

Emergency general surgery: challenges and opportunities

Research report

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About this report

The Nuffield Trust was commissioned by The Royal College of Surgeons of England to explore the challenges facing emergency general surgery (EGS) and to identify opportunities to overcome those challenges. We undertook interviews with experts, a rapid assessment of the literature and a novel quantitative analysis. This work fed into a seminar held in September 2015 that was attended by senior stakeholders across surgery, medicine, anaesthetics, radiology, pre-hospital medicine, advanced nursing and management.

This report brings together the findings of our preliminary research, seminar and subsequent exploration and analysis. It offers practical opportunities to improve the provision of EGS and provides health care leaders with important points to consider when reviewing changes to EGS services.

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List of abbreviations

A&E	Accident & emergency
ACGBI	Association of Coloproctology of Great Britain and Ireland
ANP	Advanced nurse practitioner
ASGBI	Association of Surgeons of Great Britain and Ireland
ATLS	Advanced Trauma Life Support
AUGIS	Association of Upper Gastrointestinal Surgeons
CCT	Certificate of Completion of Training
ELPQuiC	Emergency Laparotomy Pathway Quality Improvement Care
EGS	Emergency general surgery
ESAC	Emergency surgery ambulatory care
GP	General practitioner
HES	Hospital episode statistics
HRG	Healthcare Resource Group
IT	Information technology
JCST	Joint Committee on Surgical Training
NCEPOD	National Confidential Enquiry into Patient Outcome and Death
NELA	National Emergency Laparotomy Audit
NICE	National Institute for Health and Care Excellence
POPS	Proactive care of Older People undergoing Surgery
RCS	The Royal College of Surgeons of England
WHO	World Health Organization

Executive summary

The Nuffield Trust was commissioned by The Royal College of Surgeons of England to explore the challenges facing emergency general surgery (EGS) and identify opportunities to overcome them. We undertook interviews with experts, a rapid assessment of the literature and a novel quantitative analysis. This work fed into a seminar held in September 2015 that was attended by senior stakeholders across surgery, medicine, anaesthetics, radiology, pre-hospital medicine, advanced nursing and management. This peer-reviewed report brings together our findings and makes a number of practical recommendations aimed at both local providers and national policy-makers.

Challenges facing emergency general surgery

The most significant challenges faced by EGS services include:

- the variation in outcomes between different surgical units and individual surgeons
- a range of workforce challenges, including the relationships between different professional groups
- organisational and operational challenges, such as patient flow and contracting
- underlying demographic and epidemiological trends.

At the heart of these challenges are two inter-related issues: first, and most importantly, the desire to reduce variation in outcomes for EGS (particularly for high-risk diagnoses); and, second, the need to resolve the tension between increasing pressures to centralise EGS services while political and demographic considerations argue for sustaining local access. The pressures to centralise services include:

- the shift from generalist to more specialist practice in surgery
- providing access to consultant-delivered care 24/7
- reductions in the number of doctors in training
- providing EGS services with the necessary diagnostic and other support services
- ensuring high-quality training
- the increasing constraints on NHS finances.

There is a widely held perception that centralisation will drive up quality given the relationship found in a number of surgical disciplines between volumes and outcomes. However, our own analysis, in common with other findings, did not find a clear relationship in this regard.

Opportunities to address the challenges

There are four important opportunities to address the above challenges:

- the systematic use of protocols and pathways
- the increased use of more network-based approaches
- the development of new non-medical roles
- new training models.

Each of these approaches has strengths and challenges in implementation. Table ES.1 summarises our assessment of these.

Table ES.1: The strengths of different approaches and challenges in implementing them

Opportunities	Challenges addressed	Strengths and evidence of impact	Challenges in implementation
<ul style="list-style-type: none"> • Emergency Laparotomy Pathway Quality Improvement Care (ELPQuiC) bundle 	<ul style="list-style-type: none"> • National variations in quality • Suboptimal patient care 	<ul style="list-style-type: none"> • Improves adherence to national standards • Can reduce complications and mortality (e.g. risk of death is reduced from 15.6% to 9.6%) 	<ul style="list-style-type: none"> • Requires local engagement and support, including training for staff • May increase demand for resources such as theatres and intensive care units
<ul style="list-style-type: none"> • Surgical ambulatory care pathway 	<ul style="list-style-type: none"> • Reduced interactions with primary care • Operational issues • Patient flow 	<ul style="list-style-type: none"> • Can reduce admissions • Rapid access to imaging, including ultrasound • Improved working with GPs 	<ul style="list-style-type: none"> • Requires consultant leadership • Financial constraints
<ul style="list-style-type: none"> • Direct telephone access to a senior decision-maker 	<ul style="list-style-type: none"> • Reduced interactions with primary care • Operational issues • Patient flow 	<ul style="list-style-type: none"> • Can reduce admissions • Can improve interdisciplinary relationships 	<ul style="list-style-type: none"> • Requires consultant to be available for telephone consultations • Could reduce training opportunities to triage
<ul style="list-style-type: none"> • Closer integration with medical teams 	<ul style="list-style-type: none"> • Poor physician–surgeon interactions • Suboptimal patient care 	<ul style="list-style-type: none"> • More collaborative working • Can reduce complications and length of stay 	<ul style="list-style-type: none"> • Professional resistance • Need to clarify professional accountability for care
<ul style="list-style-type: none"> • Improved access to theatres 	<ul style="list-style-type: none"> • Suboptimal care • Patient flow 	<ul style="list-style-type: none"> • Improves adherence to standards • Should improve outcomes and patient flow 	<ul style="list-style-type: none"> • Lack of resources • Financial constraints

Networks	<ul style="list-style-type: none"> • Managed networks 	<ul style="list-style-type: none"> • Surgical staffing – gaps in cover and lack of generalist skills • Adherence to standards • Patient flow • Multidisciplinary team working • Critical mass of activity 	<ul style="list-style-type: none"> • Can use financial and commissioning levers to drive change • Can ‘pool’ resources across a health economy to support a patient-focused pathway of care – optimising efficiency and access 	<ul style="list-style-type: none"> • Professional and organisational resistance to change • Requires significant clinical and managerial leadership, and potentially commissioner input, to deliver • Requires time to set up appropriate systems and governance arrangements
	<ul style="list-style-type: none"> • Learning networks 	<ul style="list-style-type: none"> • Adherence to standards • Multidisciplinary team working 	<ul style="list-style-type: none"> • Quick and simple to implement, compared with managed networks 	<ul style="list-style-type: none"> • Requires professional engagement and support to translate into changes in practice • Requires continued commitment from network members in absence of contractual or management mechanisms
New roles	<ul style="list-style-type: none"> • Introduction of new roles (e.g. advanced nurse practitioner, physician associate) 	<ul style="list-style-type: none"> • Staffing – with reductions in medical training numbers • Adherence to standards 	<ul style="list-style-type: none"> • Addresses workforce gaps • Delivers more consistent care • Improve team working 	<ul style="list-style-type: none"> • Funding and local capacity for training • Professional resistance
New training models	<ul style="list-style-type: none"> • Increasing exposure to generalist skills 	<ul style="list-style-type: none"> • Surgical staffing – gaps in cover and lack of generalist skills • National variations in quality 	<ul style="list-style-type: none"> • Might address workforce pressures and facilitate safer staffing of rotas • May better tailor the skills of the future workforce to the needs of future patients 	<ul style="list-style-type: none"> • Professional resistance • Will require large-scale reorganisation of training pathways
	<ul style="list-style-type: none"> • Separate training and service contracts for trainees 	<ul style="list-style-type: none"> • Surgical staffing – gaps in cover and lack of generalist skills 	<ul style="list-style-type: none"> • Could ease tension between service and training • May facilitate smoother training and attainment of generalist skills 	<ul style="list-style-type: none"> • Requires large-scale reorganisation • May be challenging to implement with current workforce constraints
	<ul style="list-style-type: none"> • Overlap of surgical training with radiology/ anaesthetics 	<ul style="list-style-type: none"> • Lack of staffing • Lack of support for surgery from other services • National variations in quality 	<ul style="list-style-type: none"> • Reduces reliance on other specialties and services facing workforce pressures 	<ul style="list-style-type: none"> • Would need careful curriculum design • Professional resistance

The quickest gains could be achieved through the systematic use of protocols and pathways. In our view, this should be a major priority in all hospitals offering EGS and has been called for strongly in the recent report by the National Emergency Laparotomy Audit (NELA) (NELA, 2015). In particular, trusts should ensure compliance with best practice for laparotomy and cholecystectomy. We have identified the Emergency Laparotomy Pathway Quality Improvement Care (ELPQuiC) bundle as a straightforward clinical tool that may lead to considerable survival benefit in emergency laparotomy patients. A number of other pathways for the management of emergency laparotomy patients are available on the NELA website (www.nela.org.uk), and the Association of Upper Gastrointestinal Surgeons (AUGIS) has recently published a pathway for the management of acute gallstone disease (AUGIS, 2015). Implementation of such tools can be driven at a local level, and there are considerable gains to be made at relatively low cost.

The most comprehensive means to address the challenges faced by EGS would be to develop managed clinical networks. If these were commissioner-led, following the models set by trauma and stroke, they could reinforce the adoption of, and compliance with, clinical standards through commissioning levers. Provider-led networks, such as those in use for burns in some parts of England, can be easier to put in place, without the need for national oversight, and allow for provider organisations to lead on designing and operating the network. Provided adequate governance arrangements are in place, the gains from provider-led networks could be significant, and despite the financial and other barriers, we would encourage at least a feasibility assessment to be considered as a board-level priority for provider organisations.

NHS England could lead work in the area of nationally focused clinical networks – potentially as part of its broader work on new models of care. There may also be a role for bodies such as the Royal Colleges in facilitating discussion at a national level about the appropriate use of clinically led provider networks in EGS. However, implementing network arrangements effectively will not be a quick solution. Doing so requires time to establish partnerships, design appropriate governance arrangements and allow all parties' boards an opportunity to assure themselves that the arrangements are suitable.

The third approach is to **develop other professional roles – such as advanced nurse practitioners or physician associates – to address the potential gaps, in terms of both numbers and skills, in EGS.** The development of these roles offers more than just addressing the workforce shortage. We gathered evidence that suggests they can have broader benefits in terms of team working and quality of care. Again, we would recommend that all hospitals consider the potential for new roles in EGS, taking into account that such changes would have a longer lead time than other options.

Finally, in this report we have laid out options for **future training models, which would be the longest-term solution.** It is beyond our realm of expertise to recommend a particular option, but we note a wide consensus among our study participants that the skill set of trainees needs to be broadened for the delivery of an effective EGS service in the future, a view supported by the literature. We hope that the models discussed in this report will help to stimulate debate as training curricula and models are designed.

1. Introduction

The Nuffield Trust was commissioned by The Royal College of Surgeons of England (RCS) to explore the challenges facing emergency general surgery (EGS) and identify opportunities to overcome them. We undertook 12 interviews with experts, a rapid assessment of the literature and a novel quantitative analysis. This work fed into a seminar, held in September 2015, which was attended by 24 senior stakeholders across surgery, medicine, anaesthetics, radiology, pre-hospital medicine, advanced nursing and management.

This report brings together the findings of our preliminary research, seminar and subsequent exploration and analysis. It offers the reader practical opportunities to improve the provision of EGS and provides health care leaders with important points to consider when reviewing changes to EGS services. It is worth noting that our findings are illustrated with quotes throughout the text. These are the opinions of a range of experts and may be coloured by their personal backgrounds, anecdotal experience and professional identities. We have not attributed names to the quotes in order to protect participants' anonymity.

The report is structured according to our research brief, beginning with a chapter on the challenges facing EGS (Chapter 2) and followed by an exploration of the most promising opportunities to address these challenges, as identified through our research (Chapter 3). Chapter 4 draws conclusions and suggests a variety of next steps.

2. What are the key challenges?

In this chapter we describe some of the most significant challenges faced by EGS. These include:

- the variation in outcomes between different surgical units and individual surgeons
- a range of workforce challenges, including the relationships between different professional groups
- a number of organisational and operational challenges, including the role of politics in service change
- underlying demographic and epidemiological trends.

At the heart of these challenges are two inter-related issues: first, and most importantly, the desire to reduce variation in outcomes for EGS, particularly for high-risk diagnoses; and, second, the need to resolve the tension between increasing pressures to centralise EGS services while political and demographic considerations argue for sustaining local access. The pressures to centralise services include:

- the shift from generalist to more specialist practice in surgery
- providing access to consultant-delivered care 24/7
- reductions in the number of doctors in training
- providing EGS services with the necessary diagnostic and other support services
- ensuring high-quality training
- increasing constraints on NHS finances.

There is a widely held perception that centralisation will drive up quality given the relationship found in a number of surgical disciplines between volumes and outcomes (Chowdhury and others, 2007; Halm and others, 2002; Urbach and Baxter, 2004). However, our own analysis, in common with other findings (Finks and others, 2011; Posnett, 2002; Wei and others, 2014), did not find a clear relationship in this regard.

Finally, our work identified several issues that can be resolved by changed ways of working at a local level. These include improved communication and working between medicine and surgery, and between primary and secondary care.

Variation in outcomes

Emergency surgery, including procedures for high-risk diagnoses such as gastrointestinal ulcers, hernias and bowel ischaemia, is carried out in the majority of acute hospitals in the NHS. Yet there is marked variation in outcomes and the provision of care, exacerbated by the high-risk nature of the specialty. For example, Saunders and others (2012) found that mortality for emergency laparotomy ranged from 3.6 to 41.7 per cent in 35 NHS hospitals, while a report from the National

Emergency Laparotomy Audit (NELA), published in 2015, found stark variation in compliance with key standards, such as early input by senior clinicians, timely antibiotic therapy and documentation of risk of death (NELA, 2015). In addition, work from both Scotland and England has reported variation in outcomes following cholecystectomy (Harrison and others, 2012; Sinha and others, 2013), leading to national guidance for the diagnosis and management of gallstone disease being produced by the National Institute for Health and Care Excellence (NICE), (NICE 2014; Warttig and others, 2014).

The relationship between volume and outcome in EGS is complex and unclear. Multiple studies have examined this relationship in different surgical and medical areas, and research has been undertaken into volumes at both an individual clinician and a hospital level. For instance, Chowdhury and others (2007) undertook a systematic review of the impact of surgical volume and specialisation on patient outcomes. They found that high surgeon volume and specialisation were associated with improved patient outcomes, whereas high hospital volume was of limited benefit. While analysis of cholecystectomy data suggested that high-volume centres have improved outcomes (Harrison and others, 2012; Sinha and others, 2012), the differences in risk between centres with low, medium and high volumes appeared to be of clinical relevance only to older patients or patients who had multiple morbidities (Harrison and others, 2012). An earlier study, by Davoli and others (2005), found evidence of a relationship between volume and outcome in some clinical areas, but concluded that it was not possible to define clear volume thresholds. They recommended that decisions about required volumes should be a dynamic process that relies on a continual review of the evidence.

In order to inform this work, the Nuffield Trust undertook a novel quantitative analysis of variation in activity and outcomes across 154 hospital sites in England.

The analysis was based on Hospital Episode Statistics (HES) using data pooled across four years, from 2009/10 to 2012/13. HES are routinely collected administrative datasets that record information such as diagnoses and procedures. We focused on cases of adults who had presented as an emergency, received a diagnosis that placed them in a high-risk category, and subsequently underwent a major surgical procedure. In cases where patients underwent multiple surgical procedures between admission and discharge, we considered only that procedure which demanded the highest resources. Our analysis looked at this activity by hospital site, with unadjusted 30-day in-hospital mortality as the outcome of interest (see the Appendix for methods and a breakdown of high-risk diagnosis categories).

Variation in activity across hospital sites

We identified 114,597 cases in which patients had been admitted with a high-risk diagnosis between 2009/10 and 2012/13. Of these cases, 25,325 (22.1 per cent) involved a major general surgical procedure after admission.

We identified marked variation in the volume of activity undertaken by hospital site (see Table 2.1). Over the four-year period, there were 10 sites where 50 or fewer major EGS procedures had been undertaken among cases with high-risk diagnoses, while at the other end of the spectrum there were 16 sites where over 250 such procedures had been undertaken in this population.

Table 2.1: Distribution of caseload for major emergency general surgery procedures among cases with high-risk diagnoses,* pooled data 2009/10 to 2012/13

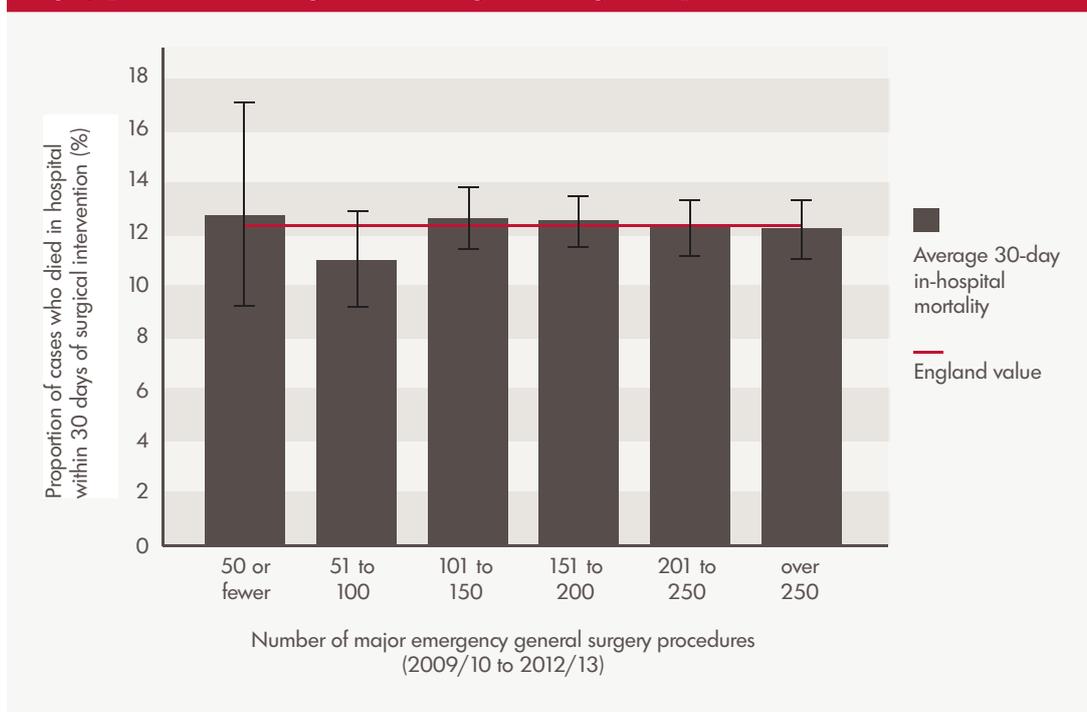
Number of major procedures	Number of hospital sites	Proportion of total sites included
50 or fewer	10	6.5%
51 to 100	19	12.3%
101 to 150	37	24.0%
151 to 200	43	27.9%
201 to 250	29	18.8%
Over 250	16	10.4%

* Hospital sites were included whose site codes had been used consistently over the study period.

Variation in outcomes

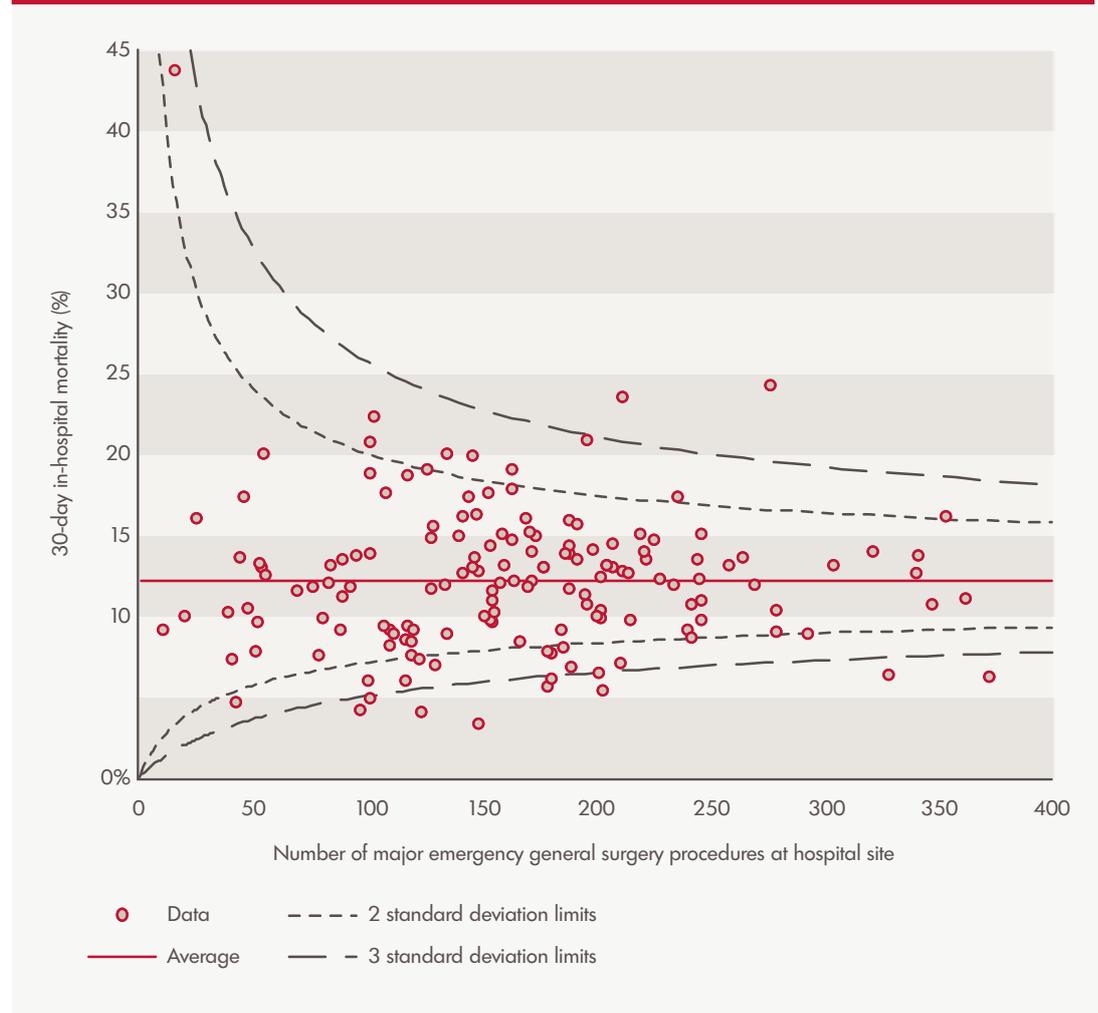
In more than 1 in 10 cases, patients with a high-risk diagnosis who underwent a major EGS procedure during the study period died in hospital within 30 days of their surgical intervention. Figure 2.1 shows how mortality varied across hospital sites, grouped according to the number of major EGS interventions they performed in this population over the study period. The mortality rate was quite consistent across these groups.

Figure 2.1: 30-day in-hospital mortality rate grouped by number of major emergency general surgery procedures among cases with high-risk diagnoses, pooled data 2009/10 to 2012/13



When we broke this down further and looked additionally at very low volume sites – that is, those with between 21 and 50 procedures and those with 20 or fewer procedures – there was no clear pattern of higher mortality. As can be seen from the funnel plot in Figure 2.2, there were only three units in the latter category, one of which had an apparently high rate of mortality and thus skews the mortality rate for this category.

Figure 2.2: 30-day in-hospital mortality rate: variation by hospital site, pooled data 2009/10 to 2012/13



Finally, it is also important to note that, while the average 30-day mortality was around 12 per cent, some sites achieved much lower rates. This suggests that there may be scope to improve other sites down to these levels, saving a large number of lives.

Hospital transfers

Our final piece of analysis examined transfers between hospital trusts, and determined the proportion of the high-risk EGS caseload that resulted from these transfers (see Table 2.2). The results indicate that 98 per cent of these cases were treated at the hospital at which they presented. The other 2 per cent comprised patients who presented at a hospital accident and emergency (A&E) department but were subsequently admitted at another hospital trust, as well as patients who were transferred from another provider.

Table 2.2: Number of high-risk cases and proportion of these involving a major emergency general surgery procedure, broken down by site of presentation, 2012/13 only

Method of admission	Number of high-risk spells	High-risk spells with major procedure
Emergency admission to provider	30,320	21.1%
Admitted from another provider's A&E department	291	25.1%
Transfer from another provider	276	16.7%

Discussion

It is important to acknowledge the limitations of this work. We were unable to adjust for case mix or demographic characteristics. Additionally, our mortality rates only took account of those patients who underwent a procedure. Finally, we recognise that this work looked at volume by site, not volume by individual surgeons, so any conclusions are limited to the level of the former.

Given the above caveats, our analysis is consistent with other research suggesting that the relationship between volume and outcome is complex. As one seminar attendee put it: "Volume is not a guarantee of anything." Further to this, low-volume centres can run services to a very high standard, as pointed out by another attendee: "It's hard to argue from this data that it isn't possible to run a very effective small unit." It may be that what is done is far more important than where it is done. Indeed, learning from centres of best practice could potentially improve outcomes for all patients regardless of whether they have surgery at a high- or low-volume site.

Workforce challenges

There are a number of workforce challenges facing EGS. These include the loss of generalist skills, delivery of training, issues in staffing 24/7 rotas and interactions between surgeons and physicians or GPs.

Loss of the generalist

Surgery is becoming increasingly specialised, leading to a loss of generalist skills (RCS and ASGBI, 2013). This continued move towards specialisation and subspecialisation is partly driven by the structure of training programmes and by trainees themselves, with a specialty being seen among them as part of a 'professional identity'. As can be seen in Table 2.3, those with specialty interests are much less likely to obtain the recommended level of experience in general surgical skills before obtaining a Certificate of Completion of Training (CCT).

"Our professional identity is predicated on being a super-specialist but, actually, if our professional identity were enhanced by being more of a generalist, then we'd all be better doctors."

(Interview participant)

Table 2.3: Percentage of trainees reaching the number of procedures recommended by the Joint Committee on Surgical Training (JCST) prior to obtaining a Certificate of Completion of Training

Procedure (JCST guideline)	% trainees reaching JCST guideline by special interest						Total (%)
	Breast	Vascular	UGI/HPB**	Colorectal	Transplant	General	
Emergency laparotomy* (100)	34	30	62	73	20	100	55*
Hartmann's procedure (5)	74	78	86	93	100	100	85
Appendicectomy (80)	82	63	90	93	60	100	84
Cholecystectomy (50)	65	59	100	89	80	100	81
Inguinal hernia repair (60)	66	70	93	93	60	100	83
Segmental colectomy (20)	82	74	86	100	60	100	86

* 75% met the modified indicative number of 75 emergency laparotomies.

** Upper gastrointestinal / hepato-pancreato-biliary.

Reproduced with permission from Thomas and others (2015).

Whereas increasing specialism supports the delivery of highly complex and technical surgery, the consequent loss of generalist skills may often lead to patients not receiving the care they need as this falls outside the specialist remit of the 'on-call' surgeon (Garner and others, 2006). This is particularly apposite at the interface of general surgery with paediatric surgery and urology. Our participants cited examples of surgical consultants not being able to operate on children or manage testicular torsion, with potentially devastating consequences.

"Anybody who calls themselves a consultant surgeon, whether they're a general surgeon or a urologist, should be able to deal with a testicular torsion and giving them the ability to opt out is dangerous."

(Interview participant)

Participants also spoke of occasions where specialist gastrointestinal surgeons had been unwilling to perform cholecystectomies, leading to a large backlog of cases. Indeed, a joint document by the Association of Coloproctology of Great Britain and Ireland (ACGBI), the Association of Upper Gastrointestinal Surgeons (AUGIS) and the Association of Surgeons of Great Britain and Ireland (ASGBI) has recently called for a 'defined acute gallbladder service' to be established within every EGS service (ACGBI and others, 2015, p. 6).

"It may be that in [named hospital] they've only got one surgeon who is confident to do acute gallbladder surgery and the others don't want to do it and they're saying that we're specialists and we can't do it and so they're getting a rotten service."

(Interview participant)

Such situations may be exacerbated by a culture in which professional loyalty lies with the specialism, not EGS, leading to a lack of leadership at the consultant level. The joint document mentioned above noted that ‘EGS at times lacks strategic clinical leadership and is mostly staffed by surgeons whose prime interest lies in their elective practice’ (ACGBI and others, 2015, p. 4).

Finally, there was a discussion at our seminar about subspecialisation in other specialties – such as radiology – and how this may further restrict the general skills of other staff involved in the delivery of EGS out of hours.

Delivery of training

Training new surgeons and mapping their skills to the needs of the future population are likely to present significant challenges. The need to emphasise more general surgical skills is vital, while at the same time staffing adequate rotas. A 2014 consultant surgeon survey (N = 279) revealed that consultants think that trainees need more exposure to emergencies and more EGS training.¹ These issues are discussed in more detail below.

Our participants also identified the increasing emphasis on consultant-delivered care as potentially leading to a reduction in training opportunities. Parallels can be drawn with neurosurgery, where in 2013 it was reported that within consultant-delivered services only 8.5 per cent of procedures were performed by trainees (NCEPOD, 2013).

“Consultant-delivered service has repercussions for training ... I think the world of training hasn’t worked out how it wants to address [this].”

(Interview participant)

Finally, there was a recognition of the tension between training opportunities and service delivery, particularly in smaller hospitals where a surgical presence is required 24/7, but with large variation in training opportunities throughout that time.

“The main problem I see is the conflict between service and training, particularly given the size of units that we’ve got around the country ... you are sitting around doing very little overnight in a DGH [district general hospital] of 250,000 because there’s not a lot going on. So a lot of time is being wasted on the service, having a service for the presence but not actually the service of emergency surgery.”

(Seminar participant)

Difficulties in providing 24/7 consultant and junior doctor cover

Providing 24/7 medical cover is a major challenge, and the literature and participants identify that onsite consultant presence is not always complete, with 30 per cent of high-risk cases having suboptimal consultant supervision (RCS and DH, 2011) and only 48 per cent of emergency laparotomy patients reviewed by a consultant within 12 hours (NELA, 2015). Recent work has suggested an association between the numbers of both junior and senior medical staff and risk-adjusted 30-day mortality (Ozdemir and others, 2016).

In addition, gaps in middle-grade and junior doctor rotas lead to challenges in safely staffing the emergency take. There are multiple reasons for this, but for consultant cover a major factor was felt to be that there can be insufficient elective work in smaller hospitals to staff adequate rotas. Challenges in recruiting surgeons (Mascie-Taylor and others, 2015), as well as financial constraints, may exacerbate the problem further.

¹ A 2014 survey by ASGBI of all 750 consultant general surgeon fellows in Great Britain and Ireland (unpublished).

“If you’re a small, medium-sized DGH, to keep an emergency rota going, you’re going to need a minimum of nine people and they probably don’t have the elective work to employ nine people in their different specialties.”

(Interview participant)

Similarly, staffing junior doctor rotas can be a challenge due to limits on working time from the European Working Time Directive, ongoing reductions in training numbers and a lack of desire among trainee surgeons to work as ‘career middle-grades’.

“You’ve got all the constraints of restriction in trainee numbers and Working Time Directive and GMC [General Medical Council] survey, work/life balance stuff and all that. I think that takes you to a point where we’re producing surgeons who’ve had a much better work/life balance but are very specialised and much less able to cope in a hot, confusing situation than they would have been in the past.”

(Interview participant)

Physician–surgeon interactions

At our seminar, we discussed challenges posed by interdisciplinary working and deconstructed this into three aspects. First, there is evidence that a minority of patients who are admitted under the wrong team (i.e. surgical patients incorrectly admitted under medical teams or vice versa) have worse care (NCEPOD, 2010). While participants accepted that this can occur, they pointed out that it is often due to genuine clinical uncertainty resulting from similar conditions having a wide variety of presentations. There was a sense that resolving such inappropriate triage depended on good working relationships between the medical and surgical teams.

“It can only be solved by making sure that the working relationships between the on-call physicians and the on-call surgeons are as good as they can possibly be, and that’s really a job where the medical directors of the hospitals have to be involved.”

(Interview participant)

Second, there was a feeling that this working relationship is not always optimal and can be destructive. The causes of this are highly variable and depend on a number of local and personal factors, but there was some recognition that physicians, particularly those in acute medical teams under heavy strain, feel unsupported by surgical colleagues.

“The amount of activity required by medical specialties and surgical specialties overnight has eroded the potential for teamwork because the physicians are on their knees with rota gaps and are getting everything referred to them. And there’s a feeling amongst the medical trainees that the surgeons can’t be bothered to get out of bed and that the surgeons will dump anything that isn’t surgical on the physicians.”

(Interview participant)

“There’s a lack of effective integration [between surgery and medicine], which is partly the balance of workload, but they’re not supporting each other well enough; they’re not getting on well enough with each other.”

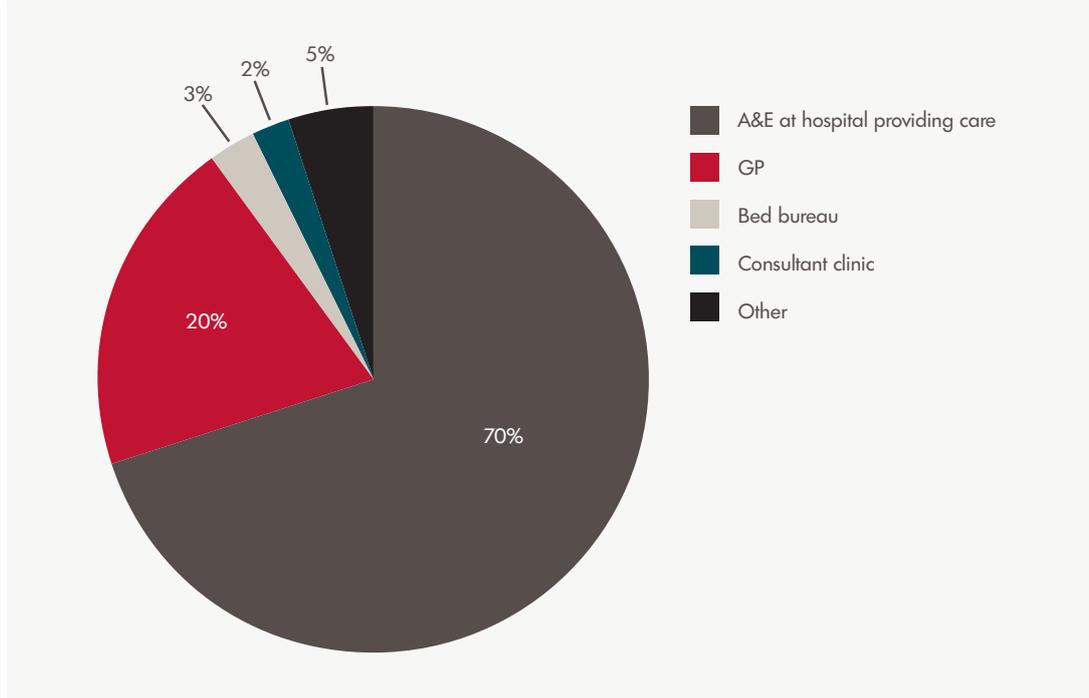
(Interview participant)

Finally, there is a challenge surrounding the integration of medical and surgical teams, particularly in light of the ageing multimorbid population of the future. The literature suggests that surgeons’ knowledge of geriatric medicine is suboptimal and that care might be enhanced by routine geriatric input into surgical patients (Shipway and others, 2015).

Interface with primary care

The referral behaviour of primary care clinicians can have a significant impact on the running of EGS services – a fifth of the high-risk EGS diagnoses explored in our quantitative analysis had entered the hospital as a GP referral (see Figure 2.3). The lack of formalised routes for GPs to obtain specialist advice when patients present with potentially concerning symptoms can mean that GPs resort to referring patients either via A&E departments or directly to surgical teams.

Figure 2.3: Referral routes for the set of high-risk emergency general surgery diagnoses analysed, 2012–13



Interviewees told us that the need for improved communication between primary care doctors and secondary care physicians working in emergency services was an important challenge, in terms of both improving referrals and enhancing post-operative care.

“GPs ... are desperate for interaction with secondary care about emergency services because ... they want to try and reduce admissions.... Sometimes what they really want, if they were offered it, would be an emergency clinic appointment.”

(Interview participant)

“Commissioners I’ve spoken to and the GPs I know ... very much welcome an interaction with general surgery.... Often, most places, you ring up the bed bureau and they just say, ‘Take them into general surgery’.... There’s no meaningful interaction with the GP.”

(Interview participant)

Operational and organisational challenges

It is clear that operational and organisational factors can pose significant challenges to the delivery of EGS; recent research has suggested an association between hospital infrastructure (including critical care and bed availability) and mortality (Ozdemir and others, 2016). Operational challenges are compounded by the high resource use of EGS – emergency surgery patients with septic complications account for the greatest use of intensive care units (RCS and DH, 2011), and EGS consumes 73 per cent of all general surgical bed days.¹

Bed occupancy and patient flow

Operational issues can hinder the provision of high-quality EGS, with a lack of surgical beds or theatre space presenting challenges. The lack of surgical beds may be due to the complexities of discharging frail, comorbid patients, and bed managers may prioritise elective patients in order to meet targets. In addition, sometimes surgical beds can be used for medical outliers and patients can move bed or ward multiple times during admission, resulting in inefficiencies (Williamson and others, 2015).

Participants also spoke of frustration about needing to operate on patients but not having the required theatre slot available, particularly out of hours; as well as a mismatch between clinical and bed management priorities. This has been recognised by ASGBI, which states that resources – including theatre and critical care access, interventional radiology and bed location – are ‘inadequate and must be urgently addressed’ (ASGBI, 2012, p. 4).

“The numbers of stories you hear of people trying to refer sick patients where the bed managers say, ‘Leave it with us’ and then nothing happens.”
(Interview participant)

“I don’t know if I am unique but I dread being on call now and it’s not because I’m lazy but we just don’t have the facilities to deal with emergency work ... if I go in to see somebody who has a diabetic foot infection, who needs surgery, I spend all my weekend negotiating to get to theatre God knows when.”
(Seminar participant)

Finally, when thinking about the future of EGS, and in particular the potential to network some services, capacity at receiving hospitals poses a real challenge.

“The biggest problem is [that our strategic partner has] no capacity whatsoever ... they’re just bursting at the seams. Our biggest problem with that hospital now is their lack of capacity.”
(Interview participant)

Lack of support for surgery from other services

EGS has a clear interdependence with a number of other services and disciplines, such as interventional radiology, endoscopy and intensive care. Facilitating timely access to and support from these specialist resources is necessary to ensure delivery of high-quality care.

“If you’ve got a patient with GI [gastrointestinal] bleeding admitted, then you need to have full endoscopy service and full interventional radiology service to support that as well as emergency surgery. So all these services are interrelated and interdependent.”
(Interview participant)

¹ HES (2014/15). Emergency admissions account for 73.2 per cent of bed days coded under the general surgery specialty code.

Despite clear national standards stating that hospitals accepting emergency surgery cases should have 24/7 access to interventional radiology, if not on site then via ‘clear and unambiguous’ pathways as part of network solutions, access to interventional radiology is currently incomplete (RCS, 2011). The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) for gastrointestinal haemorrhage (NCEPOD, 2015) found that 73 per cent of hospitals could not provide 24/7 embolisation of gastrointestinal bleeding on site and only 45 per cent had a formal network to address this. With barriers to provision of support services – including staffing, training and financial constraints – ensuring adequate and prompt access to these services is a major challenge for the delivery of EGS services now and in the future.

“It would be an absolute given that you need to have access to expert radiological advice, CT [computerised tomography] scanning in particular, and a range of diagnostic and interventional radiology services. So what are the challenges? The challenges are providing this on a 24/7, 365 basis in every hospital which currently demands it. And will we have to rationalise in the future?”

(Interview participant)

Finance and contracting

The financial and contractual arrangements for EGS present challenges. First, the marginal tariff for emergency services means that over a baseline level of activity, providers are paid at an amount less than the agreed tariff price. The marginal tariff was introduced as an incentive for providers to reduce excessive demand for their services, but where providers are unable to affect demand, they can find themselves underfunded for activity over the baseline level.

“[T]he emergency tariff is woeful and doesn’t in any way cover the cost of providing a decent quality emergency service.”

(Interview participant)

Providers can attempt to compensate for this lost revenue through their elective activity, for which marginal rates do not apply. However, their ability to influence the proportions of different types of activity can be limited by geography, the nature of the health economy in which they operate, commissioning arrangements and other factors.

“Some centres have a better chance of making the balance. The higher the proportion of your emergency work of the whole you have, I think the greater difficulty you have in making your bottom-line balancing act.”

(Interview participant)

A second issue is that when providers attempt to change the delivery of components of EGS procedures, contracting and payment mechanisms can make it more difficult to set up effective systems. One interviewee told us that it was sometimes challenging to ensure that the correct payment reached the correct organisation when one hospital provided radiology services on behalf of another.

Public and political opposition to service change

As described above, many of the challenges faced by EGS are driving moves to centralise and consolidate services. Yet service change in the NHS often faces public and political opposition and can result in protracted local debates about change and whether it is in the best interest of the population (Imison, 2011). The position is not helped by the fact that many of the benefits put forward for the reconfiguration of clinical services, particularly those of a financial nature, have relatively weak, or are lacking, evidence to support them. The cost–benefit equation of extra travel, economic impact and outcomes is also poorly understood, particularly against the backdrop of an ageing population for which local access may increasingly be a prime good (Edwards, 2014).

“That’s our experience of people talking about the [named acute reconfiguration programme]. One of my colleagues goes to meetings, and someone will get up and say, ‘You’ve come to close our hospital haven’t you?’ ... their starting position is that they want the clinic at the end of the road.”

(Seminar participant)

A range of options to de-politicise the reconfiguration process are explored by Imison (2011). However, it is also important to consider that reconfiguration may not always be the best answer. Ways of working within and across specialties can be just as important as organisational change in improving outcomes. For example, the systematic use of the World Health Organization (WHO) Surgical Safety Checklist or the ‘Sepsis Six’ care bundle, both discussed in more detail in Chapter 3, have led to reductions in absolute mortality that are greater and more robustly evidenced than those achieved through many a reconfiguration programme.

Underlying demographic and epidemiological trends

The population over 65 years of age is growing. In 1981 there were 7.1 million people in England over the age of 65, accounting for 15 per cent of the population (ONS, 2003). By 2039 this number is expected to rise to 15.2 million, or 25 per cent of the population (ONS, 2015). This demographic shift has been accompanied by an increase in the prevalence of multiple and often complex long-term conditions. The number of people in England with three or more long-term conditions is projected to rise from 1.9 million in 2008 to 2.9 million in 2018 (DH, 2012). As the older population grows, so too will the number of surgical patients carrying additional risk factors and requiring more multiprofessional and multidisciplinary support.

“With an ageing population there are more patients who we’re now being able to offer surgery to that previously we weren’t. What that means is that the volume of the workload is increasing but, also, the complexity of the workload that we’re undertaking is getting greater. And ... their expectations are very high.”

(Interview participant)

Figures 2.4 and 2.5 underline the importance of older age groups in emergency surgical care. They show the age distribution of two groups: those presenting with high-risk EGS diagnoses at our sample of 154 hospital sites across England in 2012/13 (Figure 2.4), as well as those within this cohort who underwent a major general surgical procedure, again in 2012/13 (Figure 2.5). As can be seen, approximately 60 per cent of patients in each group were 65 years of age or older.

Figure 2.4: Age distribution of patients presenting with high-risk emergency general surgery diagnoses, 2012

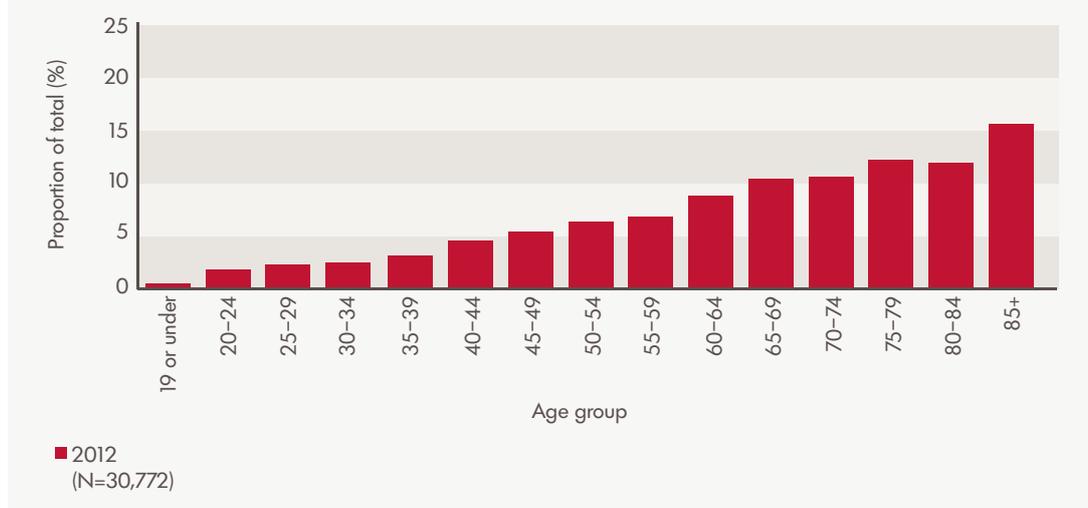
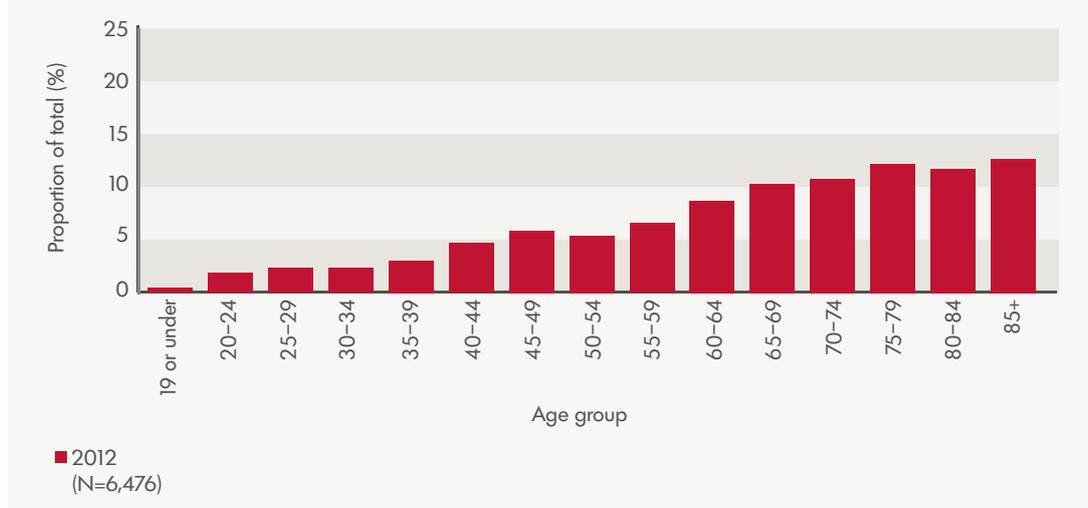


Figure 2.5: Age distribution of patients with high-risk emergency general surgery diagnoses who underwent a major general surgical procedure, 2012



3. What are the key opportunities?

Our work has identified four important opportunities to address the challenges described in the previous chapter. These are:

- the systematic use of protocols and pathways
- the increased use of more network-based approaches
- the development of new non-medical roles
- new training models.

In this chapter we describe how each of these opportunities helps to resolve the challenges.

Protocols and pathways

What do we mean by protocols and pathways?

Protocols and pathways are terms used to describe a heterogeneous array of tools designed to standardise and streamline clinical care. Such tools include:

- clinical guidelines, which encompass best practice agreed at a local or national level, such as trust or NICE guidelines
- clinical protocols, such as the Advanced Trauma Life Support (ATLS) protocol
- checklists, such as the WHO Surgical Safety Checklist
- care bundles.

Care bundles are a set of evidence-based interventions, which, when delivered in parallel, have a synergistic effect. For example, the Emergency Laparotomy Pathway Quality Improvement Care (ELPQuiC) bundle describes a set of five interventions, which, when delivered together, drastically reduce perioperative mortality (see Box 3.1 later in this chapter).

Protocols and pathways may also refer to tools designed to improve the organisation of care and patients' flow through the hospital system. Examples that were discussed at our seminar included surgical ambulatory care pathways (see Box 3.2 later in this chapter), improved triage and referral pathways and ways of optimising theatre usage.

“What we’ve done is put our consultant on the front door, also the GPs have open access and actually I’ve got rung up by the ambulance service to ask where they should take a patient. So actually that’s been quite helpful.”

(Interview participant)

In addition, protocols and pathways may be used to integrate clinical teams, and in particular bridge the gap between medicine and surgery. For example, the POPS

service (Proactive care of Older People undergoing Surgery) at Guy's and St Thomas' NHS Foundation Trust is a novel care pathway integrating pre- and post-operative geriatric input into the traditional care model for elective general surgical patients.

Finally, protocols and pathways may incorporate better use of information technology (IT) and there was recognition among participants of the role that IT systems have to play in the future.

"There's increasing evidence that electronic recording of vital signs and feeding that into an electronic system ... which sends an alert to the right person ... could actually reduce the deterioration of patients and get them managed much more quickly."

(Seminar participant)

How might protocols and pathways offer opportunities to resolve some of the challenges?

Protocols and pathways have enormous potential to improve outcomes and address a number of the challenges facing EGS. There is a robust evidence base demonstrating that, when used effectively, such tools can bring significant benefit. For example, the WHO Surgical Safety Checklist, which is now mandatory for use in UK hospitals (Aveling and others, 2013), has been shown to reduce the number of complications per 100 patients by 10.6 per cent and in-hospital mortality by 0.7 per cent (both figures, absolute risk reduction) (de Vries and others, 2010). Additionally, research on the 'Sepsis Six' care bundle has found a significant association with the intervention and a reduction in overall mortality from sepsis from 44.1 per cent to 20.0 per cent (Daniels and others, 2011).

While participants were optimistic about the potential benefits of protocols and pathways, there was a strong sense that although these tools can be effective in the delivery of treatment, their use in diagnosis is limited.

"I think protocols work very well once you've got a diagnosis ... the problem with protocols to get a diagnosis is that you don't have the flexibility, the ability to think this might be an uncommon presentation of a common disease etc. etc. and you risk doing serious harm to the patient ... I'm a big fan of protocols once you've got the diagnosis ... [but] there's no substitute for experience when getting to the point of diagnosis."

(Seminar participant)

In addition, participants also recognised the risk of 'protocol fatigue' and that such tools need to be used in conjunction with clinical skills and experience. This sentiment is echoed in the literature, with work on referral management showing that there is little evidence for 'passive' use of guidelines and that reinforcement with peer-to-peer feedback and adherence aids increases their effectiveness (Imison and Naylor, 2010). Participants recognised the role that IT systems might be able to play in overcoming these barriers and helping to integrate protocols and pathways into practice.

"You can have loads of protocols ... but unless [doctors] can integrate them into their work [their use is limited] ... some sort of electronic record system ... would help you follow the protocol or pathway."

(Seminar participant)

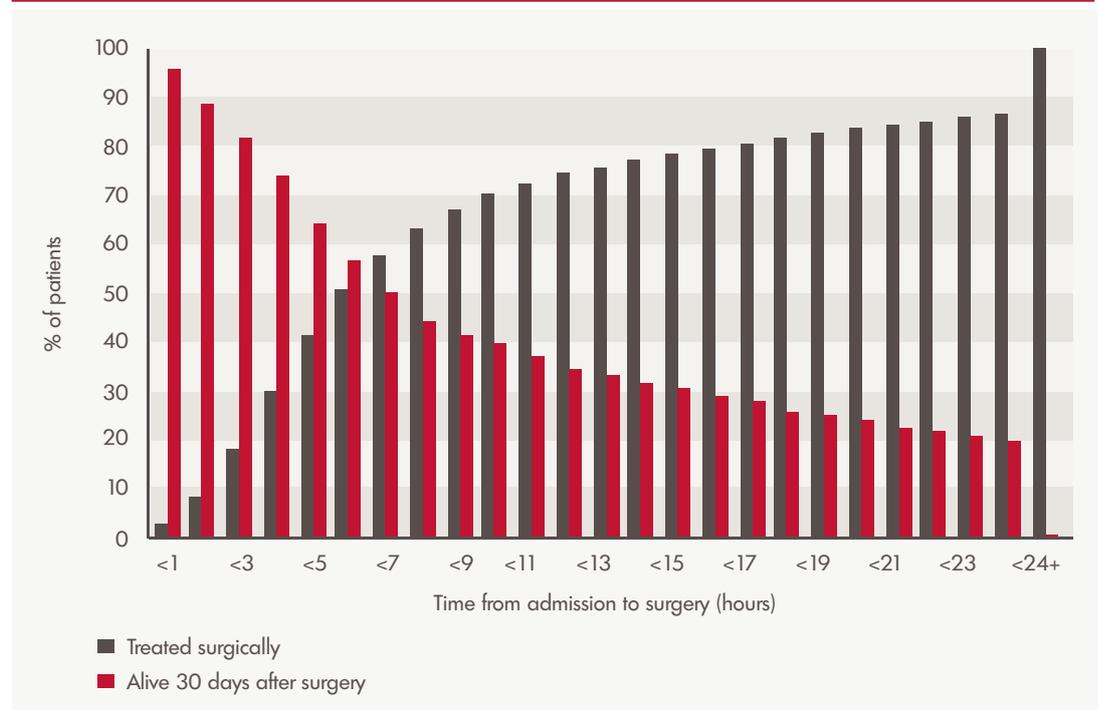
Protocols and pathways to address variation in outcomes

Both the literature and participants recognise that application of simple, well-known best practice is variable and often lacking. For example, the importance of administering broad-spectrum antibiotics within one hour in cases of suspected sepsis is a well-known standard (RCS and DH, 2011). However, in 2015 NELA found that almost half of patients who were assessed as having peritonitis and requiring surgery within six hours had yet to receive the first dose of antibiotics 3.5 hours after admission. Similarly, delayed surgical intervention is closely correlated to increased mortality (see Figure 3.1); however, NELA (2015) found that only 77% of patients requiring surgery within two hours reached theatre within the recommended timeframe. It is possible that protocols and pathways can improve compliance to known standards and thus have a positive impact on care.

'Implementation of protocols which cover the entire patient pathway can help to improve compliance with established Standards for emergency laparotomy patients.'
(NELA, 2015, p. 13)

'I think what you have to do is have very clear and robust pathways that say, 'This is how these people should be managed', which is what we have here [and it] makes it much easier to manage them.'
(Interview participant)

Figure 3.1: Cumulative percentage of patients treated surgically for perforated peptic ulcer and percentage alive 30 days after surgery in relation to time after hospital admission, February 2003 to August 2009



Source: Reproduced with permission from Buck and others (2013).

The ELPQuiC bundle (see Box 3.1), which simplifies the implementation of five evidence-based interventions, including antibiotic administration and time to theatre, is one example of a protocol that could help to address the challenge of poor and varied outcomes and improve compliance to known standards of care.

NELA has published a number of examples of EGS pathways – such as the ELPQuiC bundle – on its website (www.nela.org.uk/Pathway-Examples). In response to the national variation in outcomes for acute gallstone disease, NICE (2014) has issued guidance for the management of this condition and AUGIS (2015) has recently produced a care pathway to encourage faster, safer and more cost-effective treatment for it.

Box 3.1: The Emergency Laparotomy Pathway Quality Improvement Care (ELPQuiC) bundle

Background

- The ELPQuiC bundle consists of five interventions:
 - early assessment with an early warning score and escalation based on the score
 - broad-spectrum antibiotics if perforation or sepsis is suspected
 - once a decision to operate is made, the patient is next on the list or in theatre within six hours
 - early and ongoing resuscitation with goal-directed fluid therapy
 - all patients undergoing emergency laparotomies are admitted to the intensive care unit following surgery.
- The impact of implementing the ELPQuiC bundle on outcomes following emergency laparotomy was evaluated at four NHS hospitals.

Main results

- The number of lives saved per 100 patients treated almost doubled from 6.47 to 12.44 ($p < 0.001$).
- The risk of death decreased from 15.6 per cent to 9.6 per cent ($p = 0.002$).
- The bundle, overall, was taken up across the four sites; however, the only intervention that had a statistically significant increase in usage was goal-directed fluid therapy.

Future direction

- It is now being expanded as the Emergency Laparotomy Collaborative (ELC – <http://emergencylaparotomy.org.uk/>) as part of one of seven ‘Scaling Up Awards’ for 2015.
- It is being run in almost 30 hospitals as part of three Academic Health Science Networks.
- The components of the care bundle are very similar to that described above.
- Two smaller projects looking at the financial aspects of emergency laparotomy and the impact of geriatric medical input into the post-operative period are running alongside the main project.
- Following two years of implementation, results will be analysed and disseminated.
- The project aims to save 1,000 lives over two years.

Source: Huddart and others (2015)

Protocols and pathways to improve working between medicine and surgery

Protocols and pathways may address the challenge of physician–surgeon interactions and this may impact outcomes. Both NCEPOD and NELA have raised the issue of a lack of elderly care medical expertise for EGS patients. Indeed, in 2010 NCEPOD called for ‘clear protocols for the post operative management of elderly patients undergoing abdominal surgery’ by elderly care consultants (NCEPOD, 2010, p. 126).

“We probably accept the need to have geriatrician advice in particular to elderly patients who might need to undergo surgery.”

(Interview participant)

The POPS project at Guy’s and St Thomas’ NHS Foundation Trust, mentioned earlier, developed a care pathway for older elective surgical patients which was associated with significant reductions in length of stay and post-operative complications (Harari and others, 2007). A similar pathway for EGS patients might also have a positive impact and is currently being evaluated as part of the Emergency Laparotomy Collaborative (see ‘Future direction’ in Box 3.1).

Protocols and pathways to improve patient flow

Protocols and pathways have the ability to streamline the management of resources and address operational challenges facing EGS. One participant gave an example of where mathematical modelling of theatre use has improved time allocation.

“We got somebody with expertise in mathematic modelling to come and have a look at what the demands were and to model what type of capacity was needed, and then work out what we needed and then start providing it ... there is an element of predictability about what your emergency theatre workload requirement is going to be and it’s not as unpredictable as we clinicians imagine it must be.”

(Interview and seminar participant)

In addition, there was a sentiment that early review, or even triage, by senior decision-makers could lead to improved patient flow and quicker escalation where needed.

“If you get a senior decision-maker in very fast then things flow better and your outcomes are better.” (Interview participant)

Finally, the recent joint document by ACGBI, AUGIS and ASGBI recommends that providers separate EGS into its various component parts (such as acute abscess and appendix service, acute biliary service or emergency laparotomy service) in order to more efficiently organise services (ACGBI and others, 2015). This approach could be combined with a judicious and appropriate application of protocols or pathways so that once patients have a diagnosis and are triaged, they enter a clear pathway that streamlines their care and ensures that it is consistently of a high standard.

Protocols and pathways to reduce admissions and improve interactions with primary care

Protocols and pathways may help to address the challenge of the interface with primary care, as well as preventing unnecessary admissions. As part of the Keogh Urgent and Emergency Care Review, there has been a suggestion of having a senior decision-maker available to take calls from GPs and paramedics. Referral pathways that incorporate this approach may lead to reduced hospital attendance and divert patients to more appropriate care.

“The specific thing from the Emergency Care Review that I wanted to bring in was the idea that GPs and paramedics will have the opportunity to actually telephone the relevant consultant for advice before transferring a patient to hospital, which will help with options.” (Seminar participant)

Departments at the Royal Derby Hospital and the Royal United Hospital, Bath have taken this concept one step further and introduced surgical ambulatory care pathways. In Derby, a pilot study showed that this approach could be safely used for undifferentiated surgical patients and substantially reduces admissions (see Box 3.2).

Indeed, the joint document by ACGBI, AUGIS and ASGBI has called for every EGS service to establish ‘some form of senior surgeon-led front door assessment and parallel hot clinic service’ in order to reduce admissions and improve patient flow, thereby ‘allowing the emergency team to focus more on the sickest patients’ (ACGBI and others, 2015, p. 1). The ambulatory care models described provide good, evidence-based examples of how hospitals can effectively achieve this.

Box 3.2: Surgical ambulatory care pathways – Royal Derby Hospital

Background

- A pilot study of an emergency surgery ambulatory care (ESAC) pathway at Royal Derby Hospital was carried out.
- This was based on evidence that ambulatory care pathways (such as the National Ambulatory Care Reporting System in Canada) can reduce admissions.

Methods

- An ESAC team was formed with an experienced consultant surgeon and an assistant practitioner (for phlebotomy, cannulation, electrocardiogram).
- The consultant took referrals and triaged patients. Those not requiring hospital treatment were directed to the appropriate team, those requiring emergency admission went straight to the surgical assessment unit and those suitable were seen and assessed on the ESAC pathway.

Results

- In four months, 377 patients were seen by the ESAC team (out of a total of 1,028 referrals).
- Of these, 260 avoided admission
 - 31 per cent were discharged without needing follow-up
 - there were only six readmissions within 30 days of discharge.
- Satisfaction surveys from patients and GPs were very positive – with all 60 patients surveyed rating the consultation as good or excellent.

Source: Tierney and others (2014)

Implementation issues

Here we have presented a number of protocols and pathways that directly address a number of the challenges facing EGS and could quickly allow trusts to comply with national standards in both the delivery and organisation of care. In particular, the ELPQuiC bundle, the pathway for the management of acute gallstone disease, the pathway for surgical ambulatory care, direct access to consultants for GPs and paramedics, closer integration with medical teams and improved ways of using theatres are straightforward ‘off-the-shelf’ examples of pioneering good practice (see Box 3.3 and Table 3.1). In our view, improved implementation of protocols and pathways, to ensure compliance with national standards – and in particular those for emergency laparotomy and cholecystectomy – should be a major priority in all hospitals offering emergency surgery.

While there are important implementation lessons, including avoidance of ‘protocol fatigue’, integration with IT systems and the need for careful change management, such interventions can be driven at a local level and there are considerable gains to be delivered with relatively low cost.

Box 3.3: ‘Off-the-shelf’ examples of good practice identified by our work

- ELPQuiC bundle
- Pathway for the management of acute gallstone disease
- Pathway for surgical ambulatory care
- Direct telephone access to a senior decision-maker for GPs and paramedics
- Closer integration with medical teams
- Improved access to theatres (including optimising use with mathematical modelling).

National bodies, such as The Royal College of Surgeons of England (RCS) and NHS England, have a role in publicising and endorsing such examples of good practice. Indeed, the RCS is involved in the wider roll-out of the ELPQuiC bundle (see Box 3.1) while NHS England is driving forward the idea that GPs and paramedics can directly access consultants for advice as part of the Keogh Urgent and Emergency Care Review, something endorsed by ACGBI and others (2015). However, it is also down to individuals, senior clinicians and local leaders to recognise the substantial benefits that simply adopting good practice protocols and pathways can bring and to spearhead local implementation.

Table 3.1: Challenges addressed by, and strengths and weaknesses of, novel protocols and pathways

Protocol/pathway	Challenges addressed	Benefits	Barriers to implementation
ELPQuiC bundle	<ul style="list-style-type: none"> • National variations in quality • Suboptimal patient care 	<ul style="list-style-type: none"> • Can reduce complications and mortality • Can improve adherence to national standards 	<ul style="list-style-type: none"> • Might meet resistance due to challenges around evidence for certain interventions • Might require staff to undertake additional training • Might increase demand for resources (e.g. theatres or intensive care units)
Pathway for the management of acute gallstone disease	<ul style="list-style-type: none"> • National variations in quality • Suboptimal patient care 	<ul style="list-style-type: none"> • Can streamline care and facilitate compliance with NICE guidelines • May facilitate faster and safe care 	<ul style="list-style-type: none"> • Might increase demand for resources (e.g. theatres or intensive care units) • Might be challenging to deliver within workforce constraints
Pathway for surgical ambulatory care	<ul style="list-style-type: none"> • Reduced interactions with primary care • Operational issues and patient flow 	<ul style="list-style-type: none"> • Can reduce admissions • Can improve working with GPs • Can lead to high patient satisfaction 	<ul style="list-style-type: none"> • Requires consultant to run the service, including tasks not typically undertaken (taking and making referrals) • Requires rapid access to imaging (e.g. ultrasound)
Direct telephone access to senior decision-maker	<ul style="list-style-type: none"> • Reduced interactions with primary care • Operational issues and patient flow 	<ul style="list-style-type: none"> • Can improve patient flow and prevent admissions • Can improve interdisciplinary relationships 	<ul style="list-style-type: none"> • Requires consultant surgeon to be available to answer telephone • Might reduce training opportunities for other staff to triage
Closer integration with medical teams	<ul style="list-style-type: none"> • Physician–surgeon interactions • Suboptimal patient care 	<ul style="list-style-type: none"> • Can reduce complications and length of stay • Can lead to more collaborative working 	<ul style="list-style-type: none"> • Might exacerbate workforce pressures within medical teams • Might lead to ambiguity as to who holds clinical responsibility for patient
Improved access to theatres (e.g. optimising use with mathematical modelling)	<ul style="list-style-type: none"> • Operational issues and patient flow 	<ul style="list-style-type: none"> • Can improve patient flow • Can optimise efficient use of resources 	<ul style="list-style-type: none"> • Might be difficult to achieve for out-of-hours facilities if staff/ resources are unavailable or limited

Networks

What do we mean by networks?

Networks can vary in the degree of formality with which they are established and in the range of services they encompass. In the NHS provider sector, they can range from less structured learning arrangements to contract-based agreements with separate boards and governance structures. Setting up networks has, for some time, been viewed as a way to resolve multiple service provision challenges, receiving attention most recently in the Dalton review (NHS, 2014).

Clinical networks

Managed clinical networks may be led by commissioners and/or providers and may stem from national initiatives. These networks tend to be designed alongside research and pathway and protocol development (e.g. NHS Clinical Advisory Groups, 2010; NHS England, 2013). They often require the creation of hub-and-spoke models encompassing multiple provider organisations, and sometimes commissioners will play an active role in the network. The benefits of such arrangements are that higher volumes of more complex procedures are carried out at the hubs, while widespread access to more routine services is maintained via the spokes.

Generally, participating provider organisations retain full organisational autonomy under these arrangements, even though services may be provided in different ways than under previous arrangements. However, requirements to achieve specific outcomes or outputs may be written into provider contracts.

NHS England has described two kinds of managed clinical network in its guidance. A small number of *strategic clinical networks*, supported by NHS England, 'advise commissioners, support strategic change projects and improve outcomes' (NHS England, 2012, p. 4). These networks are generally commissioner-led, but involve those who use and provide services. Strategic clinical networks currently operate in the following areas:

- cardiovascular care
- maternity
- children and young people's services
- mental health
- dementia and neurological conditions
- cancer.

A separate group of *operational delivery networks* focus on ‘coordinating patient pathways between providers over a wide area to ensure access to specialist resources and expertise’ (NHS England, 2012, p. 4). These networks are ‘determined by clinical need as agreed between providers and commissioners’ (NHS England, 2015, unpaginated). They are usually hosted by a provider organisation, with agreed outcomes and outputs included in relevant commissioning service specifications. Operational delivery networks currently exist in the fields of:

- adult critical care
- burns
- neonatal critical care
- major trauma (see Box 3.4).

Box 3.4: Trauma networks

Regional trauma networks were introduced in the English NHS in 2012, establishing 22 major trauma centres across the country. As a result of the change, some patients are now treated in a centre that is not in the closest hospital to their home.

The networks responded to a series of recommendations by the NHS Clinical Advisory Groups for major trauma (NHS Clinical Advisory Groups, 2010), including that each region must designate at least one hospital to act as a major trauma centre, linked via a trauma network to local trauma units. All patients identified as having suffered major trauma, using a triage tool, must be taken to a major trauma centre. Those within 45 minutes’ drive of the centre should be taken directly, bypassing other units. Those more than 45 minutes’ drive away should be stabilised locally first, before being transferred.

In major trauma centres, a trained trauma team should be present 24 hours a day, with a leader who is a consultant. In local trauma units, there should be at least specialist training 4 (ST4) or equivalent competency who will attend within 30 minutes. Additionally, emergency trauma surgery should be performed by a consultant surgeon with appropriate skills and experience and all patients requiring acute intervention for haemorrhage control must be in an operating room or intervention suite within an hour.

In 2013, an independent review of the networks by the Trauma Audit & Research Network found that one in five patients who would previously have died from their injuries was now surviving. For every additional survivor, three more patients made an ‘enhanced recovery’.

Sources: Imison and others, 2014; NHS Clinical Advisory Groups, 2010; NHS England website (<https://www.england.nhs.uk/>)

Learning networks

Learning networks follow a different form and aim to share best practice, not requiring integrated delivery arrangements, although policies between institutions may be aligned. These networks survive through the members’ commitment to ‘give to the network as well as take from it’. Therefore, they can be ‘unstable’ and their work must be “benefit-rich” and characterised by “usefulness” (Goodwin and others, 2004, p. 326).

In general, networks can provide a mechanism to facilitate the implementation of protocols and pathways at a cross-organisational level, as well as enabling some streamlining of the ways in which services are provided across a health economy. Some forms of networking arrangement that may be relevant to EGS at an organisational level are service-level chains, collaboratives, management contracts and federations (NHS, 2014).

How can networks resolve some of the challenges?

Delegates at our seminar and interviewees felt that, in theory, network models could offer a solution to many of the challenges highlighted earlier in this report. We now explore the potential of network arrangements to address some of these challenges.

Through changing where services are provided, both commissioner-led and provider-led managed clinical networks are able to address workforce and training challenges such as:

- a lack of generalist skills
- low volumes
- training issues
- difficulties in providing 24/7 consultant and junior doctor cover.

Consolidating some procedures at ‘hub’ units through a network can lessen the need for certain staff groups to be present at some locations, generating more efficient ways to achieve 24/7 cover for different roles. Consolidation can also increase the number of procedures that relevant surgeons undertake in individual fields, reducing concerns over low volumes. This can also mean that, for trainees working at hub sites, there should be enough exposure to emergency surgical procedures to provide effective learning.

What services should be networked?

Seminar participants and interviewees were divided over which cohorts of patients were best suited to treatment at the hub in a hub-and-spoke-type network model, illustrating the challenges of implementing these kinds of approaches.

One school of thought was that it is better to treat patients requiring uncomplicated general surgery at the admitting hospital where possible, on the basis that this should be within the capabilities of the surgeons on site. An opposing view was that hub-and-spoke approaches lend themselves best to centralising the activity closest to elective-style work, rather than more complex cases. A third view was that there is a need and desire for diagnosis and assessment close to home, but that networks could best serve intervention. The number of presentations that require an emergency procedure is roughly 20 to 25 per cent (see Table 2.2), implying that many surgical patients could be managed expectantly, with transfer to a networked centre only if or when intervention is required.

Setting up a managed clinical network can help to address operational issues, such as:

- lack of support from other services
- bed occupancy and patient flow
- the interface with primary care
- problems around physician–surgeon interaction.

If particular types of work are concentrated at fewer sites, it becomes easier to ensure that the right facilities are in place to deliver services in line with agreed protocols and pathways. For instance, before the implementation of trauma networks, patients requiring surgery for spine, pelvis or limb injuries had often waited for seven to ten days in a local hospital before being transferred to a specialist unit. Following the changes, 90 per cent were being transferred within two days.

Networks to provide support for surgery from other services

Setting up a managed clinical network can be a way to solve problems of a lack of support for surgery from other services – for instance, the availability of intensive care unit beds, interventional radiology and endoscopy – by ensuring that procedures requiring these support services are delivered from a smaller number of locations. These networks can also promote engagement with clinicians from other fields – for example, primary or emergency care physicians. This is viewed by AUGIS (2015) as a particular benefit of networks.

However, managed clinical networks' stipulations about how services should be provided bring their own challenges, particularly if the network is configured in a way that creates problems for the delivery of some components of a service.

“In interventional radiology, everybody is talking about networks. But it's one of those things where there's a need for a person to stick something in another person and it's hard to say how you do that across more than one site.... We're considering whether we develop the training for the surgeons so that they can take on that work themselves because there's zero chance of producing any interventional radiologists for the next 10 years up here.”

(Interview participant)

Networks to address financial and contractual challenges

The establishment of managed clinical networks presents an opportunity to address some financial and contractual challenges, if commissioners contract for services in a way that facilitates better flows of funding and responsibility between organisations. However, if this is not achieved, contracting and payment mechanisms can actually hinder the successful operation of the network, by making it difficult to separate out payments for different elements of a service and ensure that payment follows the patient.

Table 3.2 lists the challenges addressed by, and strengths and weaknesses of, different network arrangements.

Table 3.2: Challenges addressed by, and strengths and weaknesses of, different network arrangements

Network model	Challenges addressed	Strengths	Weaknesses
Commissioner-led managed clinical network	<ul style="list-style-type: none"> • Lack of generalist skills • Low volumes • Training issues • Rota cover • Lack of support from other services • Bed occupancy and patient flow • Finance and contractual matters • Surgeon–physician and surgeon–GP interaction • Failure to implement good practice 	<ul style="list-style-type: none"> • Strong commissioner engagement • Generally embedded in commissioning arrangements, enabling commissioner focus on reducing variation • Can include redrawing of contracting and payment routes to ensure payment follows the patient • Enables health economy-wide approaches 	<ul style="list-style-type: none"> • May not take into account local configuration arrangements as fully as operational delivery networks • Lengthy, complex implementation process
Provider-led managed clinical network	<ul style="list-style-type: none"> • Lack of generalist skills • Low volumes • Training issues • Rota cover • Lack of support from other services • Bed occupancy and patient flow • Finance and contractual matters • Surgeon–physician and surgeon–GP interaction • Failure to implement good practice 	<ul style="list-style-type: none"> • Provider-driven approach • Usually significantly informed by local provider configuration • Enables health economy-wide approaches 	<ul style="list-style-type: none"> • May not incorporate commissioning input as effectively as strategic clinical networks • May be less opportunity to change payment and contracting mechanisms in order to address contracting barriers to change
Simple clinical network	<ul style="list-style-type: none"> • Failure to implement good practice 	<ul style="list-style-type: none"> • Quick and easy to implement, compared with other network approaches • Provides a route to share knowledge, learning and good practice • Supports professional development • Supports implementation of agreed protocols for particular service areas • Implementation does not require structural changes 	<ul style="list-style-type: none"> • Relies on the altruism/commitment of members to achieve results • Networks can easily collapse if support for their work wanes within the network • Lack of more formal routes to support new ways of working • May be underpowered to address health economy-wide challenges
Learning network	<ul style="list-style-type: none"> • Failure to implement good practice 	<ul style="list-style-type: none"> • Quick and easy to implement, compared with other network approaches • Provides a route to share knowledge, learning and good practice • Supports professional development • Provides a ‘bottom-up’ route to share innovative practice developed at an organisational level • Implementation does not require structural changes 	<ul style="list-style-type: none"> • Relies on the altruism/commitment of members to achieve results • Networks can easily collapse if support for their work wanes within the network • Lack of more formal routes to support new ways of working • May be underpowered to address health economy-wide challenges

Implementation issues

In spite of a growing body of evidence about the benefits to be offered by networks, network-based approaches can prove difficult to implement. Challenges to be overcome could include:

- insufficient focus at a board level on network principles
- insufficiently well-developed relationships between potential network members
- a fear that setting up network arrangements will invite challenge on the basis that they are anti-competitive
- a tendency to view network arrangements as a threat to the integrity of individual organisations.

For nationally focused clinical networks, an organisation such as NHS England would need to take a lead on supporting the design and development of network arrangements. However, it is possible to set up provider-led operational delivery networks that do not require national coverage and can vary from place to place in the detail of their structure and implementation. This second type can be led by groups of provider organisations and should be a priority for respective boards.

The next step in implementing network-based solutions would be to undertake work to disaggregate the general surgical workload and, for each element, determine the staffing and support service requirements in order to deliver safe, high-quality care.

Consideration would also need to be made of the shape of the health economy where the network is to be used – for instance, the nature of the provider landscape, any geographical constraints on movement between sites and the availability of facilities at different locations would all need to be factored into the planning. The reality is that the network will succeed or fail based on how well it meets local need – a fact recognised by our seminar participants:

“I think there’s a definite need for networks but we need to be really clear what it is they’re trying to solve and how they solve them.”
(Seminar participant)

Our working hypothesis is that, as in operational delivery networks, some elements of the workload will need to be centralised, in order to have a critical mass for the necessary staffing and support services, while others can be maintained locally. As one participant at the seminar said, *“sometimes the patient will need to come to the surgeon, sometimes it will be the other way round”*. However, regardless of the structure of the network, it is vital to recognise the need for robust and timely transfer arrangements for emergency patients, to prevent harmful delays.

Taken together, we believe that the gains from developing robust clinical networks could be significant and, despite the financial and other barriers, we would encourage all areas to at least assess the feasibility of such an approach. NHS England could lead work in this area – potentially as part of its broader work on new models of care. There may also be a role for national bodies, such as the Royal Colleges, in facilitating discussion at a national level about the appropriate use of clinically led provider networks in EGS.

New roles

What do we mean by new roles?

Staff working in new clinical roles may offer significant opportunities to address some of the challenges facing EGS. There was enthusiasm among our seminar and interview participants for the potential of new roles but also recognition of the heterogeneity of roles that exist and current barriers to implementation.

In this context, we have used the term ‘new roles’ to refer to non-medical staff (i.e. non-doctors) working in an advanced scope of practice, performing tasks traditionally undertaken by junior doctors and supervised directly by senior medical staff (e.g. consultants). Day-to-day activities can include:

- assessing undifferentiated or deteriorating patients via their history and through examination
- instituting a management plan, including prescribing medication when required
- reviewing ongoing progress.

Staff in these new roles may also be responsible for performing practical procedures and minor surgery, as well as communicating with the patient, their relatives and other health professionals. The most common background of such clinicians is nursing, and all of our seminar participants were familiar with the advanced nurse practitioner (ANP) or surgical nurse practitioner role (see Box 3.5). ANPs typically have senior nursing experience, followed by formal postgraduate (usually Master’s-level) qualifications in advanced nursing, as well as specific qualifications in physical examination and prescribing (NHS Health Careers, 2015). Physician associates typically have a background in undergraduate science followed by a two-year clinical qualification; they undertake clinical activities similar to those of ANPs (NHS Health Careers, 2015). In addition, there are examples of staff with a wide range of backgrounds, such as paramedics or pharmacists, working as advanced clinical practitioners in a variety of settings, following bespoke training (Swann and others, 2013).

Box 3.5: Implementation of advanced nurse practitioner (ANP) roles at Barnsley Hospital NHS Foundation Trust

Background

- This work evaluates the implementation of ANPs at Barnsley Hospital in 2009.
- Key drivers identified for introducing ANPs were:
 - the loss of middle-grade doctors due to the European Working Time Directive and other factors
 - the development of clinical nursing careers.

Benefits

- Improved confidence and competence of junior doctors and improved ward nurses' knowledge.
- Constant presence on the ward – for example if doctors had to go to theatre.
- Improved team working – ANPs bridge the gap between doctors and nurses and cross professional boundaries.
- A positive impact on patient experience – no negative opinions or reservations expressed, by either patients or staff.
- Did not detract from the clerking experience of junior doctors.

Other lessons

- Barriers to implementation:
 - resistance from some medical staff
 - suspicion from some lead nurses
 - uncertainty as to the exact nature and purpose of the roles in practice.
- Facilitators:
 - champions within nursing, medicine and the executive
 - individual qualities, skills and attributes of ANPs.
- There was not enough granular financial or outcome data available in order to quantitatively analyse cost or outcomes – this is an important lesson for future programmes wishing to evaluate impact.

Source: McDonnell and others (2013)

How can new roles offer opportunities to resolve some of the challenges?

There was consensus among our interview and seminar participants that staff in these new roles can work effectively as part of the emergency surgery team and be a reliable and competent addition to the workforce.

“The emergency general surgery advanced nurse practitioner ... is going to be a key player going forwards.”

(Interview participant)

“She [the ANP] does an awful lot with the emergency patients as well, in terms of clerking them, almost what the middle-grade doctor would do.” (Interview participant)

This is corroborated by findings in the literature for the use of new roles in intensive care, vascular surgery and general surgical follow-up (Fitzgerald, 1998; Fry, 2011; Robles and others, 2011).

Further, participants felt that such staff could provide an opportunity to address the challenges faced by gaps in middle-grade rotas. There was, however, a concern that recruiting senior nurses into new roles could deplete the nursing workforce, exacerbating existing staffing challenges. One solution to this, suggested by a seminar participant, would be to broaden the backgrounds of those who can practise at an advanced level, such as operating department practitioners. Alternatively, some felt that advanced career paths might in fact aid recruitment to the nursing profession.

“I think that the issue of depletion of really senior skills within the pool of nursing workforce really is a challenge so we absolutely have to see it as a whole-system solution with those skills.”

(Seminar participant)

“This extension of the role ... could [actually] support recruitment and retention.”

(Seminar participant)

In our interviews, questions were raised about how appropriate the new roles are for emergency patients, out of hours in small hospitals. However, the feeling among those at the seminar was that these clinicians could play a pivotal role in all branches of emergency surgery, including out of hours on call.

“I think [new roles] have got a massive role [managing surgical emergencies in small hospitals]. They are the future ... the future of middle tier on call is not doctors. Who it is, is the next decision but ... we’ve got to have a different solution and the solution I think is physicians’ assistants and advanced nurse practitioners, so I would challenge that comment [that they don’t have a role out of hours].”

(Seminar participant 1)

“I support that. In our specialty we only have 20 trainees a year being recruited so there is no way we are going to be able to provide an acute ... service with junior doctors as the first tier.”

(Seminar participant 2)

There was some concern among participants that staff working in these new roles could adversely affect the training of doctors and thus not provide opportunities to address challenges in surgical training. However, a number of seminar participants felt that this was not the case in practice and that such clinicians can actually enhance training opportunities by alleviating some of the ‘service’ workload. Literature from an intensive care setting suggests that while advanced practice practitioners can detract from training in a minority of cases, they have the potential to enhance training and experience (Kahn and others, 2015).

“There is a contrary view that our surgical trainees who are currently on call are only just getting 100 laparotomies, the basic bare minimum, over the course of their whole training so if we reduce their involvement in emergency care they are not going to be competent by the time they have finished.”

(Seminar participant 1)

“I actually disagree, I think [new roles are] a fantastic opportunity to improve the quality of training.”

(Seminar participant 2)

Despite this positive sentiment, some seminar participants queried funding arrangements for these staff, who are expensive to train and employ, fearing that unlike trainee posts, these posts would not be funded by Health Education England. Hence, new roles may not offer opportunities to address financial challenges. In addition, there may be issues around retention for these newly skilled staff and training takes time to complete, meaning that new roles do not necessarily offer an immediate solution to workforce gaps. However, training of staff to take on new roles can be completed within two to three years. There was also recognition that there are barriers to the implementation of new roles – such as regulation, the need for formal qualifications and the importance of senior medical support. All of these issues present additional challenges.

“By the time you pay out-of-hours supplements to them you are going to spend more than we do on training. I am sure it is the solution and the way forward, it has worked really well for us but we are still struggling to get the out-of-hours cover because of the cost.”

(Seminar participant)

“Anybody in extended practice won’t take risks unless they think they are going to be supported by their medical colleagues. I have had experience of nurse consultants and others who have left because they haven’t had the support of their consultant colleagues. It would be helpful if there was a little bit more certain endorsement from strong bodies like the Royal Colleges to say you can enhance your skills, it’s a good thing, it will be supported.”

(Seminar participant)

“One of the issues for nurses is getting extra competencies can be a bit of a sledgehammer-like process where you get Master’s-level qualifications and you are just extending your role in one particular area.”

(Seminar participant)

Implementation issues

There was agreement among senior clinicians attending our seminar that new roles are going to be a crucial part of the future EGS workforce. We recommend that all hospitals consider the potential for new roles in EGS, taking into account that such changes would have a longer lead time than some of the other options. National leadership organisations – such as the Royal Colleges and regulators – have a vital role to play in supporting and nurturing the development and implementation of these staff.

Box 3.6 outlines some practical considerations for those contemplating the introduction of new roles into their surgical workforce. However, the Nuffield Trust is currently undertaking a detailed project on skill mix and new roles, due for publication in spring 2016, which will provide further in-depth insights and policy recommendations on this topic.

Box 3.6: Practical insights for those considering the introduction of new roles

Planning

- When designing new roles and job descriptions, tailor them to patient and service need, rather than the desire for a particular role.
- Involve clinicians and frontline staff early in the process.
- Aim to minimise ambiguity and mystery surrounding new roles – for example, define (in conjunction with existing staff) the aims and scope of the role clearly and communicate this to new and existing staff.

Implementing

- Seek strong leadership from medical, nursing and board-level staff – for example in the form of ‘champions’.
- Strong support from consultants is critical for the success of new roles.
- When training staff in new roles, consider making them supernumerary – research shows that benefits are realised in both quality of training and staff satisfaction (McDonnell and others, 2013).

Sustaining

- Foster peer support among staff taking up new roles and ensure ongoing training and development.
- Consider how best to develop and value new staff in order to optimise retention rates.
- Consider which outcomes are most valuable and ensure robust and high-quality data collection to allow for accurate evaluation and assessment of impact.

New training models

What do we mean by new training models?

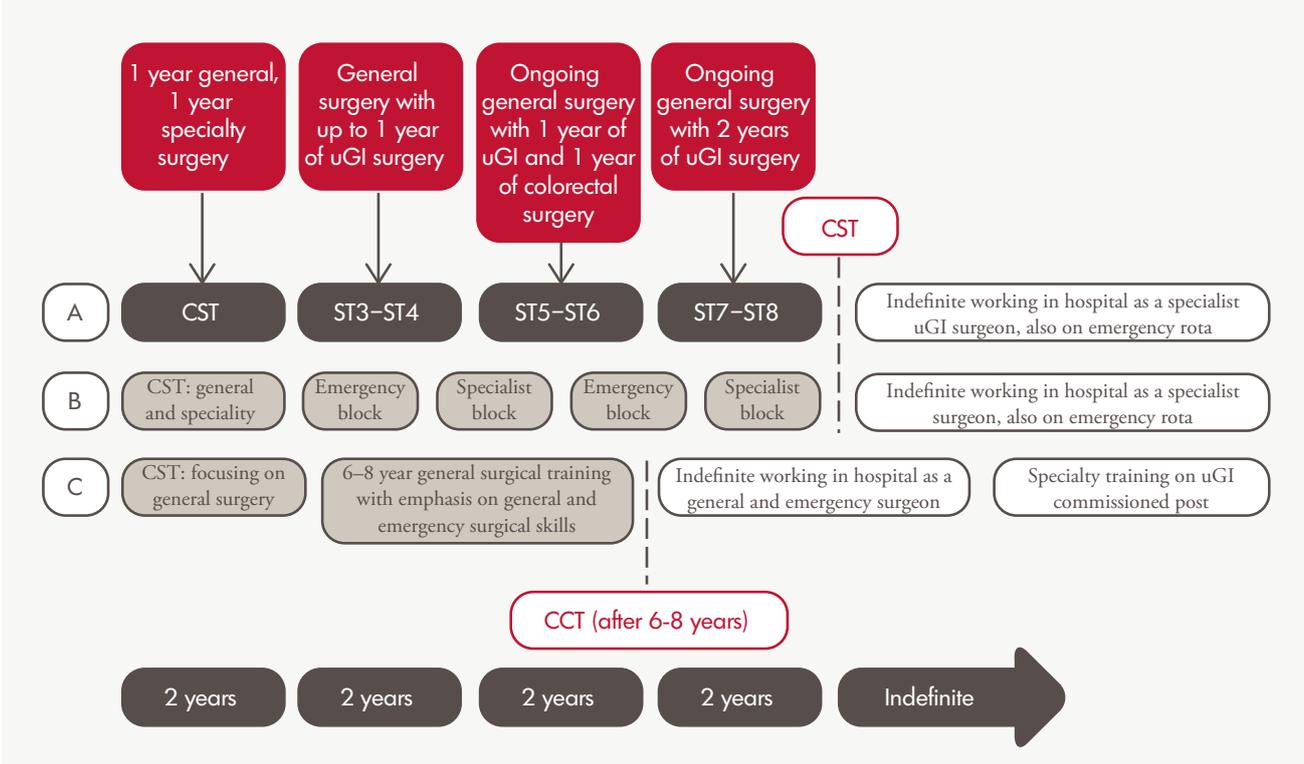
New training models may offer opportunities to address some of the challenges facing EGS and ensure that the future workforce has the skills to meet the future service need. While a range of different training models have been suggested in the literature, by our interviewees and by the participants in our seminar, they are consistent in their inclusion of a strong foundation in general surgical skills.

In their position statement, Primrose and others (2015, p. 4) comment that the Shape of Training review (Greenaway and others, 2013) provides an ‘opportunity to restructure training across three specialties in surgery [general surgery, urology and general paediatric surgery]’ and suggest that the general surgery curriculum could change to include more urology and paediatric surgery, and vice versa. Alternatively, a number of interviewees suggested a potential new training model whereby trainees rotate through dedicated emergency surgery blocks, thereby gaining concentrated and intense exposure to general surgical presentations and quickly acquiring relevant skills (see Figure 3.2, option B). Such an approach is endorsed in the joint document by ACGBI and others (2015, p. 3), which calls for ‘longer attachments and the

development of fellowships in EGS'. Trainees themselves appear to support the offer of more general training, with one study reporting that 92 per cent of those surveyed felt that more intensive training in emergency surgery would be beneficial (Pearce and others, 2016).

“People are talking about having models where people will rotate through designated emergency surgery blocks to do a concentrated emergency surgery attachment.”
(Interview participant)

Figure 3.2: Possible new models of surgical training



A: current training model for uGI and general surgeon (used as an example).

B: possible new training model based on concept of having dedicated time doing solely emergency general surgery.

C: possible new training model with generalist training followed by post-CCT specialisation.

CST = core surgical training, ST = specialist training, CCT = Certificate of Completion of Training, uGI = upper gastrointestinal

Source: http://www.gmc-uk.org/General_surgery_curriculum_2013.pdf_59413012.pdf

Please note this is for illustrative purposes only and is by no means exhaustive.

The joint document by ACGBI and others (2015) hailed the development of ‘emergency general surgeons’, suggesting that they are more likely to become clinical leaders in EGS and may provide greater continuity of care. This sentiment was echoed by some participants who supported the concept of consultants who have been specifically trained for the delivery of emergency surgery.

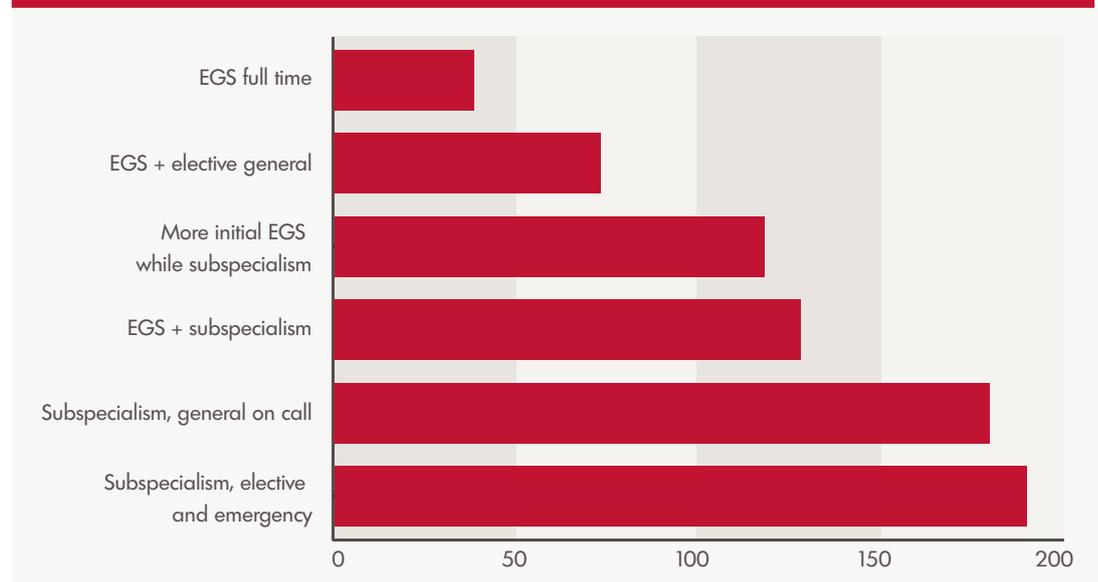
“I think recognition of the emergency general surgery speciality as a subset of training would go some way to allowing people to develop that career pathway that would be there from the beginning.”
(Interview participant)

However, while this new breed of surgeon may be a potential solution, a survey of 276 trainees¹ suggests that only 15.4 per cent would opt for these jobs full time, with a high proportion preferring EGS mixed with a specialist interest (see Figure 3.3). Additionally, only 21 per cent of trainees believe that EGS will be delivered by EGS consultants in the future (Pearce and others, 2016). Hence, while the emergency general surgeon is an attractive concept, the reality of recruiting to this role may be quite different. This was reflected in comments from our participants.

“What we’re actually looking to recruit at the moment is an emergency general surgeon. This is something that we’ve tried to recruit to twice now and been unable to.”

(Interview participant)

Figure 3.3: Which job would trainees go for? Results of a survey of 276 trainees (specialist training 3–8)



Source: 2014 ASGBI survey of surgeons in training (unpublished).

It may, therefore, be important to retain an element of subspecialisation in general surgery training while at the same time ensuring that general skills are not lost. One possible answer, suggested and discussed at our seminar, is that specialisation could be moved to post-CCT, with all trainees identifying as ‘generalists’ at the point of becoming a consultant and subsequent post-consultant specialisation being driven by service need (see Figure 3.2, option C; also Box 3.7 later in this chapter).

“[One model] is to take somebody from core [training] to a CCT in general surgery in six years with a broad base in terms of a bit of urology, some paediatrics etc. Then to spend a number of years – it could be forever, it could be a short period of time – as a generalist working within the hospital system. If you want to be a specialist you then get into competitive entry at specialist training posts ... which are commissioned [by providers based on need].

(Seminar participant)

1 A 2014 ASGBI survey of surgeons in training (unpublished).

Other suggestions included overlap with anaesthetic training to enable surgeons to be more adept at managing peri-operative care, or alternatively increasing the content of radiology in the curriculum for surgical trainees to alleviate demand on both diagnostic and interventional radiology services.

“Is it possible that some of the so-called specialist training could incorporate ... how to interpret the relevant radiological investigations up to a good-enough standard [so they] aren't dependent on this 24/7 radiological interpretation?”

(Seminar participant)

Finally, in recognition of the tension between service provision and training requirements, and the fact that trainee surgeons may struggle to gain technical skills, it was posited that trainees could be employed on two separate contracts – one for training and one for service provision – echoing international models.

“What they do in Spain is they completely separate out the training contract from the service contract so every junior doctor in Spain has two contracts, one for service and one for training, and there is complete clarity as to whether this shift is a training shift or a service shift.”

(Seminar participant)

How can new training models offer opportunities to resolve some of the challenges?

Using new training models to equip consultant surgeons of the future with a broad, general skill base can directly address the challenge of ‘loss of the generalist’, outlined in Chapter 2. Such new models also provide opportunities to address national variation – by ensuring that all trainees acquire the skills they need to deliver a general service – as well as the demographic shift towards an older, multimorbid population.

ASGBI (2012, p. 5) has stated that ‘training in EGS needs to be improved’ due to concerns that trainees and CCTs are ‘ill-equipped to cope independently with the spectrum of EGS’. Participants at the seminar were clear in their recognition of this fact but were pragmatic about the difficulties faced in turning the tide of subspecialisation, as outlined above. The RCS is currently working on ‘Improving Surgical Training’, a process that builds on the Shape of Training review (Greenaway and others, 2013) and aims to introduce new training models that develop a ‘core’ in general surgical skills (Eardley and Smith, 2015; see also Box 3.7), a model supported by ACGBI and others (2015).

Box 3.7: Improving surgical training

The Royal College of Surgeons of England (RCS) is currently having a debate about how postgraduate surgical training needs to be changed to better meet the needs of the future population, and this is included in its new strategic priorities. It is discussing the options for a pilot surgical training programme with Health Education England, which will evaluate recommendations for future changes to surgical training.

While the details have yet to be agreed, the RCS is recommending reducing service commitment in order to maximise training hours through rota redesign and greater use of the extended surgical team. There will be an increased emphasis on ‘professional’ trainers to ensure that all training opportunities are maximised and high quality. The importance of simulation will be emphasised, with recommendations to provide for this at a national level, ensuring equality of access. Finally, the importance of generalist skills will be highlighted, with recommendations of a shift towards a broader training base, with development of specialist skills occurring in nationally funded post-CCT fellowships.

“What came out of the Greenaway report ... (the Shape of Training report), which is now evolving into a document called Improving Surgical Training, is to try and accept that first and foremost we should train people to deal with emergencies and that that should become the core part of training.”

(Interview participant)

Ensuring that all surgeons have a strong foundation, or core, of EGS training would increase the number of staff available to fill rotas. All surgeons could then take turns covering the general aspects of EGS, supported by appropriate other specialists. This approach would help to maintain the involvement of all surgeons while simultaneously removing incentives to choose specialisms that distance practice from emergencies.

However, as previously mentioned, subspecialisation is highly sought after by trainees and, hence, while such changes may be important and necessary, national leadership and engagement will likely be required.

“The people that are least engaged with this are the specialist societies, both in surgery and medicine, and the trainees.... That unfortunately means that people like College presidents will have to become quite unpopular [if training is to change to become more generalist].”

(Seminar participant)

While the tension between service provision and the need for training was clearly identified, solutions to overcome this were less clear. The suggestion of separate contracts for training and service provision was met with interest as a possible solution to clarify, to both trainees and trainers, how their time is compartmentalised and help alleviate this conflict. However, recent judgments by the European Court of Justice and upcoming changes to the European Working Time Directive have led to ambiguity about future changes to the definition of working time, which may need time and further consideration to resolve (NHS Confederation, 2014; NHS Employers, 2015).

“I think DH’s [Department of Health’s] view and others’ view [about the European Court of Justice’s judgment] is ‘watch this space.’”

(Seminar participant)

Additionally, there was less consensus on how new models of surgical training could address the challenge of workforce gaps and rota cover. It may be that with declining numbers of trainees and their need to acquire a broader range of general skills, workforce solutions need to come from elsewhere with rota gaps filled with non-training middle-grades or advanced practitioners.

Implementation issues

New training models that incorporate more emergency general surgical training as well as overlap with other specialties may help to address some, but not all, of the challenges. There are a number of options for the redesign of training pathways (see Figure 3.2), all of which attempt to re-emphasise the importance of a broad, general skill base.

Work by the RCS on ‘Improving Surgical Training’ will be an important part of the process of introducing new training models and is likely to be a key document going forward (see Box 3.7). In addition, any changes to training will affect how service is delivered and so trusts and providers need to be aware of the ongoing redesign and consider how they can minimise the impact on patients.

Finally, the task of implementing any major changes to training brings with it new challenges, and how these are explained and marketed to trainees and specialist associations will be critical to the success or failure of new models of training.

4. Discussion and conclusion

This report has identified and categorised some of the challenges facing the organisations and individuals that provide and support EGS within the English NHS, before suggesting some practical solutions to these challenges.

Challenges include:

- the variation in outcomes between different surgical units and individual surgeons
- a range of workforce challenges, including the relationships between different professional groups
- operational and organisational challenges, such as patient flow and contracting
- underlying demographic and epidemiological trends.

Potential solutions to these problems range from implementing protocols and pathways for EGS to setting up different types of network and establishing new roles and training models. In the preceding chapter, we explored the potential ways that these approaches might address some of the challenges that we have identified.

However, the potential solutions we have proposed are very different. Some will be quicker and easier to implement than others; some will be more expensive; and some are likely to have a higher impact. In Table 4.1, we map the relative impact of each approach against the speed, ease and likely cost of implementation. It is important to note that this is intended as a starting point to consider the likely feasibility of different options. Depending on the specific design of the scheme under consideration, different conclusions might be drawn.

The quickest gains could be achieved through the systematic use of protocols and pathways. In our view this should be a major priority in all hospitals offering emergency surgery and has been called for strongly in the recent NELA report (NELA, 2015). In particular, trusts should ensure compliance with best practice for laparotomy and cholecystectomy. We have identified the ELPQuiC bundle as a straightforward clinical tool that may lead to considerable survival benefit in emergency laparotomy patients. A number of other pathways for the management of emergency laparotomy patients are available on the NELA website (www.nela.org.uk), while AUGIS (2015) has recently published a pathway for the management of acute gallstone disease. Implementation of protocols and pathways can be driven at a local level and there are considerable gains to be made with relatively low cost.

Table 4.1: Mapping the relative impact of opportunities against their speed, ease and likely cost of implementation

Opportunities		Speed of implementation	Ease of implementation	Likely cost	Likely impact
Protocols and pathways	ELPQuiC bundle	Fast	Easy	Low	High
	Surgical ambulatory care pathway	Fast	Medium	Medium	High
	Direct telephone access to senior decision-maker	Fast	Easy	Low	Medium
	Closer integration with medical teams	Medium	Medium	Medium	High
	Improved access to theatres	Fast	Medium	Low	Medium
Networks	Managed networks	Slow	Hard	Medium	High
	Learning networks	Medium	Medium	Low	Medium
New roles	Introduction of new roles (e.g. ANP, physician associate)	Medium	Medium	High	High
New models of training	Increasing exposure to generalist skills	Slow	Hard	High	High
	Separate training and service contracts for trainees	Slow	Hard	High	Medium
	Overlap surgical training with radiology / anaesthetics	Medium	Medium	Medium	Medium

Note: This is a subjective assessment by the authors of this report but one that draws on the evidence underpinning the interventions and the feedback gathered during our interviews and expert seminar.

The most comprehensive means to address the challenges faced by EGS would be the development of managed clinical networks. If these were commissioner-led, following the models set by trauma and stroke, they could reinforce the adoption and compliance with clinical standards through commissioning levers. Provider-led networks, such as those in use for burns in some parts of England, can be easier to put in place, without the need for national oversight, and allow for provider organisations to lead on designing and operating the network. Despite the financial and other barriers, we would encourage at least a feasibility assessment to be considered as a board-level priority for provider organisations. NHS England could lead work in the area of nationally focused clinical networks – potentially as part of its broader work on new models of care. There may also be a role for bodies, such as the Royal Colleges, in facilitating discussion at a national level about the appropriate use of clinically led provider networks in EGS.

However, implementing network arrangements effectively will not be a quick solution. Doing so requires time to establish partnerships, design appropriate governance arrangements and allow all parties' boards an opportunity to assure themselves that the arrangements are suitable.

The third approach is to develop other professional roles – such as ANPs or physician associates – as a means to address the potential gaps, in terms of both numbers and skills, in EGS. The development of these roles offers more than just addressing the workforce shortage. We gathered evidence which showed that they can have broader benefits in terms of team working and quality of care. Again, we would recommend that all hospitals consider the potential for new roles in EGS, taking into account that such changes would have a longer lead time than the other options.

Finally, we have laid out options for future training models, which would be the longest-term solution. It is beyond our realm of expertise to recommend a particular option but we note a wide consensus among our participants that the skill set of trainees needs to be broadened for the delivery of an effective EGS service in the future, a view supported by the literature. We hope that the models discussed in this report will help to stimulate debate as training curricula and models are designed.

Appendix: Background quantitative analysis

In addition to organising and synthesising the output of an expert seminar, a high-level background literature review, and interviews with key experts in EGS, we undertook a novel quantitative analysis of high-risk emergency surgical activity and outcomes as part of our research brief from The Royal College of Surgeons of England. The results of this analysis are presented and discussed in Chapter 2. Here we present our methods for the quantitative analysis.

Methods

All analyses were performed in SAS v9.4 and Microsoft Excel 2010.

Hospital Episode Statistics (HES) inpatient data were used to identify spells of care, made up of one or more episodes of inpatient care for individuals aged 18 or over (using a Nuffield Trust methodology developed in-house, which aims to overcome anomalies identified in the episode order field in HES).

A study by Symons and others (2013) identified high-risk diagnoses, categorised into eight groups, which we used. These were defined as gastrointestinal ulcers, hernias, bowel ischaemia, bowel obstruction, diverticulitis, disorders of the peritoneum, liver and biliary conditions and miscellaneous diagnoses (for subcategories of each high-risk case-mix group, see Table A1). Spells were flagged as being of interest in cases where the admission method was an emergency and a high-risk EGS diagnosis had been recorded as the primary diagnosis in any episode of an admission.

Using the Health and Social Care Information Centre (HSCIC) Healthcare Resource Groups (HRGs) grouping tool, procedures that appeared to be within the remit of general surgery were identified (namely those with codes starting with a 'G' or 'H'). The HRGs grouping tool categorises these procedure codes into 15 resource groups: 1 demanding the lowest and 15 demanding the highest resources. These groupings were used to further categorise procedures into 'minor' procedures (resource groups 1 to 7) and 'major' procedures (resource groups 8 to 15), which were assigned to the main procedure of each episode of each spell. The highest resource procedure was selected to describe the main procedure within a spell. Where there were one or more procedures in the same spell of the highest resource intensity, the first of these procedures (i.e. soonest following admission) was selected.

We described 30-day in-hospital mortality at hospital sites grouped by volume and for spells of interest where major EGS had been undertaken. Hospital sites were included whose site codes had been used consistently over the study period. Pooled data over four years (2009/10 to 2012/13) were used to reduce the uncertainty around the results presented where volumes were low. Additionally, we conducted a brief analysis of unadjusted 30-day in-hospital mortality at hospital-site level to identify outliers, again using pooled data over the four year period. Lastly, we put together an overview

of transfers between trusts for spells of interest in 2012/13. It is important to note that this analysis was not adjusted for case mix or demographic characteristics, and this may have an important bearing on the findings. 95% confidence intervals for the 30-day in-hospital mortality rates were calculated using the standard error of the pooled mortality rate for each group of hospital sites. Funnel plots were constructed by plotting observed crude mortality rates against volume for each unit and superimposing 95% (approximately two standard deviations) and 99.8% (approximately three standard deviations) prediction limits around the national mortality rate.

Table A1: High-risk case-mix group categories and subcategories (Symons and others, 2013)

Case-mix group	Subcategory of case-mix group
Gastrointestinal ulcers	Gastric ulcer, acute with perforation
	Gastric ulcer, acute with both haemorrhage and perforation
	Gastric ulcer, chronic or unspecified with perforation
	Gastric ulcer, chronic or unspecified with both haemorrhage and perforation
	Duodenal ulcer, acute with perforation
	Duodenal ulcer, acute with both haemorrhage and perforation
	Duodenal ulcer, chronic or unspecified with perforation
	Duodenal ulcer, chronic or unspecified with both haemorrhage and perforation
	Peptic ulcer, acute with perforation
	Peptic ulcer, acute with both haemorrhage and perforation
	Peptic ulcer, chronic or unspecified with perforation
	Peptic ulcer, chronic or unspecified with both haemorrhage and perforation
	Gastrojejunal ulcer, acute with haemorrhage
	Gastrojejunal ulcer, acute with perforation
	Gastrojejunal ulcer, acute with both haemorrhage and perforation
	Gastrojejunal ulcer, acute without haemorrhage or perforation
	Gastrojejunal ulcer, chronic or unspecified with perforation
	Gastrojejunal ulcer, chronic or unspecified with both haemorrhage and perforation
	Gastrojejunal ulcer, without haemorrhage or perforation
	Gastrojejunal ulcer, unspecified without haemorrhage or perforation

Hernias	Bilateral inguinal hernia, with obstruction, without gangrene
	Bilateral inguinal hernia, with gangrene
	Unilateral or unspecified inguinal hernia, with gangrene
	Bilateral femoral hernia, with obstruction, without gangrene
	Bilateral femoral hernia, with gangrene
	Unilateral or unspecified femoral hernia, with obstruction, without gangrene
	Unilateral or unspecified femoral hernia, with gangrene
	Umbilical hernia, with gangrene
	Ventral hernia, with obstruction, without gangrene
	Ventral hernia, with gangrene
	Diaphragmatic hernia, with obstruction, without gangrene
	Diaphragmatic hernia, with gangrene
	Other specified abdominal hernia, with obstruction, without gangrene
	Other specified abdominal hernia, with gangrene
	Unspecified abdominal hernia, with obstruction, without gangrene
Unspecified abdominal hernia, with gangrene	
Bowel ischaemia	Acute vascular disorders of intestine
	Chronic vascular disorders of intestine
	Other vascular disorders of intestine
	Vascular disorders of intestine, unspecified
Bowel obstruction	Paralytic ileus
	Intussusception
	Volvulus
	Gallstone ileus
	Other impaction of intestine
	Intestinal adhesions (bands) with obstruction
	Other and unspecified intestinal obstruction
	Ileus, unspecified

Diverticulitis	Diverticular disease of small intestine, with perforation and abscess
	Diverticular disease of large intestine, with perforation and abscess
	Diverticular disease of both small and large intestine, with perforation and abscess
	Diverticular disease of intestine part unspecified, with perforation and abscess
Disorders of the peritoneum	Acute peritonitis
	Other peritonitis
	Peritonitis, unspecified
	Haemoperitoneum
	Other specified disorders of peritoneum
	Disorder of peritoneum, unspecified
Liver and biliary conditions	Central haemorrhagic necrosis of liver
	Infarction of liver
	Other specified diseases of liver
	Calculus of bile duct with cholangitis
	Obstruction of gallbladder
	Perforation of gallbladder
	Fistula of gallbladder
	Cholangitis
	Obstruction of bile duct
	Perforation of bile duct
Miscellaneous diagnoses	Perforation of oesophagus
	Acute dilation of stomach
	Adult hypertrophic pyloric stenosis
	Obstruction of duodenum
	Fistula of stomach and duodenum
	Megacolon, not elsewhere classified
	Other specified functional intestinal disorders
	Abscess of intestine
	Perforation of intestine (non-traumatic)
	Enteroptosis
	Other specified diseases of intestine

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