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Daniels, S.L. [orcid.org/0000-0001-9452-3344](https://orcid.org/0000-0001-9452-3344), Burton, M., Lee, M.J. [orcid.org/0000-0001-9971-1635](https://orcid.org/0000-0001-9971-1635) et al. (5 more authors) (2021) Healthcare professional preferences in the health and fitness assessment and optimisation of older patients facing colorectal cancer surgery. *Colorectal Disease*, 23 (9). pp. 2331-2340. ISSN 1462-8910

<https://doi.org/10.1111/codi.15758>

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## ORIGINAL ARTICLE

# Healthcare professional preferences in the health and fitness assessment and optimization of older patients facing colorectal cancer surgery

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## Funding information

BASO-ACS grant; Bowel Research UK (formerly BDRF) grant. The funders had no role in the design, conduct or analysis of the study.

## Abstract

**Aim:** There are few age- and fitness-specific, evidence-based guidelines for colorectal cancer surgery. The uptake of different assessment and optimization strategies is variable. The aim of this study was to explore healthcare professional opinion about these issues using a mixed methods design.

**Methods:** Semi-structured qualitative interviews were undertaken with healthcare professionals from a single UK region involved in the treatment, assessment and optimization of colorectal surgery patients. Interviews were analysed using the framework approach. An online questionnaire survey was subsequently designed and disseminated to UK surgeons to quantitatively assess the importance of interview themes. Descriptive statistics were used to analyse questionnaire data.

**Results:** Thirty-seven healthcare professionals out of 42 approached (response rate 88%) were interviewed across five hospitals in the south Yorkshire region. Three broad themes were developed: attitudes towards treatment of the older patient, methods of assessment of suitability and optimization strategies. The questionnaire was completed by 103 out of an estimated 256 surgeons (estimated response rate 40.2%). There was a difference in opinion regarding the role of major surgery in older patients, particularly when there is coexisting dementia. Assessment was not standardized. Access to optimization strategies was limited, particularly in the emergency setting.

**Conclusion:** There is wide variation in the process of assessment and provision of optimization strategies in UK practice. Lack of evidence-based guidelines, cost and time constraints restrict the development of services and pathways. Differences in opinion between surgeons towards patients with frailty or dementia may account for some of the variation in colorectal cancer outcomes.

## KEYWORDS

clinical practice variation, gastrointestinal surgery, older adults, prehabilitation, surgery

## INTRODUCTION

Variation in practice is common in colorectal cancer surgery, particularly in the older population (>65 years) [1,2] and in those with advanced disease [3]. The health status of older adults varies considerably, which makes determining optimal treatment strategies challenging. This may require tailoring of treatment to individual patients rather than applying simplistic chronological age cut-offs to standard care. Deciding whether an older patient is 'fit' for major surgery is complex and involves balancing the benefits of surgery against risks of postoperative morbidity, functional decline and poor quality of life [4,5]. There are few published data on healthcare professionals' (HCPs') opinions regarding major gastrointestinal (GI) surgery in older patients, how they determine suitability for surgery and how they optimize them to improve outcomes [6,7]. Clinician opinion heavily influences patient decision-making and may account for lower resection rates in the older population [8–10].

No standard definition of 'fitness for surgery' exists, contributing to practice variation [11]. 'Fitness' relates to patient factors rather than disease related or technical factors, such as whether the disease is operable. Traditionally, patients were considered 'fit' for major surgery if they could perform four metabolic equivalents of activity without symptoms [12] based on subjective assessment by clinicians. Increasingly, objective tests such as cardiopulmonary exercise testing (CPET) are being used [11]. Cardiopulmonary fitness is potentially modifiable prior to surgery through exercise training, termed 'prehabilitation' [13]. Other risk factors associated with ageing that impact perioperative outcomes, such as frailty and malnutrition, may also be modifiable but targeted interventions are currently under researched [14–16]. Interventions include comprehensive geriatric assessment, optimization of comorbidities, lifestyle modifications, exercise and rehabilitation programmes [17]. However, lack of evidence of their impact on surgical outcomes and cost effectiveness limits implementation [18,19].

The aims of this mixed methodology study were to explore surgeon and wider HCP preferences for the treatment of older adults across the entire surgical pathway and to explore how older patients are currently assessed and optimized in practice.

## METHODS

### Ethical approvals

Ethical approval was obtained (IRAS ID 272619, REC ref. 19/HRA/5964). Local research governance approvals were obtained.

### Study design

A sequential, exploratory mixed methods design was used [20,21]. An initial qualitative (interview) study identified a range of issues which were then quantified using a questionnaire in a wider population of UK-based surgeons. This approach allows theories to be

### What does this paper add to the literature?

Variation in surgical treatment practice is common in the older population with colorectal cancer. Few studies have addressed this problem using a mixed methods approach. This study has demonstrated wide differences in views and practice in how patients are assessed for surgery and what support measures are available.

generated on a rich dataset from a small sample to then be tested on a larger population. This study is reported with reference to the COREQ (Criteria for REporting Qualitative research) checklist [22].

## Semi-structured interviews

### Population and sampling

Interviews were performed with a range of HCPs involved in the care of patients with colorectal cancer including surgeons, anaesthetists, oncologists, specialist nurses, general practitioners, geriatricians and allied health professionals (AHPs) (dietitians, occupational therapists and physiotherapists). HCPs at all five hospitals with colorectal units within the south Yorkshire region, comprising four district general hospitals and a tertiary referral centre, were included. Purposive sampling was used to select at least one surgeon and one anaesthetist or nurse specialist at each unit. The major subspecialties of GI surgery were included: colorectal, oesophagogastric (OG) and hepatopancreaticobiliary (HPB) surgery. This was to gather views from non-colorectal specialists who may be involved with emergency patients and from HPB specialists involved in the management of advanced colorectal cancer. Recruitment was by direct approach or via email. Written informed consent was obtained.

### Interview conduct

An interview prompt sheet was prepared with reference to the literature [23] and advice from the study steering group. The first two interviews were used as an internal pilot. Interviews were conducted by the primary researcher (SLD). Interviews were recorded and transcribed verbatim.

### Interview analysis

Data from the interviews were analysed using thematic analysis [24] housed within the framework approach [25] to organize coding of the data. The framework was used to explore the theory that there is variation in current practice and reasons for this using an inductive approach. Transcripts and field notes were read, annotated to identify subthemes and then coded. Mapping and interpretation were

undertaken sequentially. Three transcripts (10% of the total number of transcripts) were double coded by an experienced qualitative researcher (MB). Analysis focused on mapping the range of attitudes and current practice. Interview recruitment ceased after saturation of sub-themes had occurred.

## Questionnaire

### Questionnaire development

A structured, web-based (Google Forms, Palo Alto, California, USA) questionnaire was developed using the interview findings, literature review and expert input to ensure content validity [26] The survey was piloted with seven HCPs prior to dissemination to ensure face validity, comprehension and usability. Modifications were made where required. It included both closed and open questions using a range of question types (including nine-point Likert scales, multiple choice, free text) [26,27]. The questions were designed to capture the range of current practice and attitudes towards certain patient risk characteristics. Regarding optimization and assessment, respondents were asked whether their practice was to undertake each element for all patients, or only for those they considered high risk or whether it was not part of their practice. The link to the survey was converted into a click-counting URL link (bit.ly) to monitor survey visits alongside completions to determine a proxy response rate and to identify visits from outside the UK (full questionnaire is available in the supporting material).

### Questionnaire dissemination

The survey was disseminated via specialty association mailing lists (BASO and AUGIS), the Centre for Perioperative Care (CPOC) website, social media (Twitter) and email contacts of the study team. Reminder emails were sent after 6 weeks. Responses from outside the UK were excluded. Date of certification of completion of training was gathered to ensure that all respondents had completed training.

### Questionnaire analysis

Questionnaire analysis was performed using descriptive statistics including medians with ranges, where appropriate. Analyses were performed using Microsoft Excel (Microsoft, Richmond, Virginia, USA) and R.

## RESULTS

### Semi-structured interviews

Forty-two HCPs were approached, of whom 37 (88%) consented to interview. These included nine surgeons (seven colorectal, one OG and one HPB), nine nurse specialists, seven anaesthetists, three

oncologists, three general practitioners, five AHPs and one geriatrician (Table 1). Median interview duration was 29 min (range 14–64). Three themes were developed relating to older patients: attitudes towards treatment (Table 2), assessment (Table 3) and optimization (Table 4) practice.

### Questionnaire survey

The survey was completed by 104 individuals; one response was excluded as they currently practice outside of the UK, resulting in 103 responses after 256 visits to the questionnaire site (estimated response rate 40.2%). All major subspecialties of GI surgery were represented (bariatric 7/103, 7%; benign OG 10/103, 10%; HPB cancer 13/103, 13%; OG cancer 16/103, 15%; colorectal cancer 52/103, 50%; and benign colorectal 5/103, 5%). Responses were gathered from across the UK, with the highest proportion working in the Yorkshire and Humber deanery (Figure 1).

## Mixed methods synthesis

### Theme 1: Attitudes towards treatment strategies in the older patient

HCPs emphasized the importance of physiological rather than chronological age in treatment decision-making. When asked about factors that affect their decision-making, a number of age-linked risk factors were discussed, in particular frailty. Moderate to severe heart, liver or renal failure, functional impairments and 'high risk' according to a risk calculator were also rated highly in both elective and emergency settings (Figure 2). Dementia was considered particularly important; 99/103 (96.1%) surgeons rated pre-existing dementia as important (Likert score 6–9) for both elective and emergency patients (Figure 2).

The primary consideration on interview in deciding management for an older patient was whether they are 'fit' for standard

**TABLE 1** Summary of interview participants' professions and duration of interviews

Profession	Number interviewed	Median interview duration (min), (range)
Surgeon	9	34.23 (22.13–63.47)
Specialist nurse	8	22.31 (16.24–32.45)
Anaesthetist	7	28.07 (25.51–44.22)
Oncologist	3	32.51 (32.22–39.40)
General practitioner	3	31.10 (26.57–33.00)
Physiotherapist	2	19.32 (19.16–19.48)
Dietitian	2	18.48 (13.42–23.54)
Geriatrician	1	29.27
Occupational therapist	1	21.33

Note: Median and range are shown.

**TABLE 2** Summary of theme ‘attitudes towards surgical management in the older patient’ and subthemes developed during interviews, with selected quotations

Theme 1: Attitudes towards surgical management in the older patient
<b>Subthemes with quotes</b>
Impact of age on treatment decisions <i>‘Sometimes just by age, size, and obviously sometimes comorbidities, they do take them into account. But a lot of the time if they see somebody that’s just frail they rein off’</i> Nurse specialist
Potential treatment trade-offs for older patients <i>‘To live longer you might have to lose something, and that something is often your quality of life’</i> Anaesthetist
<i>‘You actually can change someone’s outcome significantly because doing a massive operation on an unfit person actually might mean they live less time than doing a minor procedure’</i> Anaesthetist
Challenges in emergency gastrointestinal surgery <i>‘The decisions are often made out of hours or at weekends, so there is limited time for input’</i> Geriatrician
<i>‘You accept a greater level of risk because the complication risk is higher in emergency surgery..., your opportunity for optimization is gone’</i> Surgeon

surgical management. Only if a patient was ‘unfit’ would alternatives (palliative stenting, defunctioning stoma, radiofrequency ablation) be considered. The survey data concurred with this, with 86/103 (83.5%) surgeons stating that the availability of alternative treatment strategies was important in their decision-making in a frail or otherwise ‘unfit’ older individual in both settings (Likert scale 7–9) (Figure 2). A common view was that ‘doing nothing’ is often the best way to preserve quality of life in an ‘unfit’ individual. Clinicians discussed risk-adapted strategies to use in high-risk individuals, such as performing a resection without anastomosis or chemotherapy omission.

The challenges discussed in emergency surgery ranged from lack of multi-professional input and decision-making out of hours, to the disordered physiology and lack of time for optimization (Table 2). However, many clinicians felt that they would be more inclined to offer surgery to older patients with emergency GI surgical presentations, even if they were at elevated perioperative risk, as mortality is high without intervention.

### Theme 2: Assessment of the older patient

The assessment of fitness for surgery was viewed as the responsibility of the surgeon, with an increasing role for anaesthetists in patients of uncertain fitness or prior to high-risk or emergency surgery (Table 3). Assessment of emergency patients was viewed as extremely difficult, particularly in the presence of acutely deranged physiology and the unpredictability of older people’s resilience to surgery. Objective assessment of cardiorespiratory fitness varied between hospitals, with some performing universal CPET, some selectively testing and one having no provision. This correlated with survey data where 27/103 (26.2%) surgeons stated that they use

**TABLE 3** Summary of theme ‘assessment of the older patient’ and subthemes developed during interviews, with selected quotations

Theme 2: Assessment of the older patient
<b>Subthemes with quotes</b>
Fitness for surgery <i>‘The MDT cannot generally make a decision about patient fitness because you do not have all the information needed in the first place’</i> Surgeon
Cardiorespiratory fitness <i>‘The vast majority of patients who we think there’s a realistic possibility of surgery have cardiopulmonary exercise testing’</i> Surgeon <i>‘We’ve not tended to use CPET testing. So it’s very much, I suppose, a subjective rating’</i> Surgeon
Functional capacity <i>‘Actually gaining [an understanding of] what the patient can do, because sometimes that’s glossed over a little bit...’</i> Surgeon
Nutritional <i>‘It’s usually just picked up from a surgeon really who will think, right, this person needs extra nutrition’</i> Dietitian
Psychological <i>‘There’s no formal assessment [for psychological problems]’</i> Surgeon
Frailty and geriatric assessment <i>‘The reason we haven’t done it [frailty assessment] up until now is because there’s no point doing a frailty assessment if you’re not going to do anything about it’</i> Anaesthetist <i>‘[Regarding detailed frailty assessment] Would it change much? Given that we’re already contemplating quite a lot of different sources of information already’</i> Surgeon
Coexisting medical conditions and risk calculators <i>‘Now what we’re saying is you’re 85, you’ve got a bad heart, we’re going to assess that, we’re going to get some sort of risk analysis and then we’re going to say to you, what do you want?’</i> Surgeon <i>‘When they come through the MDT their performance status (PS) should be on that referral form, so if they’re a PS2, we wouldn’t see them’</i> Surgeon
Lifestyle <i>‘[Regarding complex abdominal wall reconstruction]... so definite cut-off of BMI &gt;35 and smokers don’t get offered surgery because we know from the data that their outcomes are significantly worse’</i> Surgeon
Perioperative <i>‘If we think they are not fit, and the family or the patient think they’re fit, then we will take an anaesthetics opinion’</i> Surgeon regarding emergency patients

Abbreviations: BMI, body mass index; CPET, cardiopulmonary exercise testing; MDT, multidisciplinary team.

objective tests in all patients and 49/103 (47.6%) perform them only in those perceived as high risk (Figure 3). Many HCPs commented that preoperative assessment and objective fitness tests are often too late in the pathway for the assessments to inform decision-making or for targeted interventions.

Many HCPs reported poor provision of nutritional screening and access to dietitian-led assessments in the perioperative period. Surgeons frequently ask about weight loss in their own assessments; 76/103 (73.8%) and 72/103 (69.9%) ask all patients in the elective and emergency settings respectively. Many surgeons do not routinely screen for biochemical markers of nutritional deficiency; 61/103 (59.2%) and 79/103 (76.7%) do not screen elective or emergency patients respectively.

**TABLE 4** Summary of theme 'optimization of the older patient' and subthemes developed during interviews, with selected quotations

Theme 3: Optimization of the older patient
<b>Subthemes with quotes</b>
Cardiorespiratory fitness
<i>'The consultants can be a bit hit and miss on what advice they give'</i> Nurse specialist
<i>'I make sure that the patient understands what improvements they need to make and why'</i> Surgeon
<i>'I exercise tested someone yesterday for an operation in 10 days time, and I gave them advice and they're saying "but surely it's too late"</i> Anaesthetist
Nutritional
<i>'We give them Fortisips to cover 4/5 days and then say the dietitian will give them a call in the next 24–48 hours. Because we are so short of dietitians we do not get dietitian cover in the clinic, which we used to have 5/6 years ago'</i> Surgeon
Psychological
<i>'We do a lot of counselling prior, which is beneficial, and you can sometimes see who's going to struggle and who doesn't'</i> Nurse specialist
Coexisting medical conditions
<i>'Some things are very easy. So, if you take things like anaemia, hypertension, diabetes, they've all got very specific numbers to work to'</i> Anaesthetist
Lifestyle
<i>'I tell them if you're smoking I'll not operate on you. So a lot of patients will have their last cigarette on the day they see me in the clinic'</i> Surgeon
<i>'It's how much [advice/information] goes in, how much is retained and the motivation of somebody to do it...'</i> General practitioner
<i>'Patients need support to make lifestyle changes, they can't be expected to make them on their own'</i> Nurse specialist
Geriatric
<i>'The post-laparotomy emergencies the geriatricians get involved in, there are lots of comorbidities and social issues...'</i> Surgeon
Perioperative and postoperative
<i>'[Regarding AHP input] We've got dietitians that work on surgery and because they're part of the enhanced recovery, we can alert them pre-op, and OT and physio'</i> Nurse specialist
Rehabilitation
<i>'We don't have to send many patients to rehabilitation now because we're getting much better at starting their rehabilitation earlier'</i> Physiotherapist

Abbreviations: AHP, allied health professional; OT, occupational therapist.

Psychological assessment, for coexistent anxiety or depression, was felt to help predict patients' tolerance of treatments, engagement with optimization strategies and recovery. However, many surgeons do not routinely ask regarding psychological issues; 81/103 (78.6%) and 80/103 (77.7%) surgeons do not ask elective or emergency patients respectively (Figure 3).

Surgeons emphasized the link between frailty and poor outcomes (Table 3). However, a frailty assessment was infrequently performed; only 51/103 (49.5%) and 58/103 (46.3%) surgeons perform a frailty assessment in all or selected patients in the elective and emergency settings respectively. No HCPs reported having routine access to preoperative geriatric assessment. In the elective and emergency

settings, respectively, 93/103 (90.3%) and 95/103 (92.2%) surgeons ask specific functional questions of either all patients or those considered high risk (Figure 3).

Many surgeons and anaesthetists expressed concern about the increasing prevalence of dementia in their patient population. However, 46/103 (44.7%) and 48/103 (46.6%) do not routinely ask regarding memory problems in elective or emergency patients respectively; 67/103 (65.0%) and 61/103 (59.2%) surgeons do not perform cognitive testing in the elective and emergency settings respectively (Figure 3).

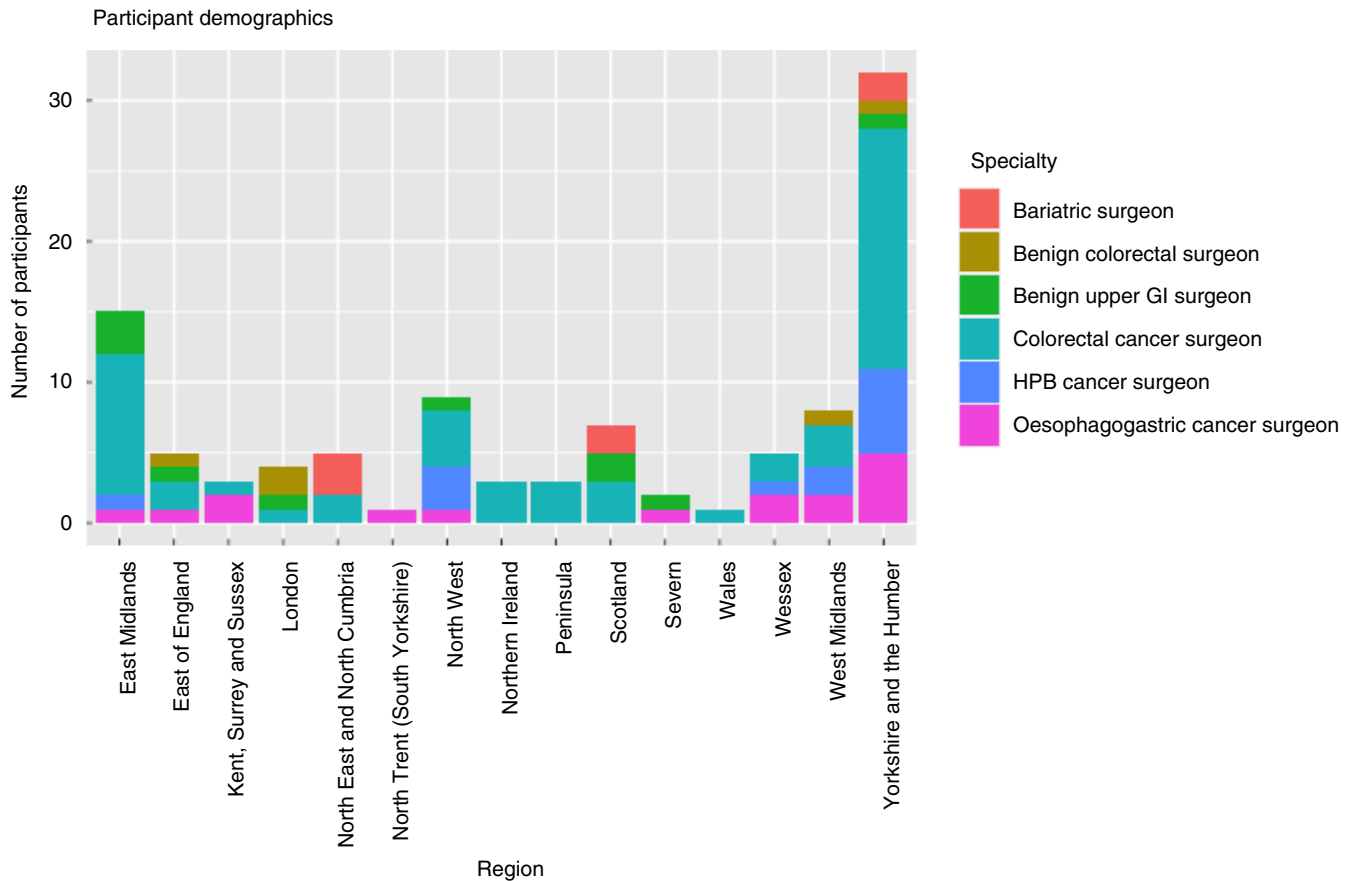
Clinicians mentioned using the WHO Performance Status in combination with comorbidity information to decide on treatment options for patients at the multidisciplinary team meetings. Comprehensive use of a risk calculator was more common in the emergency (67/103; 65%) than elective setting (20/103; 19.4%). Many HCPs spoke about national audits, such as the National Emergency Laparotomy Audit (NELA) and National Bowel Cancer Audit (NBoCA), as driving behaviour change, particularly regarding risk assessment. Many HCPs ask regarding smoking and sedentary behaviour but were less likely to ask about alcohol abuse (Figure 3).

### Theme 3: Optimization of the older patient

In the elective setting, many HCPs advise their patients to exercise more before surgery (Table 4): 55/103 (53.4%) surgeons advise all and 28/103 (27.2%) advise high-risk patients. One-third of surgeons (38/103) routinely advise both elective and emergency patients on deep breathing exercises. There was variable practice in signposting to exercise facilities, referring to prehabilitation programmes and surgery school (Figure 4). Only 17/102 (16.5%) surgeons state that they currently refer all patients for prehabilitation. Many surgeons stated that they wanted better access to prehabilitation programmes; however, some felt that the evidence base for prehabilitation is not yet sufficient to justify delaying cancer treatment (Table 4). Lack of cost effectiveness data was seen as a barrier to securing funding. The need to adhere to the cancer pathway timeframe was frequently mentioned as a barrier to improving their patients' fitness preoperatively. Some HCPs described redesigning their pathways to allow time for optimization. General practitioners described a range of community services that could be utilized.

Many HCPs spoke about the importance of nutritional optimization for elective patients. This included giving advice themselves, referring to specialist dietitians or prescribing nutritional supplements. This was also reflected in the survey where 74/103 (71.8%) surgeons give advice, 77/103 (74.8%) prescribe oral supplements and 73/103 (71.6%) refer to dietitians in all or selected elective patients. In the emergency setting, surgeons are less likely to refer to dietitians preoperatively; 38/100 (38.0%) routinely refer all or high-risk emergency patients preoperatively.

Psychological preparation, such as education and anxiety management, was stressed as important by many HCPs. However, surgeons themselves rarely advise on psychological preparation but



**FIGURE 1** Stacked bar chart depicting the deanery of current practice and declared subspecialty with number of participants shown

many (55/102; 53.9%) will signpost elective patients for support (Figure 4).

Optimization of coexisting medical conditions was often felt to be the responsibility of preoperative assessment. Many spoke about using iron infusions to correct anaemia and this was confirmed in the survey (Figure 4). In the emergency setting, many surgeons rely on anaesthetists to assist in optimization of medical comorbidities.

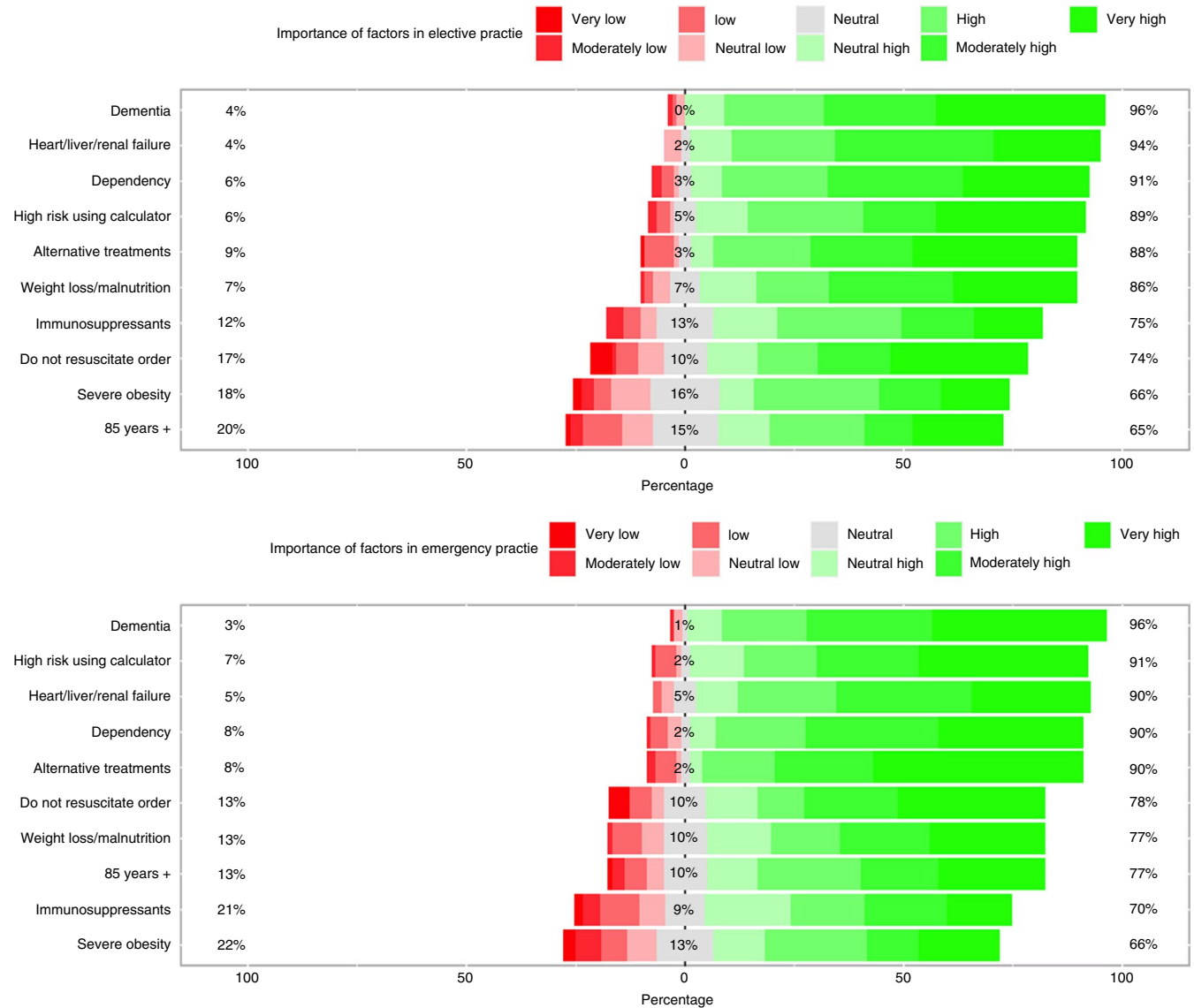
Access to geriatric input in the preoperative period was limited at all hospitals where interviews were undertaken, which was reflected by survey respondents; 14/103 (13.6%) surgeons had preoperative access for all emergency patients and 4/103 (3.9%) for all elective patients. Many HCPs felt that they would like better access to geriatrician-led support, particularly for emergency patients and those identified as frail, with the NELA reports frequently cited as a motivating factor. Lack of evidence for interventions to address frailty was frequently cited.

A range of perioperative strategies to optimize both elective and emergency patients were discussed during interviews, which was supported by the survey findings; many surgeons employ enhanced recovery after surgery protocols (92/103; 89.3%), attempt laparoscopic procedures if feasible (97/103; 94.2%) and employ regional analgesic techniques (93/103; 90.3%) for all elective patients. In the emergency setting, many surgeons also attempt all of these strategies (Figure 4).

Postoperatively, HCPs reported variable access to physiotherapists and other AHPs. This was due to AHP staff shortages, restrictive job plans and availability at weekends. Many surgeons reported routine postoperative physiotherapy and specialist nurse input for all patients (83/103, 80.6%, and 85/103, 82.5%, respectively) with input from other AHPs and geriatricians reserved for patients considered high risk (Figure 4). Routine involvement of occupational therapists and social services was more frequent in the emergency setting. Access to formal postoperative rehabilitation programmes was limited with only 10/103 (9.7%) and 7/103 (6.8%) surgeons stating that they refer all elective and emergency patients respectively.

## DISCUSSION

Available guidelines for colorectal cancer state that age should not be used in surgical decision-making; however, there remains a paucity of evidence on which measures should be used instead [28,29]. Guidelines advise on what the optimal management should be if a patient is 'fit' with the assessment of fitness left to the responsible surgeon [30,31]. This means that patients may be assessed differently if they present to different surgeons or hospitals and opportunities for optimization may be missed. Alternative guidance, such as expert consensus through a Delphi study, may help to standardize



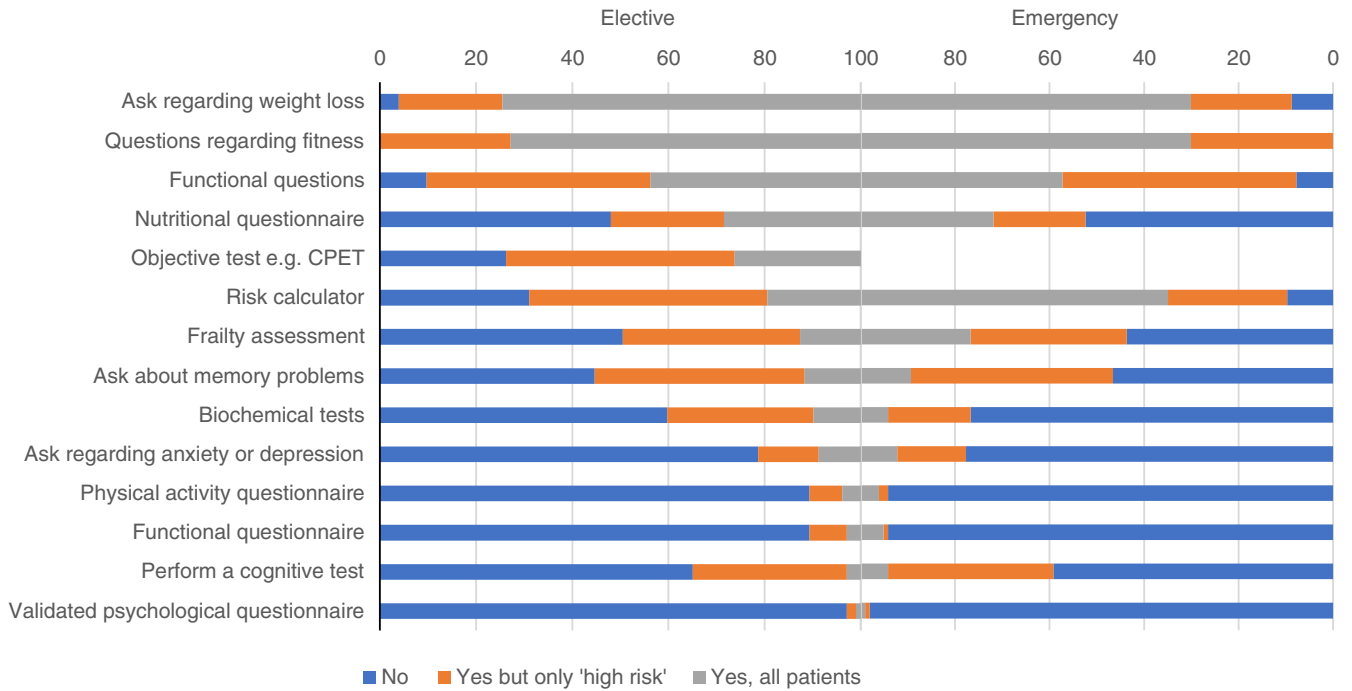
**FIGURE 2** Likert diagrams showing the importance that surgeons place on different factors in the elective and emergency settings; Likert scale 1, very low (red); 2, moderately low; 3, low; 4, neutral low; 5, neutral; 6, neutral high; 7, high; 8, moderately high; 9, very high (green). The percentages on the left summarize Likert scale 1–4, the percentages in the middle summarize Likert scale 5 (neutral) and the percentages on the right summarize Likert scale 6–9

practice in the absence of robust evidence and should be considered in this field.

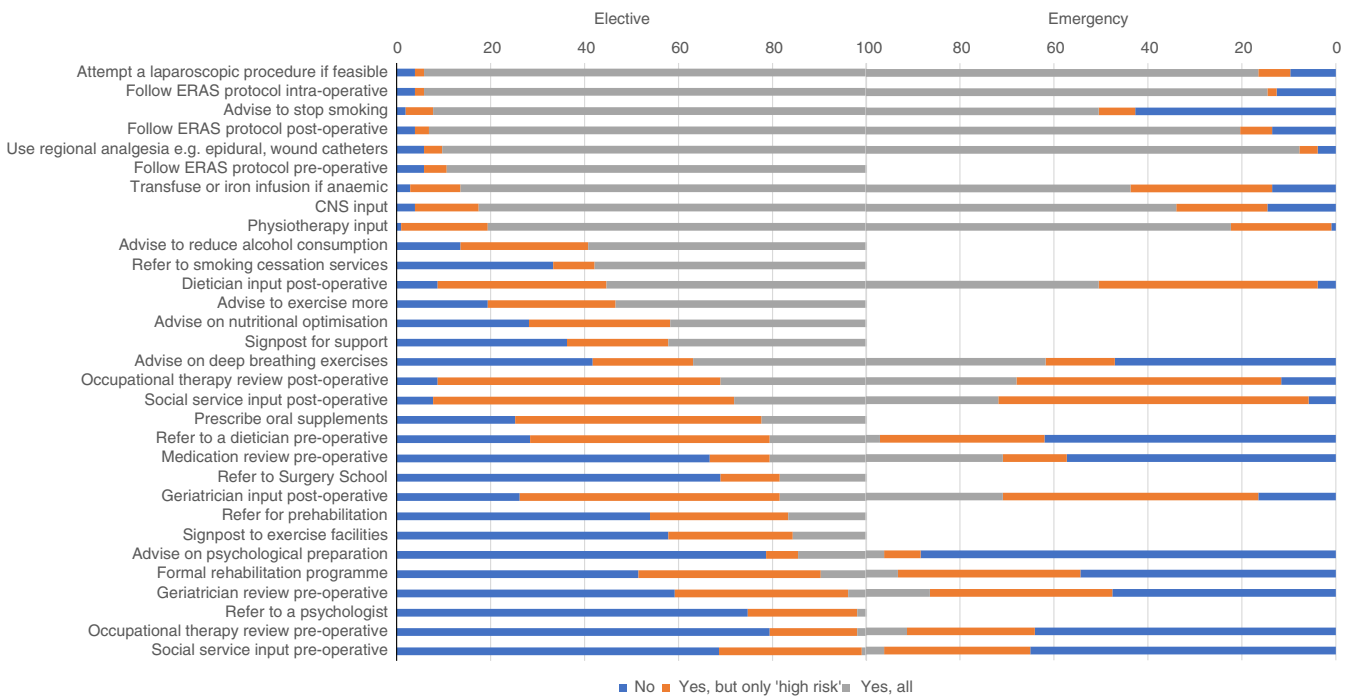
Functional and cognitive impairments are rated highly by surgeons in their decision-making in this study but are not formally assessed in the majority of patients. Dementia, whilst a life-limiting diagnosis, may be associated with a longer survival than many other comorbidities. Lower resection rates in patients with dementia were highlighted in the latest NBoCA report [32] and surgeon reticence in the presence of dementia has previously been demonstrated [7]. Clinician beliefs and attitudes about the value of life in patients with dementia may contribute towards treatment variation and could be considered discriminatory. The use of alternative procedures (such as colonic stenting) to manage symptoms and prevent complications in 'unfit' patients requires further evaluation.

Differences in commissioning of services, availability of health professionals (particularly geriatric specialists), as well as HCP attitudes towards different optimization strategies result in varying provision [15,16]. This will probably widen the difference in outcomes across the UK, particularly for those with advanced colorectal cancer [1,28]. Interventions such as prehabilitation, rehabilitation and comprehensive geriatric assessment have been demonstrated to be safe but proving their cost and clinical effectiveness has been harder to achieve [16]. Policy makers must consider strategies to ensure that innovations, specialist HCPs and service developments are available to all National Health Service hospitals. Virtual consultations, accelerated into clinical practice by the pandemic, could mean specialists in high demand, such as geriatricians and dietitians, or interventions such as prehabilitation programmes could be shared





**FIGURE 3** Bar chart demonstrating assessment strategies used in the elective and emergency settings. Surgeons were asked to indicate whether they did each aspect for all patients, only for those whom they considered to be high risk or whether it was not a part of their usual practice. Percentages are shown



**FIGURE 4** Bar chart demonstrating optimization strategies used in the elective and emergency settings. Surgeons were asked to indicate whether they did each aspect for all patients, only for those they considered high risk or whether it was not a part of their practice. Optimization strategies not relevant in the emergency setting are shown as blank. Percentages are shown



across hospitals, reducing variation in service provision and potentially cutting costs.

Older patients presenting as emergencies with colorectal cancer are an extremely challenging group and coordinated, multidisciplinary strategies to optimize their care are needed [33–35]. There is mounting evidence that the presence of frailty in patients undergoing emergency GI surgery is an independent predictor of poor outcomes [34,36]; however, this study found that it is still not uniformly assessed. Geriatrician review of emergency patients has been associated with improved mortality; however, access to geriatrician-led care remains highly variable nationally [16,33,37].

The questionnaire was disseminated by a number of methods to try to gather responses from across the UK and different subspecialists. It is therefore difficult to calculate a response rate and likely that the actual response rate is lower than that reported [38]. Self-selection of respondents may have meant that surgeons more interested in this research area completed the questionnaire, and is an acknowledged source of bias. Questionnaire responses were not spread evenly across the UK so may not be truly representative of UK practice. It is acknowledged that some aspects of assessment may be performed by other HCPs and that this has not been captured in the survey.

Interviews were only carried out within one region to enable a range of different HCPs to be approached and differences within a region to be explored, but this is a potential source of bias and limitation of the study. Only one geriatrician was interviewed due to lack of geriatricians specializing in surgical patients in the region and is another limitation. This is a national problem and progress in this area has been slow despite the NELA reports. It is likely that widespread adoption will only occur with financial incentives, as has been observed with the best practice tariff in orthopaedic surgery [39].

## Conclusion

Inconsistency in the methods of assessment and optimization may contribute to variation in outcomes in the older population undergoing surgery for colorectal cancer. This inconsistency is particularly notable in the emergency setting. Availability and utilization of members of the wider multidisciplinary team, cost of assessments and interventions and clinician preference all contribute towards this variation.

## ACKNOWLEDGEMENTS

The authors would like to thank all of the interview and survey participants for taking part in this study. We would also like to thank Debby Hawkins, research coordinator at Sheffield Teaching Hospitals, for assisting in the study ethical application, set-up and coordination.

## CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

## AUTHOR CONTRIBUTIONS

SLD, MB and LW conceived the study. SLD, MB, TRW, SRB and LW initiated the study design. SLD and LW were responsible for obtaining the required regulatory approvals. SLD, MB and LW performed the qualitative data analysis. SLD and MJL performed the quantitative data analysis. SLD, MB and LW performed the mixed methods analysis. KK, SM and LW provided specialist oversight. All authors contributed to the refinement of the study protocol, analysis of the results and approved the final paper for publication.

## ETHICS APPROVAL

This study has ethical approval (IRAS ID 272619, REC ref. 19/HRA/5964). Local research and development approvals were obtained.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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**How to cite this article:** Daniels SL, Burton M, Lee MJ, Moug SJ, Kerr K, Wilson TR, et al. Healthcare professional preferences in the health and fitness assessment and optimization of older patients facing colorectal cancer surgery. *Colorectal Dis*. 2021;00:1-10. <https://doi.org/10.1111/codi.15758>