

Original Article

A Foundation Programme educational placement in peri-operative medicine for older people: mixed methods evaluation*

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Summary

We established an innovative Foundation placement in peri-operative medicine for older patients in response to the need for training in 'whole patient' medicine and the challenge of fewer Foundation doctors in acute surgical roles. The placement and underpinning curriculum were co-designed with junior doctors and other clinical stakeholders. This resulted in a modular design offering acute and community experience and dedicated quality improvement project time. To evaluate the placement we used a mixed methods study based on Kirkpatrick's model of workplace learning. Level 1 (trainee reaction) was evaluated using Job Evaluation Study Tool questionnaires and nominal group technique. Levels 2 and 3 (trainee learning/behaviour) were assessed using a Likert-style survey mapped to curriculum objectives, e-portfolio completion, nominal group technique and documentation of completed quality improvement projects and oral/poster presentations. Sixty-eight foundation trainees underwent the new placement. A similar-sized 'control' sample (n = 57) of surgical Foundation trainees within the same Trust was recruited. The trainees in the peri-operative placement attained both generic Foundation and specific peri-operative curriculum competencies, and gave higher job satisfaction scores than trainees in standard surgical placements. The top three ranked advantages from the nominal group sessions were senior support, clinical variety and project opportunities. Universal project completion resulted in high rates of poster and platform presentations, and in sustained service changes at hospital level.

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Introduction

As the population ages and patients present with complex health and social care issues, the need for training in 'whole patient' medicine has become more apparent. Several recent reports have highlighted the association between quality training for junior doctors in 'whole patient' medicine and safe, effective patient care [1–3]. Furthermore, a report from Health Education England [4] described lower trainee satisfaction scores in the specialties of surgery, obstetrics

and gynaecology, medicine and emergency medicine, and higher scores in general practice, paediatrics and psychiatry. As a result, there has been a reduction in the number of acute surgical and medical placements in favour of community and primary care placements. Although there are benefits of community-based placements, to fully appreciate the medical and social needs of complex, multi-morbid patients, junior doctors need exposure to the full pathway of care from the

community, through the acute hospital setting, and back to primary care. Furthermore, removing Foundation trainees (doctors in the first and second years of clinical practice after completing their medical degree) from hospitals will present a considerable challenge to clinical service delivery. This is particularly pertinent in the absence of an alternative workforce trained and available to provide care to the significant numbers of predominantly older and complex hospital inpatients.

Alongside these changes, there has been a national and international focus on developing the specialty of peri-operative medicine to address the needs of the high-risk surgical population, spanning pre, intra- and post-operative care [5–7]. As most high-risk patients are older, integrated peri-operative care pathways with routine structured contributions from geriatricians have been recommended [8–10]. Despite this national appetite for change, the development of such pathways has been slow, hampered in part by a lack of trained staff. This highlights the need for training at all grades to equip a workforce able to provide quality care to older surgical patients throughout the pathway. In response to these issues, the 'Peri-operative medicine for older people undergoing surgery' (POPS) team at Guy's and St Thomas' NHS Foundation Trust was established in 2003 [11, 12]. This collaborative approach between surgeons, anaesthetists, physicians and allied health professionals, ensures an emphasis on 'whole patient care' and continuity throughout the peri-operative pathway focusing on the high-risk, older patient.

To address the workforce issues in acute surgery resulting from Foundation school changes and the national need to train doctors in peri-operative medicine, the 'POPS' team established a Foundation Programme rotation at Guy's and St Thomas' NHS Foundation Trust in 2015. In this study, we aimed to examine whether this placement provided quality training in core Foundation competencies and met specific learning objectives in peri-operative medicine, and to assess its effect on trainees' experience and satisfaction.

Methods

Health Research Authority approval was gained. Research Ethics Committee approval was not required. The study was set in an inner-city teaching hospital that provides tertiary surgical services supported by the anaesthetic department. Peri-operative medicine for older people undergoing surgery is a geriatrician-led, multidisciplinary service which provides comprehensive geriatric assessment and optimisation for older patients undergoing surgery. This approach is used from the point where surgery is first considered, through the pre-operative assessment and

optimisation phases; it is also applied during hospital admission and includes postoperative medical care, rehabilitation goal setting and discharge planning. The team also oversees patient management in community rehabilitation units, to which a small proportion of patients are discharged. In response to the Health Education England report [4] in 2015, 11 foundation doctors were transferred from 'traditional' surgical placements to a new Foundation placement in peri-operative medicine for older people undergoing surgery.

We recruited consecutive Foundation Year 1 and 2 trainees undertaking this new peri-operative placement. Participants were identified when they attended the induction meeting at the beginning of the placement and we obtained their written consent to take part in the study. A convenience sample of Foundation year 1 and 2 doctors in traditional surgical placements within the same trust was consented and recruited into one aspect of the study data collection (Job Evaluation Survey Tool questionnaire).

The POPS Foundation placement and curriculum was co-designed with involvement from Foundation doctors, surgeons, anaesthetists, physicians and allied health professionals in collaboration with medical education specialists, using underpinning principles of curriculum design [13,14]. It consisted of a 4-month modular training placement with time spent in a variety of clinical settings throughout the patient's pathway of care. In addition to the clinical learning opportunities, the placement was designed to provide structured tutorials in peri-operative medicine, teaching in verbal and written communication skills (e.g. letter writing), and formalised training in quality improvement methodology, academic presentation and publication.

Clinical training consisted of three main elements. First, trainees spent 6–8 weeks working on a surgical wards (one of orthopaedic, vascular or urology) under the supervision of a POPS consultant. Second was a 4–6-week outpatient and community module. Completing the placement was a 2-week block of surgical and medical on call commitments and 2 weeks of annual leave. Formal education and training opportunities included those detailed above as well as generic hospital-wide core Foundation curriculum training and geriatrics departmental teaching. More detail is given in Fig. 1.

Supporting documentation, structures and processes were established to provide an underpinning framework for the new placement. These included a Foundation trainee curriculum in peri-operative medicine for older people undergoing surgery, co-produced with trainees themselves (see also Supporting Information, Appendix S1) [13]. We

established a weekly forum in which a senior trainee or consultant from the POPS team elicited feedback from the Foundation doctors. This facilitated discussion of highlights and challenges of the week and ensured that necessary changes in the placement were made rapidly. We used the ‘plan, do, study, act’ methodology for this. Finally a Whatsapp™ group was established to facilitate immediate communication between team members, foster a culture of continual learning (e.g. sharing of guidelines and other resources, and to promote a team spirit).

The ‘control’ group consisted of Foundation year 1 and 2 doctors in surgical placements in gastro-intestinal, orthopaedic, urological and vascular surgery. These positions were fully ward based, were clinically and educationally supervised by surgeons, and included various opportunities for department-based teaching. They received the same Trust-wide Foundation teaching as the ‘intervention’ group, including access to the ‘grand round’.

Outcome measures were mapped onto Kirkpatrick’s model of workplace-based learning [15]. This assesses the impact of the educational intervention according to four levels. Level 4 seeks evidence that the intervention leads to a change in patient outcomes. Level 3 refers to changes in professional practice, whereas level 2 describes a positive change in knowledge, skills and attitudes. The lowest level of change (level 1) is based on the reaction of the recipient to the intervention (e.g. was the course enjoyable/relevant etc.). Our outcome measures, using Kirkpatrick’s model,

were proposed at the beginning of the study and are shown in Table 1. The measurement of Level 4 (impact on patient outcomes) was beyond the scope of the study.

Trainees’ job satisfaction was deemed important as it was one of the drivers for the removal of Foundation doctors from surgical positions as suggested by Health Education England. This was measured using the Job Evaluation Survey Tool (JEST) questionnaire (see also online Supplementary Information Appendix S2). This tool was developed and validated by West Midlands Deanery in the UK [16] to aid local monitoring of the Deanery’s adherence to General Medical Council standards for postgraduate medical education. In the 3 years of use in Foundation trainees (n = 3,367), it was found to have a reliability of 0.91, and correlation of 0.80 (p < 0.001) with the Postgraduate Hospital Educational Environment Measure (PHEEM) [17]. Trainees completed these job evaluation questionnaires at the beginning, mid-point and end of the placement. The ‘control’ group (surgical Foundation trainees within the same Trust) also completed the questionnaire at the same time-points. The two groups were compared using the Mann–Whitney U-test.

We invited trainee participants to assess their own knowledge of elements related to the curriculum developed for the placement. This was achieved using a Likert-type survey (see also online Supplementary Information Appendix S3) [18] at the same three time-points. The change in knowledge, skills and attitudes of the

In-patient clinical training	Out-patient and community clinical training	On-call	Formal education	QI training
<ul style="list-style-type: none"> • Joint medical and surgical ward rounds • Board rounds • Medical case management (including acute medical management) • Geriatrician-led multidisciplinary team meetings • Case conferences with patients and their relatives (often covering decisions regarding surgery in patients lacking capacity, advance care planning, discharge planning issues) 	<ul style="list-style-type: none"> • POPS pre-operative comprehensive geriatric assessment and optimisation clinic • Nurse-led pre-operative assessment clinic • Surgical clinics (urology one stop haematuria clinic, venous clinic, stoma clinic) • Scheduled theatre sessions with both anaesthetists and surgeons • Ward rounds and medical support at a community amputee rehabilitation unit or continuing care unit 	<ul style="list-style-type: none"> • 2 week block of surgical and medical on-call commitment • 2 week block of annual leave 	<ul style="list-style-type: none"> • Generic hospital-delivered core curriculum foundation training • Weekly Trust Grand Round • Weekly geriatric medicine departmental teaching sessions • Weekly consultant or registrar-delivered POPS teaching session (1 h) based on the POPS curriculum • Weekly consultant or registrar-delivered POPS teaching session (1 h) covering skills including critical appraisal of research literature, medical letter writing and oral presentation training • Opportunities to attend other relevant teaching sessions and conferences 	<ul style="list-style-type: none"> • Compulsory completion of quality improvement project with dedicated sessions to complete this • Formal teaching on QI methodology • Formal teaching on presenting and publishing findings

Figure 1 Structure of the new Foundation placement in peri-operative medicine for older people undergoing surgery (POPS). QI, quality improvement.

Table 1 Study outcome measures according to Kirkpatrick's model [15].

Outcome measure	Defined by	Measurable	Level of effect according to Kirkpatrick's model
Core Foundation competencies	UK national Foundation Programme	E-portfolio completed with educational supervisor	2
Supervisor-defined learning objectives in peri-operative medicine	POPS Foundation curriculum	Quantitative self-completion survey using Likert-type scale	2, 3
Quality of training	Breadth of clinical experience and self-perceived impact on professional behaviour	Nominal group technique	3
Quality of training	Job satisfaction	JEST questionnaire Nominal group technique	1
Quality of training	Broader training	Evidence of quality improvement project completion and presentation Publications Presentations	2

JEST, Job Evaluation Survey Tool; POPS, 'peri-operative medicine for older people undergoing surgery'.

trainees over the 4 months of the new peri-operative placement was also analysed using the Mann–Whitney U-test.

Nominal group sessions were conducted at the mid-point and end of each placement. Originally developed by Van de Ven and Delbecq [19], nominal group methodology was used in preference to traditional focus groups as it is said to offer advantages when some group members are more vocal than others, when group members think better in silence or participate less, and when participants' contributions may be influenced by the 'group effect'. Furthermore, in contrast to focus groups or Delphi-type techniques, this approach is less burdensome as it does not need repeated iterations. It has been used extensively in medicine for several decades [20]. Two statements were used to facilitate discussion. These were 'The major advantages of participating in this Foundation placement include...' and conversely 'The major disadvantages of participating in this Foundation placement include...'. The senior trainee within the POPS team, acted as facilitator, asking participants to list their answers without conversing with others. The participants were asked to declare their responses, which were then recorded on a screen by the facilitator. After review and discussion of each comment, the group ranked the list of comments from the most to the least important.

Results

We recruited 68 Foundation trainees undergoing the new peri-operative medicine placement and 57 Foundation

trainees in standard surgical placements during the study period (August 2015–July 2017 inclusive).

Over the 2-year study period, all trainees in the peri-operative placement achieved e-portfolio 'sign-off', indicating that they had attained the necessary core national Foundation curriculum competencies. Job evaluation questionnaires revealed significantly higher satisfaction scores resulting from the peri-operative medicine placement than the standard surgical placement (Table 2). (Only the end-of-placement scores were used in the analysis, as scores were similar throughout the placement.) Questions 13 and 15, which pertain to 'accommodation and catering' and 'junior doctors' forum' are not included; they were frequently not answered. The Likert-type items revealed an improvement in scores for all peri-operative medicine curriculum competencies throughout the rotation (Table 3). The advantages and disadvantages of the placement, evaluated using the nominal group technique, are shown in Table 4. Trainees described changes in their attitudes and behaviours during the placement citing the acquisition of skills in thoroughness, reflective practice, and an holistic approach to care. Illustrative responses are listed in the Supporting Information (Appendix S4).

All trainees completed a quality improvement project and presented the findings in the Trust's geriatric medicine academic meeting. Over the 2-year study period, a total of nine posters and 12 platform presentations were given by trainees on the peri-operative placement at national and international conferences, with two trainees winning first

Table 2 Comparison of job satisfaction between the new placement in peri-operative medicine for older patients (POPS) undergoing surgery and standard surgical placement. Values are mean (SD).

Item	POPS (n = 55)	Standard surgical (n = 53)	p value
Patient safety	4.35 (0.52)	3.75 (0.71)	< 0.001
Programme director's planning	4.33 (0.61)	3.25 (0.77)	< 0.001
Induction to this post	3.85 (0.93)	3.02 (0.91)	< 0.001
Appraisal and assessment	4.13 (0.62)	3.02 (1.12)	< 0.001
Feedback on your work	4.19 (0.83)	3.06 (1.15)	< 0.001
Protected bleep-free teaching	4.52 (0.69)	3.30 (1.14)	< 0.001
Service based teaching	4.24 (0.67)	3.14 (1.15)	< 0.001
Senior cover	4.47 (0.66)	3.85 (0.89)	< 0.001
Clinical work-load	3.85 (0.89)	3.19 (0.83)	< 0.001
EBM/audit	4.29 (0.76)	3.36 (1.13)	< 0.001
Inappropriate tasks	3.96 (0.80)	3.35 (1.03)	0.001
Rota compliance	4.00 (10.05)	2.96 (1.10)	< 0.001
Annual and study leave	3.69 (0.92)	3.46 (1.00)	0.272

EBM, evidence-based medicine.

prize for platform presentations. Furthermore, one quality improvement project resulted in the implementation of a new hospital-wide antiplatelet guideline for patients undergoing vascular surgery; another saw the introduction of a mental capacity assessment form on the Trust-wide electronic patient record.

Discussion

This study is the first to examine a Foundation placement in peri-operative medicine for older people undergoing surgery. It has demonstrated that the placement was effective in delivering both core Foundation competencies and specialty-specific learning objectives, while achieving high trainee satisfaction.

One particularly well-received aspect of the placement was the focus on quality improvement. This was one of the most valued aspects as judged by the results of the nominal group evaluation. Learning about quality improvement methodology and undertaking a quality improvement project with supervision are mandatory components of the national Foundation Programme. However, when we consulted with existing Foundation doctors during the design of the new placement, it was apparent that in many standard Foundation placements, these objectives were often not being met, and if quality improvement projects were undertaken it was felt this was solely to meet curriculum objectives rather than to effect changes in practice.

Weekly teaching sessions in peri-operative medicine for older patients served as a forum for eliciting trainee feedback on the placement, and 'plan, do, study, act'

methodology was used to effect changes. Elements that were clearly not of educational benefit (e.g. nurse-led pre-operative assessment clinics, case logbooks, individual trainee-defined learning objectives) were removed on the basis of this feedback. Dissatisfaction with role definition and 'ownership' of patients was thought to stem from a lack of understanding of shared care models, and specific training on this was incorporated. Administrative work such as clinic letter writing received mixed feedback; some felt it to be valuable training, whereas others found it burdensome. This was addressed by delivering teaching on administrative aspects of patient care at induction to the post. Some trainees reported feeling very challenged by the complexity of the patient group seen in outpatient clinics dealing with the peri-operative care of older patients. To alleviate this, more intensive induction in the trainees' first clinic was introduced, as well as a weekly teaching session focused on outpatient medicine. This teaching covered the clinical management of multi-morbidity and working in a time-efficient manner. Through discussion, trainees were also encouraged to embrace challenges and view these as positive learning opportunities.

There were a number of limitations to this study. It was a single-centre study conducted at a teaching hospital in London, which may potentially limit its translation to other hospital settings. However, many similar services for the peri-operative care of older patients are now being set up nationally and internationally (unpublished survey data). The lessons from this placement can be applied to the development of new training opportunities for junior doctors. To enable sustainable translation to other

Table 3 Self-evaluation by Foundation doctors of their knowledge of, skills in and attitudes towards peri-operative medicine according to predefined curriculum. Values are mean (SD).

Curriculum item	Beginning (n = 57)	End (n = 55)	p value
I have an appreciation of the demographics and political landscape relevant to the older surgical patient	3.60 (0.70)	4.22 (0.50)	< 0.001
I am aware of national reports and policy drivers relevant to the older surgical patient	2.98 (0.83)	3.85 (0.80)	< 0.001
I am aware of models and pathways of care for older surgical patients	3.33 (0.89)	4.20 (0.56)	< 0.001
I know how to risk assess peri-operative morbidity and mortality (including use of tools, for example, P-POSSUM and investigations, cardiopulmonary exercise testing)	3.33 (1.08)	4.37 (0.53)	< 0.001
I understand how to modify risk including the use of organ specific national and international guidelines (e.g. European Society of Cardiology)	2.98 (0.83)	3.67 (0.82)	< 0.001
I understand the use of interdisciplinary and cross-specialty interventions to improve postoperative outcome (e.g. therapy delivered pre-habilitation)	3.71 (0.56)	4.16 (0.54)	< 0.001
I understand basic detail of some common surgical procedures	3.86 (0.65)	4.15 (0.62)	0.014
I understand basic quality improvement methodology	3.33 (1.01)	4.22 (0.69)	< 0.001
I understand how to clinically assess a patient and the appropriate use of investigations and tools to pre-operatively risk assess for peri-operative morbidity and mortality	3.63 (0.67)	4.38 (0.53)	< 0.001
I know how/when to communicate risk with health professionals and patients/relatives	4.23 (0.68)	4.29 (0.50)	< 0.001
I know how to optimise patients with comorbidity and geriatric syndromes	3.25 (0.81)	4.16 (0.46)	< 0.001
I am able to recognise the unwell postoperative patient, appropriate initial management and involvement of senior assistance	4.07 (0.53)	4.33 (0.51)	0.012
I understand the principles of appropriate allocation of postoperative resources (e.g. use of level 2 and 3 care)	3.11 (0.88)	3.71 (0.92)	< 0.001
I can make decisions regard rehabilitation, and timely and effective discharge pertinent to the surgical patient	3.14 (0.72)	3.80 (0.65)	< 0.001
I am able to liaise with patients, anaesthetists and surgeons to ensure shared decision making	3.77 (0.69)	4.02 (0.62)	0.049
I understand ethical and biomedical approaches to ensure appropriate ceilings for escalation of care	3.49 (0.85)	4.11 (0.50)	< 0.001
I am able to objectively assess the risk-benefit ratio of surgery for older patients without value-laden judgement through the use of appropriate scoring systems and quantification of disease/comorbidity severity	3.04 (0.87)	3.82 (0.77)	< 0.001
I appreciate the importance of collaboration between geriatricians, anaesthetists and surgeons in promoting high quality care	4.42 (0.53)	4.45 (0.50)	< 0.001
I have developed effective team working behaviours to ensure accountability, efficiency and quality care (e.g. between surgical Foundation doctors, advance nurse practitioners)	3.89 (0.57)	4.45 (0.57)	< 0.001

P-POSSUM, Portsmouth physiological and operative severity score for the enumeration of mortality and morbidity.

hospitals, the placement 'package', comprising the curriculum, timetables, rotas, teaching schedule and resources, and feedback and evaluation tools, is available from the corresponding author. Using a senior trainee within the same clinical service to administer job evaluation and Likert-type questionnaires may have potentially introduced bias. However, we tried to lessen the effect of this by collecting scores anonymously. The effect of 'obligation' on Likert survey self-scores was also minimised by anonymity, although this effect cannot be ruled out. For practical reasons, the nominal group technique was modified for the study, in that the ranking of outcomes at the end of the process was mutually agreed by the group

rather than individually. Although using this approach may have reduced the technique's effect on negating 'group-think', it led to useful discussion, which informed changes to the placement and group learning. Finally, although the association between quality training and quality patient care is already established, direct measurement of patient care and/or satisfaction outcomes was beyond the scope of this study.

This mixed methods study has shown that a geriatrician-supervised Foundation doctor placement in peri-operative medicine for older people provides effective and enjoyable training in line with national recommendations regarding 'whole patient medicine'. Locally the placement has been

Table 4 Nominal group session results: advantages and disadvantages of placement in order of citation frequency (those cited only one or two times excluded).

Advantages	Disadvantages
Senior support	'Ownership' of patients/role definition between surgery and peri-operative medicine for the older patient
Experience of pre-operative assessment/optimisation, comprehensive geriatric assessment and holistic approach to care	Staying late, work-load too high or low, disparity of work-load between jobs within peri-operative placement according to different surgical specialities
Academic and audit opportunities	On-call rota issues
Experience of outpatient clinic work	Clinic administrative work challenging and time-consuming
Autonomy	Community block rota issues
Formal and informal teaching	Surgical team disowning patients/becoming deskilled/giving inappropriate tasks to peri-operative placement trainees
Breadth and complexity of cases seen	Leave issues
Multidisciplinary team meeting and discharge planning experience	Lack of procedural skills
Exposure to a variety of clinical settings	Peri-operative outpatient clinic work challenging, and lack of induction
Hours/work-life balance and pace of job	Handover between clinic and ward block, and at end of block
Use of evidence-based medicine	Clinics outside remit of peri-operative medicine for the older patient not sufficiently challenging
Time for thoroughness and reflection	Cross-site working
Interesting on-call work	Having to make decisions, feeling out of depth or unsupported
Experience of intermediate care environment	

deemed successful and has proved sustainable. From a national perspective, early training experience in peri-operative medicine may help assist development of future specialists and meet the demands of an increasingly multimorbid surgical patient population. Furthermore, adoption of such peri-operative medicine placements in other UK Trusts may train junior doctors in 'whole patient medicine' throughout the patient pathway while ensuring that clinical services retain a Foundation doctor workforce in the face of decreased surgical placement numbers.

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external and internal, had full access to all of the data (including statistical reports and tables) in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. No competing interests declared.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Appendix S1. Peri-operative medicine curriculum for POPS foundation trainees.

Appendix S2. Job Evaluation Survey Tool questionnaire.

Appendix S3. Likert survey of POPS curriculum.

Appendix S4. Quotes from trainees.