

ORIGINAL RESEARCH ARTICLE

A survey of the workload generated by older surgical patients referred to on-call medical registrars—SNAP-3

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Abstract

Background: Older surgical patients who develop medical problems are commonly referred to medical teams, which can be proactive physician-led teams or through reactive referral to the on-call medical registrar.

Methods: A cross-sectional survey of on-call medical registrars who received referrals from surgical teams was conducted in March–June 2022 at 140 NHS hospitals. It focused on the workload derived from referrals of older surgical patients to on-call medical registrars, excluding referrals to existing services such as perioperative medicine, orthogeriatric, or medical specialty teams. To minimise recall bias, completion of the survey was encouraged regardless of whether a registrar had received a referral. The aim of this survey was to estimate the unplanned, acute workload generated by older surgical patients requiring referral to on-call medical registrars. The survey also aimed to estimate the prevalence and nature of training in perioperative medicine amongst medical registrars.

Results: During an on-call shift, 41.3% (266/644) of medical registrars received at least one referral regarding an older surgical patient. The commonest indications were arrhythmia, acute respiratory problems, electrolyte abnormalities, suspected myocardial infarction, sepsis, and delirium. Three-quarters of registrars reported not receiving training in perioperative management of older patients.

Conclusions: The findings highlight the significant workload and training gaps faced by medical registrars in managing older surgical patients. Bridging the gap between national recommendations and local services may reduce demands on on-call registrars and improve care.

Keywords: ageing; geriatric medicine; health service; geriatric; health services research; healthcare facilities; manpower; and services; internal medicine; perioperative care; surgery

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The use of surgical interventions is increasing in the older population; in 1999 14.9% of people aged ≥ 75 yr had surgery, by 2015 this had increased to 22.9%.¹ This trend is attributed to the proven success of surgery in managing pathological conditions (e.g. cancer resection surgery), and providing symptom relief and improved quality of life through procedures such as orthopaedic joint replacement. The growing acceptance of surgery among older individuals highlights its pivotal role in achieving favourable outcomes in both curative and symptom control contexts. However, older patients are at greater risk of medical and surgical complications, resulting in longer length of stay; increased mortality; reduced quality of life; and discharge to higher levels of care.^{2–4} For example, patients undergoing emergency laparotomy who were aged < 65 yr had a median length of stay of 9 days, compared with a median stay of 12 days for those aged ≥ 65 yr. Ninety-day mortality after emergency laparotomy is four times higher for those aged ≥ 65 yr, compared with those < 65 yr old.^{4,5}

Perioperative medicine is defined as ‘patient-centred, multidisciplinary, and integrated medical care of patients from the moment of contemplation of surgery until full recovery’.⁶ It aspires to design pathways so that patients’ medical, surgical, and social needs are anticipated and addressed in order to expedite surgery; promote rapid recovery; and facilitate safe and timely discharge. It is widely accepted that surgical patients, especially more high-risk cases, benefit from the multidisciplinary and interspecialty expertise offered by the perioperative care model. This model of working is endorsed by the Royal Colleges of Anaesthetists (UK), Physicians (London) and Surgeons (England), collaborating through the Centre for Perioperative Care, an organisation dedicated to integrated, multidisciplinary working.^{7–10} Similar priorities are identified in the American College of Surgeons and American Geriatrics Society guidance on ‘Optimal perioperative management of the geriatric patient’ and in the Australian and New Zealand College of Anaesthetists (ANZCA) document ‘A framework for perioperative care in Australia and New Zealand’.^{11,12}

The on-call medical registrar is crucial to the smooth running of the hospital, and was described in a Royal College of Physicians report as the ‘workhorse’ of the hospital with multiple and diverse responsibilities, often without clear boundaries.¹³ Medical registrars are resident doctors who have completed at least 4 years of foundation and internal medicine training or equivalent and have elected to continue higher training in a medical specialty. This medical training spans 5–6 years and usually culminates in entry to the specialty register as a consultant physician. The Royal College of Physicians defines the on-call medical registrar’s role as leading the medical admissions team, acting as a senior clinical decision-maker, supporting the training of resident doctors, and ensuring effective communication and escalation to senior staff as needed. Their leadership and expertise are vital for managing admissions and referrals to medicine.¹³ It is challenging to evaluate the additional workload generated by older surgical patient referrals which could potentially be anticipated by other clinicians and pre-emptively managed.^{13,14}

Therefore, the aim of this survey was to estimate the unplanned, acute workload generated by older surgical patients requiring referral to general and geriatric medical registrars who were acting as the first point of contact for interspecialty referrals. Commonly, initial contact with medical services for non-specialty specific problems is made with the medical registrar on-call. In some larger hospitals, older patients requiring referral to medicine for non-specialty specific

problems are referred to a medical registrar specifically allocated to the care of older people. Surgical inpatients encompass individuals receiving both operative and nonoperative treatment: perioperative medicine focuses on the care of all patients for whom surgery is considered.¹⁵ This survey includes referrals regarding all older surgical inpatients, irrespective of whether they have undergone or are planned to undergo surgery. The survey also aimed to estimate the prevalence and nature of training in perioperative medicine for medical registrars.

Methods

This cross-sectional survey formed one part of the 3rd Sprint National Anaesthesia Project (SNAP-3), alongside a cohort study, which looked at frailty, multimorbidity, and delirium in older surgical patients in the UK¹⁶; and a survey which aimed to describe the perioperative medicine services for older surgical patients across the UK and Republic of Ireland. The methodology of SNAP-3 is described more fully elsewhere.¹⁷

The survey was designed by an expert, multidisciplinary panel including patient representative, anaesthetic, geriatric, and general medicine input, and was piloted in two hospital sites by medical registrars for readability, non-ambiguity, content validity, and ease of completion. The survey consisted of 31 questions within two sections. We aimed to keep the burden on respondents to a minimum, cognisant that data regarding acute medical reviews can be challenging to capture because of the volume and acuity of demands placed upon on-call medical registrars. The survey contained two sections: one regarding perioperative medicine training, and one regarding the nature of each referral. No ethical approval was sought because participation was voluntary, no patients were involved, and respondents were not an over-surveyed group. All UK hospitals who have surgical services and medical registrars providing on-call services, were eligible to participate. This survey has been adapted for use in the Australian arm of SNAP-3.

The survey, distributed in both REDCap electronic (hosted at the University of Nottingham¹⁸) and paper formats, aimed to gather responses from all medical registrars who were accepting acute referrals from surgical teams ([Supplementary information 1](#)).¹⁸ It was advertised through e-mail, social media, and site initiation visits for the SNAP-3 cohort study. Multiple participation was prevented by data collection being coordinated by one site local lead alongside a secondary check of responses using hospital and dates. Each medical registrar completed the first section which addressed perioperative medicine training, only once. Each patient referral required a separate case report form (the second section). We defined medical registrars as those working as a speciality training registrar or speciality and specialist doctors (SAS) fulfilling a similar role. The survey was conducted for at least 24 hours per hospital during March–June 2022, with the Principal Investigators (PIs) for SNAP-3 coordinating its distribution through medical staff and acute handover areas. On-call anaesthetic teams often encouraged medical registrars to complete the survey at the end of their shift to minimise recall bias.

Referrals to the on-call medical registrar were recorded for those aged 60 years and older, who were under the primary care of the surgical team. In some hospitals this may be a medical registrar for all adult patients, in others, a separate medical registrar may be responsible for older patients. Referrals were defined as any request for a medical registrar to

review a patient, provide input on aspects of their care, or address specific questions related to the care of an older surgical patient. Referrals that were made to existing services such as perioperative medicine, orthogeriatric or medical speciality teams were excluded.

Responses were analysed using descriptive statistics in R (version 4.3.1, R Project for Statistical Computing, Vienna, Austria) software¹⁹ and have been reported by themes. Denominators are reported on a per referral or per responding registrar basis, as appropriate.

Results

Participating hospitals

One hundred and forty of the 214 SNAP-3 hospital sites participated in the survey. Missing data were minimal, all questions had a response rate of >96%, and missingness is assumed to be random. A total of 644 shifts were reported by 586 individual medical registrars. The majority of these shifts (82.1%) were from hospitals in England, with 62 (9.6%) shifts from hospitals in Scotland, 40 (6.2%) shifts from hospitals in Wales, and 13 (2.0%) shifts from hospitals in Northern Ireland.

The median (interquartile range [IQR]) number of days per hospital that a medical registrar responded to the survey was 2 (1–3). Responses were received evenly between day (49.7%, 320/644) and night (44.4%, 268/644) shifts, with some twilight (5.9%, 38/644) shifts recorded.

Referrals regarding older surgical patients

Timing and logistics of referrals

During an on-call shift in the study period, 41.3% (266/644) of medical registrars received a referral regarding an older surgical patient. Thirty-one percent (198/644) of the recorded medical registrar shifts involved only one referral concerning an older surgical patient, while 10.6% (68/644) of the recorded shifts received two or more referrals (Fig. 1).

There was an even distribution of referrals made during and outside of regular working hours, with 47.2% (175/371) recorded between 08:00 and 18:00 and 52.0% (193/371) outside these hours, while 3/371 had no recorded timing. No clinically important differences were observed between the referring surgical specialty and the timing of referrals. Amongst the three largest referring specialties, orthopaedics made 43.8% (57/130) of referrals out of hours, colorectal 42.0% (34/81), and upper gastrointestinal 55.3% (26/47). The proportions of referrals resulting in telephone advice or face-to-face review were similar—45.3% (168/371) and 50.9% (189/371) referrals, respectively (14/371 not recorded).

Which patients required acute referral to general or geriatric medicine?

Most recorded referrals were regarding patients whose surgery or proposed surgery was emergency, urgent or expedited (76.8%, 285/371) with 21.6% (80/371) recorded as elective (6/371 not reported). Half of respondents' referrals (52.6%, 195/371) were regarding postoperative older surgical patients, 26.1% (97/371) of respondents' referrals were regarding preoperative patients, and 20.5% (76/371) were described as 'other' or 'nonoperative' (3/371 not reported).

The six most common surgical specialties referred to an on-call medical registrar in our survey were trauma and

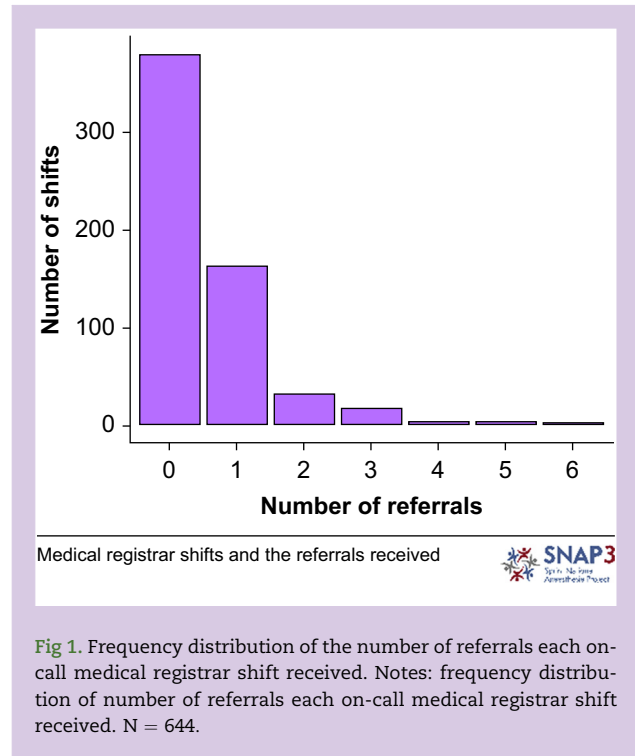


Fig 1. Frequency distribution of the number of referrals each on-call medical registrar shift received. Notes: frequency distribution of number of referrals each on-call medical registrar shift received. N = 644.

orthopaedics, colorectal, upper gastrointestinal, urology, general, and vascular surgery (Fig. 2, Supplementary Table S1). Those patients who had sustained a hip fracture made up 17.0% (63/371) of respondents' referrals. Patients who had or were being considered for a laparotomy made up 14.6% (54/371) of respondents' referrals.

Why are older surgical patients acutely referred to general or geriatric medical teams?

The six most common reported reasons for referral were arrhythmia (13.7%, 51/371); acute respiratory problems (10.5%, 39/371); electrolyte abnormalities (10.5%, 39/371); chest pain, myocardial infarction (MI) or suspected MI (9.2%, 34/371); sepsis or infection (7.8%, 29/391); and delirium (5.3%, 20/371) (Fig. 3, Supplementary Table S2).

Training in perioperative medicine

Three-quarters (74.1%, 434/586) of reporting medical registrars said that they had not received any training in the perioperative management of older people. The six most common ways that the responding medical registrars received training were through orthogeriatric posts (13.3%, 78/586), webinar/online teaching (8.0%, 47/586), clinical teaching sessions (7.3%, 43/586), classroom teaching sessions (7.2%, 42/586), perioperative medicine posts (6.1%, 36/586), and conference attendance (3.2%, 19/586). Medical registrars could record more than one way in which they had received training.

Discussion

This comprehensive survey of medical registrar referrals concerning older surgical patients gives a clear account of current practice in England and some data on the other UK Nations. Our findings align with the Royal College of

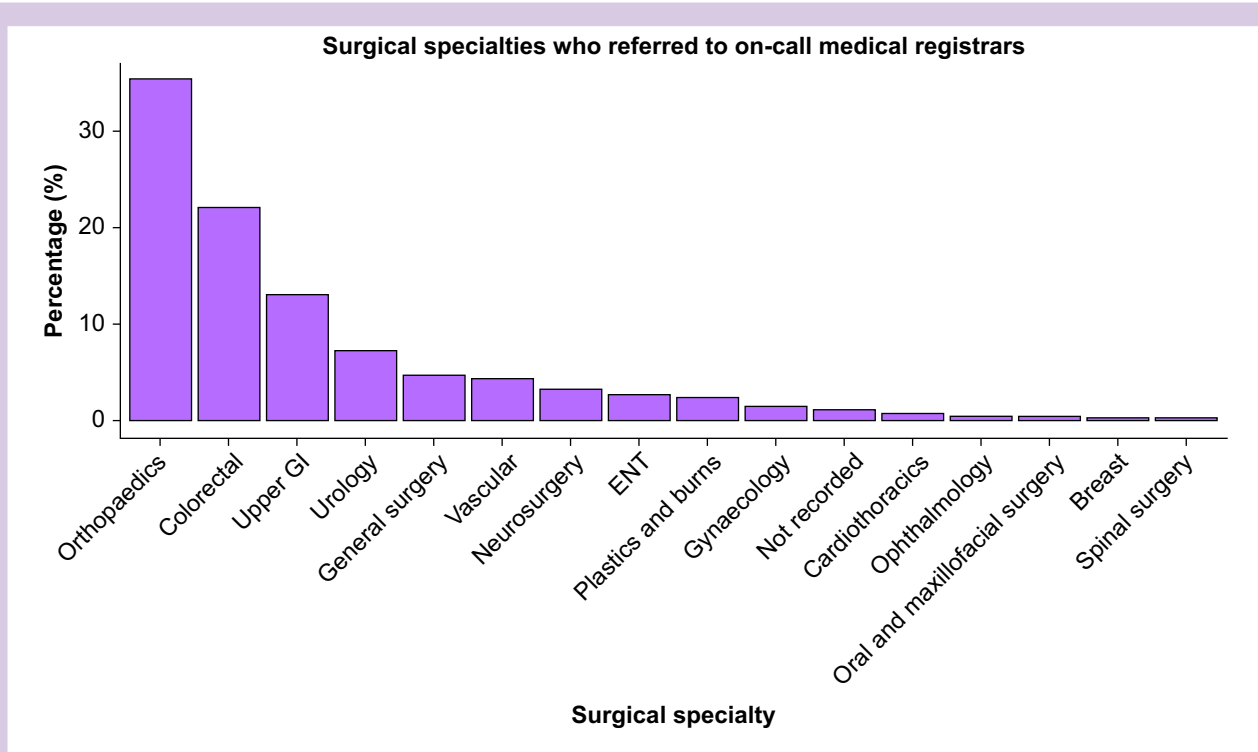


Fig 2. The source surgical specialties of patients referred to the on-call medical registrar. Notes: the distribution of the source surgical specialties of the patients referred to the on-call medical registrar. N = 371. ENT, ear, nose, and throat; GI, gastrointestinal.

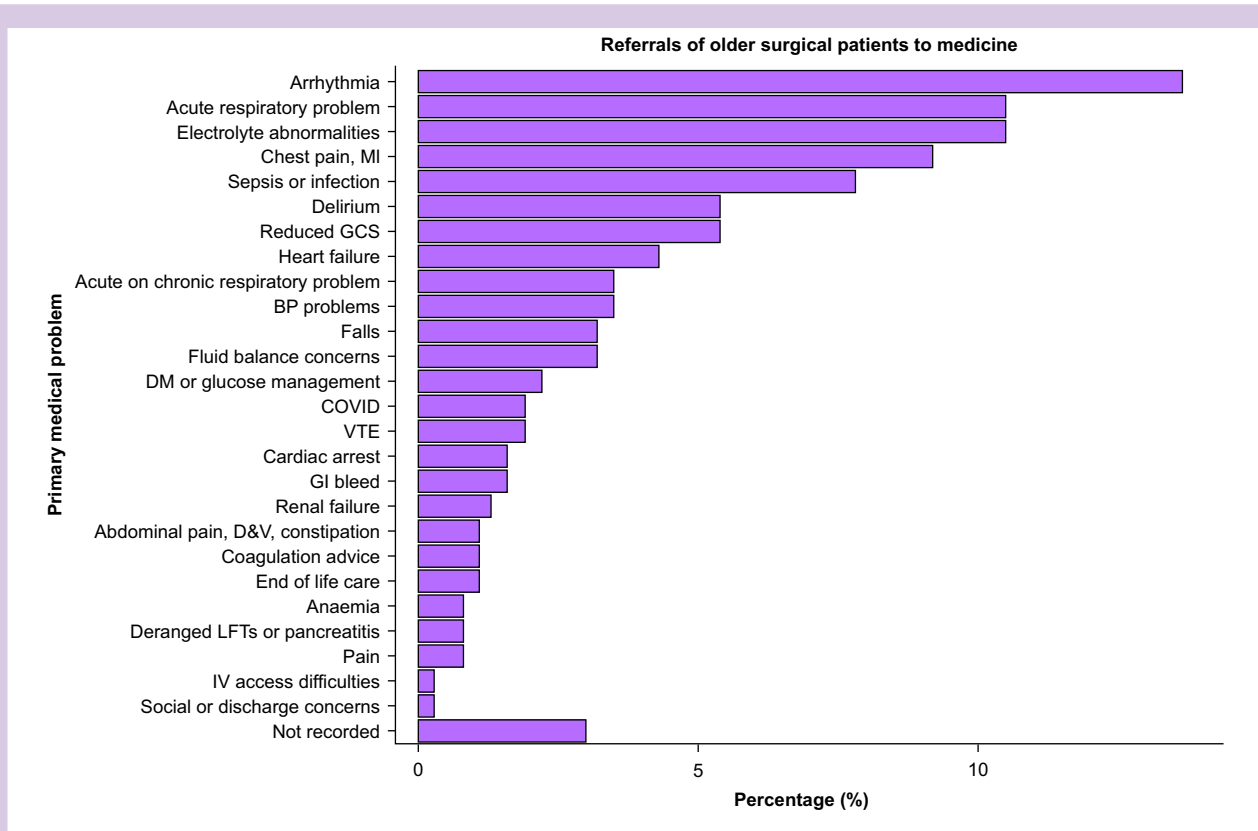


Fig 3. The primary medical problems of older surgical patients requiring a referral to the on-call medical registrar. Notes: the primary medical problem given as the reason for referral to on-call medical registrars regarding older surgical patients. N = 371. D&V, Diarrhoea and vomiting; DM, diabetes mellitus; GCS, Glasgow Coma Scale; LFTs, liver function tests; MI, myocardial infarction; VTE, venous thromboembolism.

Physicians findings from 2011 to 2012 'that a significant proportion of their [medical registrars] workload was spent providing care for patients under non-medical specialty teams, mainly surgical teams'.¹⁴ Approximately 40% of responding medical registrars reported at least one referral of an older surgical patient during their shift in March–June 2022. This is not surprising, considering the ageing surgical population and the well-established association between age and higher complication rates, with medical complications being more prevalent than surgical ones.^{1,20}

Elective patients typically benefit from preoperative optimisation and planning facilitated by preoperative assessments and 'high-risk' clinics. This proactive approach often leads to fewer complications; reduced length of stay; and lower mortality rates compared with emergency patients.^{5,21} Emergency surgical patients often do not receive comprehensive pre-optimisation because of constraints on time and resources. Inclusion of proactive medical involvement in the management of older patients undergoing emergency surgery has demonstrated benefit despite these challenges.^{4,10,22–24} These innovations require resources, motivation, enthusiasm, and interprofessional collaboration. Despite some recent expansion, most hospitals are not able to provide these pre-emptive services to all older surgical patients, so many medical problems in this patient group continue to be referred to the on-call medical registrar.²⁵

To our knowledge there are no formal studies of how much time is spent by medical registrars reviewing surgical referrals. However, one study timed medical registrars clerking medical patients on an acute medical unit, and found that the mean time spent with each patient was 32 min (standard deviation 15 min).²⁶ This is likely to approximate the time spent with a surgical patient; the medical registrar will need to take a history and examine with a medical focus; review and request relevant investigations related to the medical problem; communicate back to the surgical team; and document their review. Although it is important not to over-extrapolate our survey's findings, if we were to consider our cohort as representative of UK hospitals, we could infer that ~40% (266/644) of medical registrar shifts involve at least 30 min reviewing an older surgical patient. Whilst acknowledging that not all referrals of this nature can be predicted and resolved by the parent surgical team with the guidance of a physician, it is plausible that a significant portion could be effectively managed during working hours by a dedicated team or with better signposting to management of common medical problems. This approach has the potential to reduce the on-call workload.

This survey offers professionals a deeper understanding of the medical problems driving referrals to on-call teams. It is anticipated that these insights will inform the design of perioperative services, enabling them to more effectively address the most common medical challenges. Common indications for referral include cardiovascular and respiratory problems, electrolyte imbalance, sepsis, and delirium. To reduce on-call referrals to medical teams, surgical teams can collaborate with perioperative medicine through joint care or referrals; shared clinical guidelines; and training. For instance, understanding the importance of preventing arrhythmias through thorough history-taking, monitoring vital signs, blood tests, and requesting ECGs when indicated is crucial. Surgical teams can manage these tasks with perioperative support as needed, including ensuring the timely reintroduction of anti-arrhythmic medications and proactively managing electrolytes after operation. Providing junior surgical staff with

guidelines, training, and support to prevent these common medical problems can enhance care quality, reduce the severity of complications, and decrease the need for on-call medical referrals.

The unpredictable nature of certain acute medical problems necessitates a system which ensures that surgical patients receive appropriate medical care outside of the hours delivered by perioperative medicine services. This is evident from the finding that 17.0% of surveyed referrals involved patients with a hip fracture, despite the presence of orthogeriatric services in most hospitals. The need for acute medical referrals does not diminish the value of orthogeriatric services; rather, it highlights that some medical issues are inherently unpredictable and require *ad hoc* management even within a comprehensive perioperative care framework. This requirement is likely relevant across all surgical specialties.

Over three-quarters of acute medicine referrals of older surgical patients relate to emergency admissions. Notably, >80% of these referrals are from trauma and orthopaedics, urology, general abdominal, and vascular surgery. One reason these specialties require greater acute medical input is the high proportion of older patients undergoing surgical care within these fields. Almost a third of all surgical patients aged 60 years and older are undergoing orthopaedic surgery and almost a quarter of all older orthopaedic patients are undergoing surgery for hip fracture.¹⁶ Proactive orthogeriatrician-led care exists almost ubiquitously in UK hospitals, in which older patients with a hip fracture are invariably reviewed pre-emptively and other orthopaedic patients seen according to perceived clinical need.²⁵ Geriatrician involvement in the care of older patients under the care of other surgical specialties is increasing; however, it remains variably available across UK hospitals.²⁵ The benefit of shared care or anticipatory input from physicians or geriatricians in orthogeriatrics for emergency laparotomy is well described.^{5,27} Such services offer consistent management of common postoperative medical problems, accepting that unexpected clinical deterioration will still require on-call out of hours medical support. There are several other reasons why patients undergoing orthopaedic surgery more often require on-call medical input; their relatively advanced age; higher ASA physical status grades; greater prevalence of frailty and multimorbidity; increased procedural operative severity; longer postoperative stays and higher incidence of postoperative morbidity, especially delirium, compared with other surgical specialties.¹⁶

This survey highlights where perioperative medicine services may improve continuity of care for older surgical patients, thus limiting acute reactive referrals to the on-call medical registrar. Reducing these acute referrals would not only reduce demands on the on-call medical registrar but also reduce the workload of on-call surgical teams. Utilising the specialist knowledge and skills of medical and surgical teams to address specialty-specific patient problems is highly likely to enhance the quality and consistency of clinical care for older surgical patients. Whilst achieving effective collaboration between specialties can be challenging, it is strongly advocated by medical royal colleges and interspecialty organisations such as the Centre for Perioperative Care.^{8,10,28–31} The success of perioperative medicine teams relies on the formation of a cohesive multidisciplinary team that evolves to work within its own hospital or organisation's environment.^{8,23,30,32} Successful models of collaborative perioperative care include clinic-based joint consultations, ringfenced time for multidisciplinary team

meetings, integrated care pathways, proactive geriatrician involvement, and postoperative shared care.³²

The staffing of perioperative medicine teams remains a significant challenge. Previous surveys of geriatricians have consistently demonstrated the barriers to their involvement in perioperative medicine include funding, workforce issues, and training.^{33–35} A survey of anaesthetists described enthusiasm for preoperative assessment and optimisation, but less appetite for the routine management of postoperative problems.³⁶ Qualitative work references human factors and departmental cultures slowing the expansion of perioperative medicine.³⁷ Our survey highlighted a lack of training in perioperative medicine with approximately three-quarters of responding medical registrars not receiving any formal or informal training. This is despite the recognition by medical registrars and the Royal College of Physicians, that referrals from surgery make up a considerable number of acute referrals to on-call teams.

Beyond the considerations of training availability, the practical challenge within the field of perioperative medicine lies in the noticeable workforce deficit. There is a significant shortage of medical professionals with expertise in perioperative medicine, whether from a medical or anaesthetic background. This shortage poses a significant hurdle, as the current numbers are insufficient to adequately staff perioperative services whilst maintaining existing services. The integration of perioperative medicine training into the Royal College of Anaesthetists' curriculum, alongside the emphasis on interspecialty collaboration by the Royal College of Physicians (London) and the Royal College of Surgeons (England), is expected to enhance perioperative knowledge among resident doctors in training.^{28,29,31} However, whilst the Joint Royal Colleges of Physicians Training Board Internal Medicine Stage 2 curriculum identifies 'managing medical problems in patients in other specialties' as a core competency, it does not explicitly address the care of surgical patients or perioperative medicine. The Centre for Perioperative Care is collaborating with NHS England to develop comprehensive perioperative curricula for both medical and non-medical staff, ensuring cohesive education across disciplines. Including explicit reference to surgical patients in the Royal College of Physicians curriculum could help develop training to improve the confidence and competence of medical registrars in this area, given the frequency of surgical referrals to on-call medical registrars. Additionally, national initiatives such as NHS Elect (an NHS organisation providing online learning, webinars, coaching, and consultancy to healthcare professionals and organisations) play a crucial role in expanding perioperative services. NHS Elect supports the development of locally designed proactive medical teams, which help to redistribute medical workloads away from on-call teams, thereby enhancing the quality and efficiency of patient care.³⁸

We acknowledge that, as with most surveys, selection and recall bias may influence our findings. However, methodological steps were taken to minimise these biases. Participating hospitals and medical registrars were self-selecting, and factors such as their workload, motivations, and available services may limit the representativeness of the wider medical registrar population. Relative to the number of hospitals in each country, medical registrars from England were overrepresented; Scotland and Wales were proportionally represented, and Northern Ireland was underrepresented. Despite our efforts to ensure representation across all four nations, the voluntary

nature of research participation meant involvement was influenced by the competing priorities and research interest of individuals within eligible hospitals. The higher participation rates of hospitals in England align with other aspects of the SNAP-3 study and likely reflect geographical differences in research networking, communication, and the availability of local investigators. Another limitation of this survey is the exclusion of referrals made to sub-specialty medical teams or medical emergency team calls. In larger centres with well-established sub-specialty referral systems, a proportion of referrals for medical problems in older surgical patients, such as cardiovascular issues including arrhythmias and chest pain, may have been directed straight to sub-specialty cardiology teams, bypassing the surveyed medical registrars. Consequently, such cases would not be captured in this survey. Similarly, where the on-call medical registrar is automatically involved in emergency care of a surgical patient through a medical emergency team call without a direct referral from the surgical team, these may not have been recorded if the registrar did not classify these as referrals. These limitations potentially lead to an underestimation of the total number of referrals made to medical teams from non-recorded sources, reflecting the resource constraints of this survey.

Conclusions

On-call medical registrars are under pressure to provide a comprehensive referral service throughout the hospital. A significant part of their workload involves referrals regarding the care of older surgical patients for the management of common medical problems such as arrhythmias, respiratory failure, and delirium. Whilst existing national drivers, guidelines, training opportunities, and collaboration between physicians, surgeons, and anaesthetists have increased availability of perioperative care in the UK,^{33,39,40} there remains a significant implementation gap between national recommendations and local services. This survey indicates that medical service provision for older surgical patients has evolved from preexisting services, rather than being strategically designed anew. The implementation gap not only has potential impact on the quality of care received by older surgical patients but also contributes to the workload of on-call medical registrars.

Authors' contributions

Initiated the collaborative project: IKM

Designed protocol: JP, AS

Designed the data collection tools: CS, JP, TP, AS

Implemented the study in the UK: CS

Monitored data collection for the study: CS

Cleaned and analysed the data: CS

Provided expertise in geriatric medicine: JP

Coordinated site and UK-wide activity: KW

Provided expertise in anaesthetics and perioperative medicine: AS

Provided insights from a patient and public perspective and helped to design the patient facing documents: BE

Guarantor: IKM

Grant holder: IKM

Drafted the paper: CS

Revised the draft paper: IKM, JP, TP

Revised the paper: CS, AS

Reviewed the final draft and contributed to revisions: all authors

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Declarations of interest

IKM is the Director of the Centre for Research and Improvement at the Royal College of Anaesthetists. IM, AS, and JP have received grant funding for clinical trials in perioperative care of older people. AS has received honoraria from Pharmacosmos UK outside of the submitted work.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.bjao.2025.100394>.

Appendix 1. SNAP-3 collaborators contributing to this article

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Arrowe Park Hospital	David Blackman
Ashford and St Peter's Hospital	Mark Macgregor
Barnet General Hospital	Claire King
Barnsley Hospital	Sunil Chaurasia
Basildon University Hospital	Pallavi Marghade
Bedford Hospital	Peter Knowlden
Birmingham Heartlands, Good Hope and Solihull Hospitals	Joyce Yeung
Birmingham Women's Hospital	Jane Pilsbury
Blackpool Victoria Hospital	Anwar Ulhaq
Borders General Hospital	Stephen Alcorn
Bradford Royal Infirmary	Robert Spencer
Bristol Royal Infirmary and St Michael's Hospital	Hannah Wilson
Bronglais General Hospital	Gabor Dudas
Broomfield Hospital	Al Hughes
Buckinghamshire Healthcare Trust	Tamsin Mcallister and Jeremy Drake
Calderdale and Huddersfield FT	Sophie Lawton and Pnt Laloe
Charing Cross Hospital	Kenneth Murray
Chelsea and Westminster Hospital	Marcela Vizcaychipi
Chesterfield Royal Hospital	Julie Hui
Colchester Hospital	Joanna Simpson
Countess of Chester Hospital	Woei Lin Yap
Croydon University Hospital	Agnes Fong
Cumberland Infirmary, Carlisle	Geetanjali Verma
Darent Valley Hospital	Mansoor Sange
Darlington Memorial Hospital	Victoria Craig
Derriford Hospital	Gavin Werrett
Doncaster Hospital	Alasdair Strachan
East Surrey Hospital	Anthony Ratnasingham
Eastbourne District General Hospital	Tara Bolton
Edinburgh Royal Infirmary	Thomas Ballantyne
Epsom and St Helier University Hospitals	Martin Akioyame
Glangwili General Hospital	Peter Havalda
Glasgow Royal Infirmary and Stobhill Ambulatory Care Hospital	Malcolm Howell and Sonya Mckinlay
Glenfield Hospital	Rahil Mandalia
Gloucestershire Hospital NHS FT	Henry Murdoch
Great Western Hospital	Mala Greampet
Guy's and St Thomas'	Kariem El-Boghdady

Continued

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Organisation	Collaborator
Hammersmith Hospital	Kenneth Murray
Harrogate District Hospital	Abhinav Kant
Hillingdon Hospital	Myra Malik and Robert Crooks
Homerton University Hospital	Christian Schwiebert
Hull Royal Infirmary	Andrew Gratrix
Ipswich Hospital	Elizabeth Speirs
James Paget University Hospital	Sudha Garg
Kent and Canterbury Hospital	Srdjane Trajkovic
Kettering General Hospital	Satya Jakkampudi
Kings College Hospital, Denmark Hill	Ravi Bhatia
Kingston Hospital	Sarang Puranik
Lancashire Teaching Hospitals	Zara Townley, Arumugam Pitchiah
Leeds Teaching Hospital NHS Trust	Simon Howell
Leicester General Hospital	Rahil Mandalia
Leicester Royal Infirmary	Rahil Mandalia
Leighton Hospital	Helen Burton
Lincoln County Hospital	Manish Kakkar
Lister Hospital	Pietro Ferranti
Liverpool Women's Hospital	Grainne Garvey
Manchester Royal Infirmary (MRI)	Hannah Greenlee
Medway Maritime Hospital	Keith Lankester
Manchester University NHS FT (except MRI)	Sujesh Bansal
Mid Yorkshire Hospital NHS Trust	Brendan Sloan
Milton Keynes University Hospital	Richard Stewart
Moorfields Eye Hospital	Louisa Pavlakovic
Morrison Hospital	Shilpa Rawat
Musgrove Park Hospital	Rebecca Purnell
National Hospital for Neurology and Neurosurgery	Eleanor Carter
Newcastle upon Tyne Hospitals NHS Foundation Trust	David Saunders
Newham Hospital	Bavesh Gohil
NHS Tayside	Sharon Hilton-Christie
Norfolk and Norwich University Hospital	Melanie Maxwell
North Middlesex University Hospital	Hemantha Handapangoda
University Hospital of North Tees	David Pritchard
North Tyneside General Hospital	Adrian Taylor
North West Anglia NHS FT	Shiny Sivanandan and Sivaprakash Vaitheeswaran
Northampton General Hospital	Prashant Kakodkar
Nottingham University Hospitals NHS Trust	David Hewson
Orpington Hospital	Bavesh Gohil
Oxford University Hospitals NHS Trust	James Day
Pilgrim Hospital	Lisa Sharp
Poole General Hospital	Henrik Reschreiter
Portsmouth Hospital NHS FT (Queen Alexandra Hospital)	Renee Ford
Prince Charles Hospital	Omar Pemberton
Prince Philip Hospital	Peter Havalda
Princess Royal University Hospital (PRUH)	Karthick Duraisamy
Queen Elizabeth Hospital, Gateshead	Joanne Knight
Queen Elizabeth Hospital, Birmingham	Mansoor Bangash
Queen Elizabeth Hospital	Danielle Factor
Queen Elizabeth Queen Mother Hospital	Sanjay Agrawal
Queen Elizabeth Hospital, Kings Lynn	Holy Sira
Queen Victoria Hospital	Fiona Ramsden
Queens Hospital Burton	Manab Haldar
Queens Hospital Romford	Madeep Phull
Raigmore Hospital	Mario Fernandes
Robert Jones & Agnes Hunt Hospital	Melanie Bloor
Rotherham General Hospital	Elinor Cromarty
Royal Alexandra Hospital and Vale of Leven	Michael Brett
Royal Berkshire NHS Foundation Trust	Richard Barnes
Royal Blackburn Hospital	Anuradha Kurvey
Royal Bolton Hospital	Peter Sandbach
Royal Bournemouth Hospital	James Walker
Royal Cornwall Hospital	Claire Preedy
Royal Derby Hospital	Nagendra Prasad
Royal Devon and Exeter Hospital	Helen Gilfillan
Royal Gwent, the Grange and Nevill Hall Hospitals	Jake Hartford-Beynon
Royal Hampshire County Hospital	Kathleen Hemenstall
Royal Lancaster Infirmary	Corinne Rimmer

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Organisation	Collaborator
Royal Liverpool and Broadgreen University Hospitals NHS	Richad Ramsaran
Royal National Orthopaedic Hospital	Rachel Baumber
Royal Surrey County Hospital	James Mckinlay
Royal United Hospital, Bath	Lesley Jordan
Royal Victoria Hospital, Belfast	Kerry Featherstone
Royal Wolverhampton Trust	Asha Ramkumar
Russell Hall Hospital	Anser Ali
Salford Royal Hospital	Manjunatha Patel
Salisbury District Hospital	Xantha Holmwood
Scarborough and Bridlington Hospital	Bejamin Chandler
Sherwood Forest Hospitals (Kings Mill Hospital)	Srinivas Magham
Shrewsbury and Telford Hospital NHS Trust	Paul Jones
Southampton General Hospital	Karen Salmon
Southend University Hospital	Aneta Oborska
Southern Health & Social Care Trust	Michael Jones and Laura McLoughlin
Southmead Hospital, Bristol	Sarah Martindale
Southport and Ormskirk NHS Trust	Abdul Alim Khan
St John's Hospital	Andrew Goddard
St Mary's Hospital, Imperial	Kenneth Murray
St Richard's Hospital	Emily Dana
Stepping Hill Hospital	Petya Chalakova
Sunderland Royal Hospital	Sean Cope
The Christie Hospital	Jaya Nariani
The James Cook University Hospital	Charlotte Anderson
The Princess Alexandra Hospital	Rajamani Seturaman
The Royal Glamorgan Hospital	Neeta Taylor
The Royal London Hospital	Ashley Parker
The Whittington Hospital	Denise Lim
Torbay Hospital	Johannes Retief
Tunbridge Wells Hospital	Hilary Taylor
University College Hospital	Sohail Bampoe
University Hospital Ayr	Philip Hamilton
University Hospital Coventry	Carol Bradbury
University Hospital Crosshouse	Andrew Clark
University Hospital Hairmyres	Jonathan Edgar
University Hospital Lewisham	Danielle Factor
University Hospital Monklands	Samuel Maguire
University Hospital of North Durham	David Hamilton
University Hospital Wales	Margaret Coakley
University Hospitals Sussex NHS FT (Royal Sussex County Hospital, Princess Royal Hospital, Haywards Heath, Sussex Orthopaedic Treatment Centre)	Stuart White
Victoria Hospital, Kirkcaldy	Katie Hunter
Warwick Hospital	Emert White
Watford General Hospital	Nidhi Gautam
West Cumberland Hospital	Elena Grani
West Middlesex University Hospital	Mhairi Jhugursing
Western General Hospital	Louise Peach
William Harvey Hospital	Kim Jemmett
Withybush General Hospital	Sunita Agarwal
Worcestershire Acute Hospitals NHS Trust (Worcester Royal Hospital, The Alexandra Hospital and Kidderminster Treatment Centre)	Emily Johnson
Worthing Hospital	Patrick Thorburn
Wrexham Maelor Hospital	Anna Williams
Wrightington Hospital and Royal Albert Edward Infirmary	Anthony Short
Yeovil District Hospital	Agnieszka Kubiszpudelko
York Hospital	Andrew Chamberlain
Ysbyty Glan Clwyd Hospital	Venkat Sundaram
Ysbyty Gwynedd Hospital	Chrisopher Bailey

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