty (see Fig. 3); first quartile (ENT and Plastic Surgery), median [IQR] 12 [13], compared with fourth quartile (OMFS, Urology, T&O, and Cardiothoracic Surgery), median 5 [11]; $\chi^2(3) = 10.273$, p = 0.016. There was a significant difference in the number of CBD ($\chi^2(3) = 10.424$, (p = 0.015) and DOPS ($\chi^2(3) = 12.333$, p = 0.006) completed by subspecialty but there is no significant difference in the numbers of CEX, and PBA completed (Table 3). The level of WBA awarded did not vary significantly across specialties ($\chi^2(8) = 8.251$, p = 0.409).

Influence of Hospital Training Status

A total of 1574 WBAs were completed by trainers in the 2 teaching hospitals compared with 1358 WBAs completed in the 11 DGHs. Consultants in teaching hospitals were less likely to be an AES or NTR clinicians than DGH counterparts, but more likely to be a CS; AES 38/150 vs. 40/123; CS 68/150 vs. 34/123; no training role 44/150 vs. 49/123, $\chi^2(2) = 9.072$, (p = 0.011). See Table 4 for adjusted residuals. The median number of total WBAs completed per consultant was similar irrespective of hospital training status; teaching vs. DGH, median 7, IQR 12 vs. median 6, IQR

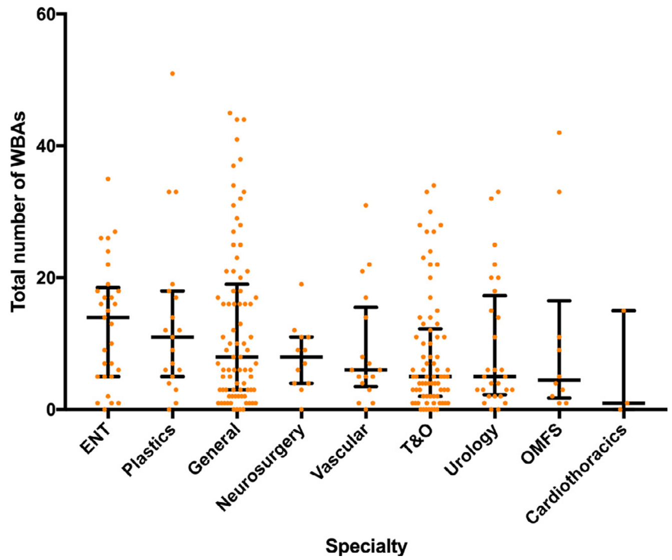

FIGURE 3. Scatterplot of total number of WBA by specialty. Bars are medians with interquartile range. ENT, Ear, nose and throat, T&O, Trauma and orthopedics; OMFS Oral and maxillofacial surgery.

TABLE 3. Number of Work-Based Assessments (WBA) Completed Related to Subspeciality

	Work-Based Assessment				
	Total	**CBD**	**Mini-CEX**	**DOPS**	**PBA**
Orthopedic	5 (10)*	1 (4)	2 (3)	1 (3)*	0 (1)*
General	8 (16)*	2 (4)	2 (7)	3 (6)*	0 (1)*
ENT	14 (14)*	4 (3)	4 (6)	3 (5)*	0 (2)*
Urology	5 (15)*	1 (4)	2 (4)	2 (7)*	0 (0)*
Plastic	11 (13)*	3 (4)	4 (4)	5 (5)*	0 (0)*
Vascular	6 (12)*	2 (4)	2 (4)	2 (4)*	0 (0)*
Neurosurgery	8 (7)*	2 (4)	1 (4)	3 (3)*	0 (0)*
OMFS	5 (15)*	2 (4)	2 (6)	2 (5)*	0 (0)*
Cardiothoracic	1 (0)*	0 (0)	0 (0)	0 (0)*	0 (0)*

All values median (interquartile range).
CBD, case-based discussion; mini-CEX, clinical evaluation exercise; DOPS, direct observation of procedural skill; PBA, procedural-based assessment; ENT, Ear, nose and throat; OMFS, Oral and maxillofacial surgery.
*Significant to <0.05.

TABLE 4. Crosstabulation of Hospital Status, Gender and Training Role

		Consultant Trainer Role		
		AES	**CS**	**No Training Role**
Hospital status	Teaching	38 (−1.3)	68 (3.0)	44 (−1.8)
	DGH	40 (1.3)	34 (−1.3)	49 (1.8)
Gender	Male	64 (−2.0)	96 (2.3)	81 (−0.4)
	Female	14 (2.0)	6 (−2.3)	12 (0.4)

Frequency (adjusted residuals).
DGH, District General Hospital; AES, Assigned Educational Supervisor; CS, Clinical Supervisor.

16 respectively, p = 0.889. The level of WBA awarded was not different between the 2 hospital types ((U = 8889, z = −0.610, p = 0.542).

Influence of Trainer Gender

There was no statistical difference in the number of WBAs validated or the level of WBA awarded related to gender across the full range of WBAs; total WBA median (IQR) female vs. male were 10(24) vs. 6(13) (p = 0.251). There was however a statistically significant association between gender and training role, suggesting that female consultants were more likely to be AES than CS; $\chi^2(2) = 6.410$, (p = 0.041); adjusted residuals are shown in Table 4.

Influence of RCS Eng. TrACE Accreditation

Overall, 33 trainers (12.1%) had completed the RCSEng TrACE course comprising 13 AES (16.7%), 13 CS (12.7%), and 7 NTR clinicians (7.5%). There was no statistical difference in the number of WBAs completed, or the level awarded, by trainers who had completed the TrACE course compared with those who had not, irrespective of trainer status; overall median (IQR) WBA 12 (14) vs. 6(13) (p = 0.168). There was a statistically significant association between TrACE completion and specialty; General Surgery and Vascular Surgery were more likely to have completed the course compared to other specialties ($\chi^2(8) = 35.071$, $p < 0.001$; Table 5). There was no difference in the level of WBA awarded comparing trainers who had completed the TrACE course and those who had not (U = 3687.5, z = −0.755, p = 0.450).

DISCUSSION

This is the first study to examine the performance of the full spectrum of consultant surgical trainers related to core surgical training in a UK Deanery, which has revealed important and significant variance in trainer performance. The principal findings were that the numbers of trainee assessments completed differed significantly; trainers with an assigned educational supervisory role were some 2 to 3 times more likely to engage with and complete WBAs, when compared with clinical supervisors, and almost 6 times more likely than clinicians with nontraining roles. There was also variation in WBA performance related to subspecialty; upper quartile specialties (ENT, Plastic Surgery) completed twice as many assessments as lower quartile specialties (OMFS, Urology, T&O, and Cardiothoracic Surgery). Variation was apparent within the spectrum of trainer roles, with individual consultant trainers in all 3 roles who failed to complete a single WBA. This is of particular concern when related to the AES role, where a trainer is assigned time within their job plan specifically for training. The reasons for this variation were not clear from this study, but a previous report by Nisar and Scott identified WBA completion as a marker of trainer quality.[15]

One of the most important variables in training is the deliverer i.e., the trainer, and evidence of progress is a key metric of the effectiveness of training and trainers. In complex and multifaceted craft specialties such as surgery, this may be surprisingly difficult to achieve, with surrogate markers often used to represent summative progress. Defining a good trainer is complex with many variables to consider.[21,22] A systematic literature review has identified super-themes associated with successful surgical trainers including: character, procedural, teamwork, communication, and clinical domains, each associated with individual characteristics or themes.[23] Yet the traits associated with a good trainer are controversial, with key differences reported and perspective dependent.[15] Identification of such attributes has led to the creation of validated trainer assessment questionnaires,[24,25] and although these tools provide insight into trainer quality, they do not consider trainee ARCP outcome. Moreover, such trainer assessment is not mandated for either undertaking a training role, or ongoing quality assurance.

Since their introduction to the UK in 2007, WBAs have divided the opinions of trainees and trainers alike, regarding their validity as assessment tools for competence based progression in training.[9,11−13] Nonetheless, they have become an integral part of surgical curricula in the UK, to assess trainee surgeons' clinical and procedural skills and determine ARCP outcomes, ultimately contributing toward the award of a certificate of completion of training.[5] But the validity of an assessment tool largely depends on trainers engaging with the assessment system.[1,9,14] Guidance has been published for consultants in training positions, with roles clearly defined for both AES and CS trainers.[1,5,17,19] Several UK deaneries have made it mandatory for consultants in training positions to complete the TrACE course, yet the validity

TABLE 5. Percentage of Consultants Completed RCS Eng TrACE

Specialty	
Orthopedic surgery	2.70 (−2.9)
General surgery	24.69 (4.1)
ENT surgery	3.45 (−1.5)
Urology	14.29 (0.4)
Plastic surgery	0 (−1.7)
Vascular surgery	35.29 (3.0)
Neurosurgery	0 (−1.3)
OMFS	0 (−1.2)
Cardiothoracic surgery	0 (−0.6)

TrACE by specialty (adjusted residuals).
ENT, Ear, nose and throat; OMFS, Oral and maxillofacial surgery.

of the RCSEng TrACE course as a training aid, and in predicting training engagement has not been explored. In the Wales Deanery, completion of the TrACE course has only been untaken by a relatively modest number of trainers (12.1%), with significant variation between specialties. Moreover, trainees often cite trainers' lack of engagement with WBAs, and the ISCP platform in general, with a perception that poor engagement results in an associated institutional drag on training.[10−14]

Of the principal, 4 WBAs used on the ISCP platform, PBAs were completed the least; 5 times less frequently than mini-CEX, CBD and DOPS, and despite PBA being the only surgery-specific WBA, and arguably the most useful in determining a surgical trainee's technical skills, due to their comprehensive nature.[26−28] Several reasons might underlie this finding; PBAs assess more technically advanced procedures, and since the trainee cohort in this study were universally core surgical trainees, it is possible that core surgical trainee PBA completion rates are lower than that of higher surgical trainees (HST). Furthermore, several procedures may be assessed using either PBA or DOPS, and aside from being a potential source of confusion, DOPS may be preferred because completion is perceived to be easier.

Surgical subspecialty was associated with WBA engagement, and the differences observed are likely multifactorial, but may be a result of core surgical trainees undertaking placements in smaller specialties, that map poorly to long term career goals, poor engagement, or specialties with high HST:CST ratios, in which proportionally less time is devoted by trainers to junior trainee's needs. In contrast, the lower trainer WBA numbers may also reflect the higher specialty specific consultant to core surgical trainee ratio, with far fewer core surgical trainees working within each team at a time, with the training workload shared across consultants. Teaching hospital status did not predict a higher number of WBAs per trainer, with teaching hospitals and DGHs performing similarly in terms of trainer WBA engagement. This may similarly reflect the higher number of consultants per teaching hospital department sharing the core surgical trainee assessment when compared to DGHs. There were, in contrast, differences in who performed specific training roles. Consultants in DGHs were more likely to be AES compared with their counterparts in teaching hospitals, and vice versa related to the role of CS. This likely reflects the larger number of consultants in each department in teaching hospitals, with the option to select multiple CSs per placements.

There are several potential inherent limitations and criticisms of this study. The results only reflect training of core surgical trainees and not medical students, foundation doctors (interns), HST or allied healthcare professionals. AES, CS, and assessors without a training role within this study may have shared training commitments, and responsibility for trainees who may have comparatively more demanding training needs. Furthermore, AES responsibility for one trainee does not mutually exclude CS responsibility for a second, and the ratio of trainees to AES and CS was not explored; thus trainers with joint AES/CS roles were grouped within the AES cohort. It is also of note that few contemporary trainees work with a single consultant trainer but rather several. Arguably therefore, a more appropriate assessment should be of the surgical unit a trainee is attached to, and not the individual trainer. In addition, there are some inherent limitations in the WBAs evaluated. For example, in tertiary specialties such as transplant surgery, very few specialty-specific DOPs or PBAs relate to procedures appropriate for core surgical trainees and thus opportunities for assessment may be limited despite engagement by trainees and trainers, alike. Nonetheless, this study's findings are original, and have statistical power. The results propose a starting point for more in-depth analysis of surgical training engagement in general, including that for HSTs.

In conclusion, tools should be introduced to assess trainer and unit performance, arguably via ISCP, the results of which should be available for postgraduate deaneries to deliver targeted aid for trainees with difficulties, and ensure fair exposure to adequate training opportunity. Future work should focus on establishing objective metrics of trainer quality. WBA completion may only represent a single facet of a quality trainer, but the ISCP should allow training programme directors to observe and assess trainers' engagement. In combination with global assessments of trainers, including multisource feedback, a combined trainer-quality index should be developed to help trainees and trainers alike in career development. Emphasis must be placed on the delivery of high quality, safe surgical training, delivered by accredited trainers in a grade-adapted fashion. Trainees and trainers alike must be aware of such data when constructing learning agreements and educational contracts.

REFERENCES

1. General Medical Council. Designing and maintaining postgraduate assessment programmes. London: General Medical Council; 2017.

2. Scottish Executive, Department of Health, Department of Health Social Services and Public Safety, Welsh Assembly Government. Modernising Medical Careers: The Next Steps. The Future Shape of Foundation, Specialist and General Practice Training Programmes. London: Department of Health; 2004.

3. Chand M, Faruque M, Dabbas N, Nash GF. Modernising medical careers and the British surgeons of the future. *Br J Hosp Med (Lond)*. 2010;71:282–285.

4. Intercollegiate Surgical Curriculum Programme. The purpose of WBA: ISCP.

5. McKee RF. The Intercollegiate Surgical Curriculum Programme (ISCP). *Surgery (Oxford)*. 2008;26: 411–416.

6. Conference Of Postgraduate Medical Deans (COPMeD). A Reference Guide for Postgraduate Specialty Training in the UK. 7th ed COPMeD; 2018.

7. Shalhoub J, Vesey AT, Fitzgerald JE. What evidence is there for the use of workplace-based assessment in surgical training? *J Surg Educ.* 2014;71:906–915.

8. Massie J, Ali JM. Workplace-based assessment: a review of user perceptions and strategies to address the identified shortcomings. *Adv Health Sci Educ Theory Pract*. 2016;21:455–473.

9. Mitchell C, Bhat S, Herbert A, Baker P. Workplace-based assessments of junior doctors: do scores predict training difficulties? *Med Educ*. 2011;45:1190–1198.

10. Ali JM. Getting lost in translation? Workplace based assessments in surgical training. *Surgeon*. 2013;11: 286–289.

11. Eardley I, Bussey M, Woodthorpe A, Munsch C, Beard J. Workplace-based assessment in surgical training: experiences from the Intercollegiate Surgical Curriculum Programme. *ANZ J Surg*. 2013;83:448–453.

12. Bindal T, Wall D, Goodyear HM. Trainee doctors' views on workplace-based assessments: are they just a tick box exercise? *Med Teach*. 2011;33:919–927.

13. Pereira EA, Dean BJ. British surgeons' experiences of a mandatory online workplace based assessment portfolio resurveyed three years on. *J Surg Educ*. 2013;70:59–67.

14. Govaerts MJ, Schuwirth LW, Van der Vleuten CP, Muijtjens AM. Workplace-based assessment: effects of rater expertise. *Adv Health Sci Educ Theory Pract*. 2011;16:151–165.

15. Nisar PJ, Scott HJ. Key attributes of a modern surgical trainer: perspectives from consultants and trainees in the United kingdom. *J Surg Educ*. 2011;68:202–208.

16. de Jonge L, Timmerman AA, Govaerts MJB, et al. Stakeholder perspectives on workplace-based performance assessment: towards a better understanding of assessor behaviour. *Adv Health Sci Educ Theory Pract*. 2017;22:1213–1243.

17. General Medical Council. Promoting excellence: standards for medical education and training. General Medical Council; 2015.

18. Royal College of Surgeons of England. Training and Assessment in the Clinical Environment (TrACE).

19. Academy of Medical Educators. Professional Standards. 3rd ed Cardiff: Academy of Medical Educators; 2014.

20. Joint Committee on Surgical Training (JCST). Roles and Responsibilities JCST; 2018.

21. Singh P, Aggarwal R, Zevin B, Grantcharov T, Darzi A. A global delphi consensus study on defining and measuring quality in surgical training. *J Am Coll Surg*. 2014;219:346–353. e347.

22. Sutton PA, Beamish AJ, Rashid S, Elsey E, Mohan HM, O'Regan D. Attributes of excellent surgical trainers: an analysis of outstanding trainers. *Int J Surg*. 2018;52:371–375.

23. Dean B, Jones L, Garfjeld Roberts P, Rees J. What is known about the attributes of a successful surgical trainer? A systematic review. *J Surg Educ*. 2017;74: 843–850.

24. Wyles SM, Miskovic D, Ni Z, et al. Development and implementation of the Structured Training Trainer Assessment Report (STTAR) in the English National Training Programme for laparoscopic colorectal surgery. *Surg Endosc*. 2016;30:993–1003.

25. Dean BJF, Keeler B, Garfjeld Roberts P, Rees JL. Development of a surgical trainer assessment questionnaire. *ANZ J Surg*. 2017;88:45–49.

26. Beard J, Bussey M. Workplace-based assessment. *Bull R Coll Surg Engl*. 2007;89:158–160.

27. Evgeniou E, Peter L, Tsironi M, Iyer S. Assessment methods in surgical training in the United Kingdom. *J Educ Eval Health Prof*. 2013;10:2.

28. Marriott J, Purdie H, Crossley J, Beard JD. Evaluation of procedure-based assessment for assessing trainees' skills in the operating theatre. *BJS*. 2010;98:450–457.

SUPPLEMENTARY INFORMATION

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