



Royal College
of Surgeons
ADVANCING SURGICAL CARE



National undergraduate curriculum in surgery

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Curriculum

Introduction

A. Context

This National Undergraduate Curriculum in Surgery provides guidance for medical schools to create an evidence based, clinically relevant and contemporary curriculum for all students. The topics and learning objectives included are the minimum standard expected of all students graduating with a medical degree, including a Bachelor of Surgery (BS, ChB, BCh, BChir, etc.). Given the ubiquity of surgical principles to all aspects of medicine, these learning objectives and topics are relevant to all students, irrespective of subsequent career path.

Exposure to surgery is essential for all medical students for several reasons:

- A. Surgical conditions are responsible for a significant proportion of elective and emergency referrals. All graduating doctors require knowledge of surgical principles and an understanding of the management of common surgical conditions for the rest of their career. A minimum level of competency is required to ensure good care for future patients seen within any branch of medicine.
- B. Surgical wards and clinics provide an excellent environment to develop those clinical skills that are required of all medical students. They are typically high-volume services with a wealth of clinical material that provides training in generic medical skills such as history taking, physical examination, diagnostic formulation and management. They also provide an environment that allows development of non-clinical skills such as communication and team-working. There are often very rapid changes in a patient's condition, allowing for immediate reinforcement of learning and reflection on interventions.
- C. Surgery is the exemplar interventional specialty. All doctors need to understand the challenges for patients and doctors of diagnostic and therapeutic interventions, including how they should be planned, discussed, agreed and delivered while maintaining patient dignity, privacy and safety. Furthermore, an understanding of potential interventions allows doctors to put each investigation into context for each patient, avoiding unnecessary tests and dealing with expectations.

The GMC's *Tomorrow's Doctors*¹ set the standards for each graduating doctor and includes many surgical aspects. This National Undergraduate Curriculum in Surgery seeks to raise standards by demonstrating where surgery is essential to achieve *Tomorrow's Doctors* requirements, but also by defining the minimum level of achievement to improve understanding of surgery at medical school. This curriculum will improve patient care and enhance patient safety particularly as the key topics for inclusion have a particular emphasis on reducing or eliminating errors.

B. Surgery within the National Health Service

The public expects doctors to have an awareness and understanding of conditions that are common and/or urgent.² A review of Hospital Episode Statistics shows that surgical conditions account for around a quarter of first hospital outpatient appointments, emergency admissions to hospital and elective admissions to hospital.^{3,4} The proportions by surgical specialty are shown in Table 1.

Table 1 Hospital Episode Statistics for 2012/2013

Specialty	All Outpatients	First Outpatients	All Admissions	Emergency Admissions	Elective Admissions
Total	75,455,584	22,530,106	15,145,633	5,336,043	5,617,926
General surgery	4,112,757	1,729,232	1,654,460	605,107	935,132
Urology	1,967,975	627,022	712,139	89,908	443,815
Trauma and orthopaedics	7,050,069	2,426,677	1,113,537	283,584	766,497
Ear, nose and throat (ENT)	2,728,514	1,148,792	337,694	68,788	257,417
Oral and Maxillofacial Surgery (OMFS)	358,930	160,272	86,721	8,372	74,105
Neurosurgery	286,137	106,891	81,042	21,993	43,491
Plastic surgery	985,863	288,490	239,484	55,543	164,792
Cardiothoracic surgery	160,873	56,591	61,665	5,937	45,646
Paediatric surgery	134,434	59,081	59,049	16,756	30,852
Total surgical	17,785,552	6,603,048	4,345,791	1,155,988	2,761,747
Surgery as percentage of total	24%	29%	29%	22%	49%

These data emphasise the importance of all doctors having an understanding of the most common and important surgical conditions.

Given that postgraduate medical training has changed such that many doctors will have very little exposure to surgery after graduation, it is all the more important that undergraduates have an adequate exposure to surgery during their training.⁵ The skills and knowledge gained are transferable to other interventional specialties and also are crucial to the care of patients provided by general practitioners and those in other specialties.⁶

The overarching outcomes include the following:

- To recognise and understand common surgical conditions
- To recognise and understand emergency surgical presentations
- To be aware of what treatment possibilities are available, including non-operative
- To understand the principles of preoperative optimisation
- To understand postoperative complications
- To be able to explain in general terms to a patient the implications of a common surgical diagnosis
- To have sufficient basic understanding of surgery to help with future career choice

This curriculum should be seen in conjunction with the syllabus (page 11). It lists 35 conditions deemed essential for every graduating doctor to understand, with learning objectives defined for each (page 13). There is also a list of key skills (page 24).

C. Undergraduate exposure to surgery and a surgical curriculum

Medical students currently have very varied exposure to surgery and several good qualitative and quantitative studies demonstrate that personal contact with surgeons and practical experience are the most valued aspects of learning in surgery.^{7,8} There have been huge changes during the past few decades both in the scope of surgery and the way that surgery is practised. It is essential that doctors qualifying now have the knowledge, skills and attitudes to equip them for changes during their future careers.

Many factors have reduced the traditional learning of surgery 'on the job' after qualifying.^{9,10} These include the reduction in surgical foundation posts, the restrictions on doctors' working time the increased role of nurse specialists and allied healthcare professionals to deliver surgical care.

Other factors have increased the level of awareness of surgical conditions that non-surgeons are required to have. Most notably, for general practitioners a thorough understanding of surgical possibilities and pathways are required to treat and to know whether and when to refer. Postoperative patients, particularly after rapid discharge pathways, will benefit from GPs with thorough understanding of surgery, postoperative care and complications, to reflect the increased demand for community-delivered care.

Medical students' preparedness for work as doctors suggests that experience helps preparedness, increases confidence and reduces stress.¹¹

With this in mind, the following (surgery-specific) outcomes should be achieved by all undergraduates:

- An understanding of those surgical conditions that are common, urgent or easily missed. For example, all doctors should know the hallmarks of an early cancer diagnosis
- An understanding of the optimisation of a patient for surgical treatment
- An understanding of the types and risks of anaesthetics
- An understanding of the normal postoperative course and deviations from these
- An understanding of the principles of informed consent

Students need to make the most of any time that they spend within surgical specialties and interfacing with surgical thinking while experiencing other specialties. This curriculum is presented as a way of maximising the benefit of this exposure.

D. Surgery as an intervention

Surgery is the exemplar interventional specialty. A significant proportion of medical care is now delivered by means of some sort of intervention. Surgeons deliver the majority of these, although increasingly other specialties undertake procedures under radiological or endoscopic control.

Interventions raise all sorts of issues that are pertinent to all doctors, whatever their specialty, including those of choice, consent and patient safety.

E. Expectations for all doctors

All medical graduates are required to develop key knowledge, clinical skills, behaviours and attitudes. The GMC's *Tomorrow's Doctors* provides an outline of the outcomes that are expected from a modern curriculum.

Outcome 1 is the development of the doctor as a scholar and a scientist;

Outcome 2 is the development of the doctor as a practitioner; and

Outcome 3 is the development of the doctor as a professional.

For all of these, surgical practice provides a wealth of expertise and clinical material for medical undergraduates. Appendix 1 covers this in more detail. Since there are fewer surgical opportunities in the Foundation Programme, there is also more need now to adhere to the objectives in the GMC's *The Trainee Doctor*.¹²

Surgical wards and clinics provide an excellent environment to develop those clinical skills that are required of all medical students. These are often high-volume services with a wealth of clinical material that provides training in generic medical skills consistent with the outcomes of *Tomorrow's Doctors*. The operating theatre provides an arena where students can understand the practicalities of intervention.

Specifically, a surgical attachment can provide the clinical environment where the following generic outcomes can be achieved:

- To apply biomedical scientific principles, method and knowledge to medical practice
- To apply the principles, method and knowledge of population health and the improvement of health and healthcare to medical practice
- To apply scientific method and approaches to medical research
- To carry out a consultation with a patient
- To diagnose and manage clinical presentations
- To communicate effectively with patients and colleagues in a medical context
- To provide immediate care in medical emergencies
- To prescribe drugs safely, effectively and economically
- To carry out practical procedures safely and effectively
- To use information effectively in a medical context.
- To behave according to ethical and legal principles
- To reflect, learn and teach others
- To learn and work effectively within a multi-professional team.
- To protect patients and improve care

The surgical environment facilitates clinical and professional skills that are essential for all doctors.

F. Global surgery

The global burden of surgical disease is massive, of which much is un-diagnosed and untreated. All doctors need to understand which options are possible and many of the treatments are basic and well-established in higher-income countries (Table 2). The graduating medical student should have an awareness of health services beyond the NHS, including the place of surgery in global healthcare.

Table 2 Summary of global surgery

Summary of Global Surgery¹³

Billions of people worldwide lack access even to basic surgical care. Out of the roughly 250 million operations performed each year, only 3.5% are performed on the poorest third of the world's population. Fifteen per cent of the world's disability is due to surgically treatable conditions. Injuries alone cause 5.7 million deaths yearly, much more than the 3.8 million deaths caused by malaria, HIV/AIDS and tuberculosis combined.

Other prominent conditions that demand surgical treatment are cancer, congenital anomalies such as club foot and cleft lip, cataract and obstetric complications. Surgery has a crucial role to play in achieving universal health coverage including the United Nations Millennium Development Goals, a set of goals set by the UN in 2000 to be fulfilled by 2015.

Lack of surgical treatment puts a significant economic burden on the millions that cannot work or function due to conditions for which the treatment has been known for decades.

Surgical treatment has been identified as a cost effective intervention in resource-poor settings, in level with vaccination programmes and 10-15 times more so than antiretroviral medication for HIV. This is not to say that surgery is any more important than other types of treatment, but it is certainly as important as other global health priorities. The goal is to achieve an equitable distribution of treatment options, and to integrate different aspects of healthcare, from prevention and primary care to antibiotics and surgery.

G. Health promotion and prevention of disease including surgical conditions

All doctors need to understand that the majority of common conditions are preventable. This includes surgical conditions; for example, 80% of amputations are performed as a result of preventable chronic conditions (principally type 2 diabetes and peripheral vascular disease). The incidence of type 2 diabetes, vascular disease, stroke, heart disease, breast cancer, dementia, bowel cancer and prostate cancer recurrence can be reduced by 25–45% with regular moderate exercise. Measures that improve nutrition, increase exercise, reduce smoking, reduce alcohol consumption and reduce traffic collisions would have astonishing health benefits.¹⁴ All doctors, including future surgeons, need to feel empowered discussing these issues with patients, especially those who have least access to choices. Any doctors who may manage services in the future need to consider a surgical approach to interventions at a community level.

H. Consent, ethics, risk and clinical judgment

The consent process for a surgical operation crystallises elements of ethics, risk, benefit, choice, complications, communication and mental capacity. Emergency surgery, resuscitation discussions, and paediatric surgery consent are also relevant issues. Although medical students cannot sign for consent, they need a firm understanding of risks, benefits and decision-making, assessing each patient as an individual. Explaining risk to patients is a complex intervention in which adjuncts exist to augment communication.¹⁵ This also helps with discussion around alternative treatment options and whether to pursue particular lines of investigation.

I. Team-based working and avoiding bullying behaviour

Surgery requires a team-based approach as delineated in *Good Surgical Practice*.¹⁶ Surgery has embraced the WHO team briefing in an attempt to improve patient safety. Many surgeons who are educators may be interested in the suggestions within the new *Surgical Tutor Handbook*.¹⁷ This also contains guidance on how to modify behaviour so that students and other staff do not perceive behaviour as negative or bullying. In general terms, understanding the skills and needs of each individual (each student and each team member) gives the best clinical care and the best learning experience.

J. Embracing diversity and careers in surgery

Surgery has historically been the domain of white males.^{18,19} There are many role models now for surgeons from a variety of backgrounds. The curriculum should help to demystify surgery. A good curriculum clarifies the minimum expectations for knowledge, skills, attitudes and behaviours, which can be learnt and practised. Selection for future roles within surgery already selects according to clear expectations and those applying need to realise this. It is hoped that the opening up of the curriculum for surgery will encourage and support those who want to be surgeons, or who want to develop a career in similar interventional or related specialties.^{7,8} For surgery, good interaction between senior surgeons and medical students has been demonstrated as the most influential factor in career choice.^{20,21}

This curriculum itself is aimed at the minimum expectations for every doctor. The College wants to generate the best surgeons of the future. This National Undergraduate Curriculum in Surgery allows standardised teaching to be delivered to all medical students. For potential future surgeons, this is the minimum level of training to build on and so be the best they can be. Those intending a career in surgery are advised to consider the suggested resources for further study and support (page 26).

Ways of teaching and learning in surgery

Concepts of surgery

The practicalities of operations include removing tissue, releasing collections of fluid, unblocking vessels or other tubes, repairing tissue and rearranging anatomy. Every doctor must be able to discuss, in general terms, the risks and benefits of different courses of action and understand complications. For example, obstruction of the ureter may be treated by radiologically guided percutaneous drainage or by surgical endoscopic placement of a stent. There is overlap with other interventional specialties, and surgery is linked with anaesthesia, interventional radiology and emergency medicine.

Surgical placements should provide experience with explanation and/or reflection. The students should understand the clarity of each surgical condition, as listed in the syllabus. They should also understand the discussion behind each decision. The unique role of every doctor is as 'diagnostician [...] and handler of uncertainty'.²²

We encourage surgical trainers to verbalise the options and explanations to their students as well as to their patient, so they understand the 'iceberg of practice'.²³ 'Surgical thinking' is helpful to any future career; this gives the future doctor the ability to explore options and uncertainties, including at which level to investigate or undertake screening depending on possible intervention.²⁴ A good understanding of surgery encourages a more holistic view of healthcare. This includes placing the fundamental importance of the social determinants of health and the preventable aspects of ill-health across the range of conditions.¹⁴

Types of conditions

We realise that there has to be a realistic number of conditions in the curriculum for it have a practical application. We prioritise conditions according to the following criteria:

1. Important – ie will have a significant detrimental effect on a patient;
2. Frequency – ie how likely will the undergraduate medic come across these conditions.

The related syllabus consists of 35 conditions that include those that are important and common together with those conditions that are judged to be important and rare. For the complete list please see page 12.

Learning opportunities

We anticipate much of the curriculum can be covered by surgical placements, but important and rare conditions will need additional reading and formal teaching (these conditions are highlighted in the syllabus).

There are multiple opportunities to learn within surgical placements. Often these opportunities are not recognised by medical students, their trainers and those designing curricula. The opportunities of most benefit are those that allow doctors to put surgery into the context of wider patient care.

Locations for learning

- Timetable – planned to allow time in the operating theatre, in clinic and on the ward
- Operating theatre
- Day case surgery
- Outpatient clinics (general)
- Outpatient clinics (specialised)
- Other clinics: 'hot clinic', DVT clinic, etc, or others
- Seeing emergency referrals/attendances (in the emergency unit or surgical assessment unit)
- Preoperative assessment clinic – fitness for surgery
- Surgical wards
- Intensive Care Unit
- Multidisciplinary team (MDT) meetings

Useful ways of learning

- Planned opportunities to follow patients through the system
- Assessing patients on surgical wards
- On call
- Ward rounds
- Participation in clinics
- Participation in surgery in the operating theatre
- Post-operative ward cover
- Planning of follow-up, interaction with GP and community care
- Planning administration / discharge paperwork
- Case based discussion
- Discussions around consent
- Discussion of tumour and other guidelines
- Team-based working
- Spending time or teaching session with allied health professionals or surgical care practitioners
- Involvement with discharge planning and the multi-disciplinary team
- Tutorials and one-to-one teaching
- Simulation
- Audits

Expected learning outcomes

- Describe what is involved in common operations, and seeing the patient during the entire perioperative period
- Summarise a patient's entire treatment by, for example, following a patient with fractured neck of femur from admission to discharge
- Discuss surgical conditions commonly referred by GPs or A&E departments, eg fracture clinic
- Learn about and explain common surgical conditions
- Describe the work of specific clinics such as one-stop breast clinics, infertility, testicular clinic, back, etc.

- Give an account of how emergency cases are managed
- Explain the urgent surgical care that can be planned on an ambulatory basis
- Discuss dealing with complications
- Explain the assessment of patients for surgical operations
- Explain the assessment and care of patients postoperatively
- Describe the management of pre- and postoperative patients.
- Learn and practise physical examination skills including what are discriminating tests
- Develop team-working skills interacting with ward, theatre, administrative and other staff
- Develop time management skills

A good understanding of anatomy and physiology is essential for all medical students. Some medical schools have a thorough grounding in pre-clinical years and this needs reinforcement in clinical placements. Other medical courses expect anatomy and physiology to be integrated into patient-based learning and this needs to be clear. (See [resources](#) on page 26 for links.)

We encourage those planning surgical placements to design a timetable incorporating a variety of the above. A list of expected learning outcomes and a list of opportunities attended, or log-book, is recommended.

All students should have some exposure to the operating theatre to understand the practicalities of intervention. We have already produced a short document on learning in operating theatres.²⁵ This should be circulated prior to clinical rotations so students maximize their opportunities. It should also ensure that trainers and other staff understand the vital importance of students learning in the operating theatre and ensure expectations are clear (eg scrubbing up, following patients through their journey, being part of the WHO team briefing, etc).

We recommend our short document to medical students and trainers entitled *Learning in Operating Theatres*: <http://bit.ly/1F780oC>

Syllabus

Background

What follows is a list of 35 conditions deemed essential for every graduating doctor to understand, with learning objectives defined for each. There are also 26 skills that the College considers essential for all doctors to learn and practise. These comprise the eight interventional procedures mandated by the GMC that are easiest to learn in a surgical setting and 16 other essential skills including examination skills. The list of conditions was agreed through discussions with senior surgeons, doctors in training, medical students and others involved in medical education, using criteria including those considered important or common and those where early recognition and potential surgical treatment is important to the patient's outcome. The curriculum lists our own and others' research into where graduating doctors lack knowledge or skills; these areas have been prioritised. The learning objectives have been discussed and re-edited with surgical trainees and medical students. For those wanting to learn or teach in more depth, resources are recommended (page 30).

In terms of formatting, the conditions are mainly listed by common symptomatology, for ease of use by medical schools with a problem-based learning (PBL) structure; we hope this will be adaptable also for use by courses with a more traditional structure. For examples, see appendices 2 and 3 (page 34). Each medical school will develop its own curriculum fitting with the trainers, the environment and opportunities locally. Furthermore, we have listed most conditions in groups by surgical specialty in order to help those planning student placements and to help students within each placement to focus on the important topics. Where it is clear that a student will not be passing through a particular specialty, the student and the medical school should consider how to focus on the 'missing' topics.

Medical student learning in different surgical specialties

There are 10 GMC-defined surgical specialties. Students should learn generic care of surgical patients and find a way of developing an understanding of these 35 conditions and surgical specialties, even if they are not passing through the primary specialty in which the conditions typically occur. For example, those students with a placement in cardiothoracic surgery can develop understanding of the management of the critically ill, applied physiology, basic surgical skills, consent, decision-making and team-working. Many conditions have been omitted to avoid overloading the students at a basic level. For example, plastic surgery is a high-volume specialty covering burns, skin cancer, tendon repairs and soft tissue reconstruction, in addition to the conditions listed below.

Key in table:

Gen = General

Vasc = Vascular surgery

T&O = Trauma and orthopaedics

Neuro = Neurosurgery

Urol = Urology

PaedS = Paediatric surgery

ENT = Ear, nose and throat

MaxF = Maxillofacial surgery

Plast = Plastic surgery

Cardio = Cardiothoracic surgery

The key surgical conditions

		Usual surgical specialty	Also seen in
1	Abdominal pain	Gen	
2	Abdominal swelling	Gen	
3	Change in bowel habit / rectal bleeding	Gen	
4	Vomiting blood	Gen	
5	Difficulty swallowing / dyspepsia / dysphagia	Gen	
6	Jaundice	Gen	
7	Lumps in groin	Gen	
8	Lumps in scrotum / scrotal pain	Urol	
9	Pain in loin	Urol	
10	Urinary retention or flow obstruction	Urol	
11	Haematuria (including stones and tumours)	Urol	
12	Leg ulceration	Vasc	Neuro, T&O
13	Painful and/or paralysed limb	Vasc	Neuro, T&O
14	Breast lumps and nipple discharge	Gen (Breast)	Plast
15	Lumps in the neck	ENT	MaxF
16	Nose bleeds (epistaxis)	ENT	MaxF
17	Ear discharge / pain	ENT	MaxF
18	Deafness	ENT	MaxF
19	Acute airway obstruction in adults and children	ENT	MaxF
20	Upper airway infection and rhino-sinusitis	ENT	MaxF
21	Fractures or dislocations with displacement or wound	T&O	Plast
22	Fractures without displacement	T&O	
23	Swollen painful joint	T&O	
24	Back pain and/or sciatica (including cauda equina)	Neuro	T&O
25	Peripheral nerve injuries / palsies	Neuro	Plast
26	Raised intracranial pressure / intracranial blood clots and intracranial mass lesions	Neuro	
27	Limping child	PaedS	T&O
28	Groin lump in child	PaedS	
29	Consent for surgery including mental capacity	ALL	
30	Caring for the postoperative patient, including nutrition, enhanced recovery and the critically ill patient; advice re return to activities	ALL	
31	Understanding wound healing	ALL	Plast
32	Trauma including head injury	ALL	
33	Sepsis and infection	ALL	
34	Surgical safety (WHO checklist, minimising complications, errors, communication and team-working)	ALL	
35	Caring for the patient before and after surgery, including fitness	ALL	Cardio

Learning objectives for the 35 key conditions

	Learning objectives	Specialties
1	Abdominal pain	Gen
	<ol style="list-style-type: none"> 1. Describe the symptoms, signs, and differential diagnosis for patients presenting with an acute abdomen. 2. Discuss the investigations and management of patients with acute abdominal pain (including conditions such as peritonitis, obstruction and pancreatitis). 3. Describe the pre and postoperative management of an acutely unwell patient who requires emergency surgery. 4. Discuss the difficulties with fluid management and electrolyte derangements, including oliguria and acute kidney injury. 5. State the essential pathology of: appendicitis, acute pancreatitis, acute cholecystitis, abdominal aortic aneurysm and diverticular disease. 	
2.	Abdominal swelling	Gen
	<ol style="list-style-type: none"> 1. Compare and contrast pathophysiological causes of abdominal swelling and outline relevant investigations. 2. Describe the aetiology, presentation and management of intestinal obstruction. 3. Discuss the differential diagnosis, investigation and management of patients presenting with a left iliac fossa mass. 4. Describe the pathophysiological causes of a swelling in the epigastrium (including those arising from the liver). 5. Explain the appropriate imaging in the investigation of acute abdominal pain including: plain radiography (erect chest X-ray and abdominal X-ray), abdominal ultrasound scan, CT scanning and contrast studies. 6. List differential diagnoses for small bowel obstruction. 7. Summarise complications that can result from small bowel obstruction including: ischaemia, perforation and biochemical derangement. 	
3.	Change in bowel habit / rectal bleeding	Gen
	<ol style="list-style-type: none"> 1. Describe the blood supply to the lower gastrointestinal tract. 2. List potential causes of change in bowel habit. 3. List potential causes of rectal bleeding. 4. Summarise the aetiopathology of the common causes of change in bowel habit, including: irritable bowel syndrome, coeliac disease, colorectal cancer, inflammatory bowel disease, thyroid disease, diverticular disease and bowel obstruction. 5. Explain the aetiopathology of the common causes of rectal bleeding including: colorectal cancer, diverticular disease, haemorrhoids, anal fissures and inflammatory bowel disease. 6. List the common causes of diarrhoea and constipation. 7. Recognise the signs and symptoms for colorectal cancer and its pathological development. 8. Explain the management for rectal bleeding, including relevant investigations and the indications for surgical intervention. 	

Learning objectives		Specialties	
4.	Vomiting blood	<ol style="list-style-type: none"> 1. Assess and appropriately resuscitate a patient with acute GI haemorrhage. 2. State the aetiopathology of the common causes of upper GI bleeding including: duodenal ulcer, gastric ulcer, gastric erosions, oesophageal varices, Mallory Weiss tear and oesophagogastric cancer. 3. Explain the role of oesophago-gastro-duodenoscopy (OGD) and colonoscopy in the management of GI bleeding. 4. List the risk factors for upper GI bleeding and the role of the GP in its prevention. 5. Discuss the role and indication for investigations, interventional radiology and surgery in the management of GI bleeding. 	Gen
5.	Difficulty swallowing / dyspepsia /dysphagia	<ol style="list-style-type: none"> 1. Explain the terms dysphagia and dyspepsia. 2. Identify the different causes of dysphagia, including strictures, malignancy, achlasia, and neurological causes. 3. Explain 'red flag signs' and the role of blood tests, endoscopy and contrast studies in the assessment of dysphagia. 4. Explain the presentation of and risk factors for oesophageal cancer. 5. List the medical and surgical treatment of oesophageal cancer including palliative care. 6. State the NICE clinical guideline for managing new-onset dyspepsia. 7. List the different causes of dyspepsia and identify their risk factors. 8. Describe the different causes of gastro-oesophageal reflux disease. 9. Describe the Los Angeles classification of GORD. 10. Describe the conservative, medical and surgical treatment of GORD. 11. State how to investigate and treat <i>H. pylori</i>. 12. Describe the aetiology, pathogenesis and pathology of Barrett's oesophagus. 13. Explain the management of Barrett's oesophagus and its complications. 14. Describe a hiatus hernia. 	Gen
6.	Jaundice	<ol style="list-style-type: none"> 1. Describe the physiology and anatomy of the liver and gallbladder. 2. List the causes of jaundice. 3. Describe the presentation of a patient with obstructive jaundice. 4. Explain the investigation and management of obstructive jaundice. 	Gen
7.	Lumps in groin	<ol style="list-style-type: none"> 1. List possible causes of groin lumps including: hernias, lymph nodes, saphena varix and femoral artery aneurysm. 2. Explain the anatomy of the inguinal canal with respect to the presentation and management of hernias. 3. List the different types and causes of hernias, and describe their surgical and non-surgical management. 4. Discuss the complications of hernia surgery. 	Gen Urol
8.	Lumps in scrotum / scrotal pain	<ol style="list-style-type: none"> 1. Describe the anatomy of the testes including blood supply and contents of the spermatic cord. 2. Diagnose the different causes of scrotal lumps/swelling/pain including: varicocele, hydrocele, epididymal cysts, epididymo-orchitis, testicular torsion, hernias and cancer. 3. List the investigations that should be performed in patients presenting with scrotal lumps/swelling/pain. 4. Recognise testicular torsion as a urological emergency and understand its management. 	Urol

Learning objectives		Specialties
9.	Pain in loin	Urol
	<ol style="list-style-type: none"> Describe the symptoms and signs that can be used to distinguish between the different causes of loin pain. State the role of urine microscopy and bedside urinalysis in determining the cause of loin pain. Describe the role of a CT KUB in identifying radio-opaque renal stones, and the role of ultrasound in identifying hydronephrosis. Discuss the role of conservative management and interventions, including lithotripsy, in managing renal calculi. List the risk factors, aetiology, treatment and complications of acute pyelonephritis. Explain the diagnosis, assessment and treatment of tumours arising within the urinary tract. 	
10.	Urinary retention or flow obstruction	Urol
	<ol style="list-style-type: none"> Explain the anatomy of the male urinary tract and the physiology of voiding. Classify the causes of urinary outflow obstruction by the site of obstruction: <ol style="list-style-type: none"> Within the lumen Within the wall Extrinsic compression Distinguish between the symptoms of upper and lower urinary tract obstruction. Describe the range of laboratory tests and imaging techniques used in the investigation of patients with urinary outflow obstruction, in particular the role of the PSA test. Explain the pathology of the following common causes of urinary tract obstruction, and their medical or surgical management: <ol style="list-style-type: none"> Urinary tract calculi Benign prostatic hyperplasia Malignant tumours of the urinary tract. State the complications of untreated urinary tract obstruction. 	
11.	Haematuria	Urol
	<ol style="list-style-type: none"> Define and classify microscopic and macroscopic haematuria, and be able to describe the common causes of each. State the NICE urgent referral guidelines for haematuria. Interpret the results of a urine dipstick test in a patient with haematuria. Discuss the range of laboratory tests and imaging techniques used in the investigation of patients with haematuria, and their specific indications. Explain the pathology of the following common causes of haematuria, as well as their medical and surgical management: <ol style="list-style-type: none"> Infective: cystitis; pyelonephritis; prostatitis; urethritis Urinary tract calculi Benign prostatic hyperplasia Malignant tumours of the urinary tract Glomerular diseases Polycystic kidney diseases. 	
12.	Leg ulceration	Vasc Plast
	<ol style="list-style-type: none"> List causes of chronic leg ulcers and describe differences in appearance. Compare and contrast the presentation of venous and arterial leg ulcers. Describe the pathogenesis of ischaemic, venous and diabetic ulcers. Discuss appropriate investigations and treatment options for a patient with chronic leg ulcers including: <ol style="list-style-type: none"> management of underlying cause dressings and bandaging reconstruction. Describe the gangrene associated with chronic ischaemia. 	

	Learning objectives	Specialties
13.	<p>Painful and/or paralysed limb</p> <p>Chronic Limb Ischaemia:</p> <ol style="list-style-type: none"> 1. Describe the symptoms and signs of chronic limb ischaemia. 2. Describe the pathogenesis of peripheral vascular disease. 3. List risk factors for the development of peripheral vascular disease and describe how each of these can be looked for and controlled. 4. Describe the investigations that should be performed to determine the presence and severity of peripheral vascular disease. 5. Discuss with a patient on improving symptoms, slowing progression and preventing complications of peripheral vascular disease. 6. List indications for percutaneous transluminal angioplasty and arterial reconstruction surgery. 7. Describe the percutaneous transluminal angioplasty and arterial reconstruction surgery to a patient, including risk of complications. 8. Discuss indications for limb amputation. 9. Describe types and process of limb amputation and list possible complications. 10. Discuss rehabilitation for patients following limb amputation and list mobility aids available. 11. Explain the options available for pain control and palliative support in a patient with intractable limb ischaemia. <p>Acute Limb Ischaemia:</p> <ol style="list-style-type: none"> 1. Describe the symptoms and signs . 2. Discuss mechanisms leading to acute limb ischaemia. 3. Explain the nature and timing of pathological changes that will occur in an acutely ischaemic limb if the ischaemia is not relieved. 4. Describe the emergency investigation of a patient with acute limb ischaemia. 5. Discuss the options available for emergency management of acute limb ischaemia including anticoagulation, thrombolysis, angioplasty and embolectomy. <p>Compartment Syndrome:</p> <ol style="list-style-type: none"> 1. Explain symptoms, signs, pathogenesis and management. 	Vasc T&O Neuro
14.	<p>Breast lumps and nipple discharge</p> <ol style="list-style-type: none"> 1. Describe the anatomy of the breast including blood supply, venous drainage and lymphatics. 2. Analyse presenting symptoms and management of benign breast disease. 3. Explain the rationale in treatment decisions for patients with genetic predisposition to cancer. 4. Discuss how and when to take a family history and to request genetic tests, to discuss the significance of this and how this guides surveillance and gene testing. 5. Explain the patient pathway for breast screening and subsequent cancer management, including one-stop clinics, triple assessment and multidisciplinary team management. 6. Identify staging of breast cancer including the principles behind sentinel node biopsy. 7. Explain different types of surgical operations available and indications for mastectomy and breast conservation operations. 8. Describe the scientific basis for current breast cancer therapies. 9. Define the principles behind adjuvant / hormone therapy and radiotherapy. 10. Explain the need and indications for oncoplastic breast surgery. 11. List the reconstructive options available to patients undergoing mastectomy. 	Breast Plast

		Learning objectives	Specialties
15.	Lumps in the neck	<ol style="list-style-type: none"> 1 Describe the aetiology and pathology of common benign and malignant lumps occurring in the neck, including those arising from the salivary/thyroid/parathyroid glands and lymph nodes. 2 Identify which lumps require referral (non-urgent and urgent) to ENT and which can be left alone. 3 Recognise high-risk symptoms, eg dysphagia, voice change and throat/mouth/neck pain. 4 Describe investigations including ultrasound, CT, MRI, nasoendoscopy, video contrast swallow and tissue biopsy. 5 Explain different treatment modalities, including antibiotics, surgery and chemotherapy/radiotherapy. 	ENT MaxF
16.	Nose bleeds	<ol style="list-style-type: none"> 1 List local and systemic causes (including drugs) as well as common anatomical sites of nasal bleeding. 2 Perform first aid measures to reduce or stop bleeding, including nose pinching and patient positioning. 3 State possible options for treating more persistent bleeding, including nasal packing and cauterisation. 4 Summarise when to refer for specialised intervention/assessment, recognising that patients with severe epistaxis may require surgical ligation of the sphenopalatine artery. 	ENT
17.	Ear discharge / pain	<ol style="list-style-type: none"> 1. Describe the management of otitis externa. 2. List the different types of otitis media and their management, including tympanic membrane perforations. 3. Describe risk factors for significant disease, e.g. diabetes and immunocompromise. Describe simple measures to aid resolution. 4. List local complications of ear infections including mastoiditis, meningitis and brain abscess. 5. List the complications of cholesteatoma and its surgical management. 6. Explain the principles of managing 'glue ear' (otitis media with effusion). 7. Recognise common sources of referred otalgia. 	ENT
18	Deafness	<ol style="list-style-type: none"> 1 Demonstrate the simple assessment/examination of the ear and hearing. 2 Explain the difference between conductive and sensorineural deafness, with common examples of each. 3 List the implications of hearing loss with children and with adults eg. behaviour issues, disordered speech and language development, effect on the elderly and effect on dementia. 4 Describe possible strategies to aid hearing loss, which may be surgical or non-surgical. 5 Explain the basic pathophysiology, diagnosis and management of presbycusis, otosclerosis, noise-induced hearing loss, Meniere's syndrome, impacted wax, tinnitus and acoustic neuroma. 6 Summarise effective approaches to the prevention of deafness. 	ENT
19	Acute airway obstruction in adults and children	<ol style="list-style-type: none"> 1. Summarise the aetiology and treatment of acute airway obstruction in adults and children. 	ENT MaxF
20	Upper airway infection and rhino-sinusitis	<ol style="list-style-type: none"> 1. Summarise management of infection of the upper airway and its complications. 2. State the aetiology and management of acute and chronic rhino-sinusitis. 	ENT MaxF
21	Fractures or dislocations with displacement or open wound	<ol style="list-style-type: none"> 1. State the general principles of fracture management. 2. Describe and classify different types of fractures. 3. Describe radiological principles in fracture diagnosis. 4. List complications from fractures. 5. Describe the basic surgical management fractures, including femoral neck fractures. 6. Describe the management of a dislocated joint. 7. Explain the management of open fractures and soft-tissue injury necessitating reconstructive surgery. 	T&O

		Learning objectives	Specialties
22.	Fractures without displacement	<ol style="list-style-type: none"> 1. Describe the cellular process of fracture healing. 2. Describe the principles behind the general management of a fracture. 3. Explain the differences between different types of undisplaced fractures, eg stress, paediatric. 4. Summarise the concept of 'stability' of a fracture; explain that undisplaced fractures may not be benign fractures. 5. Describe the soft tissue component of a fracture. 	T&O
23.	Swollen painful joint	<ol style="list-style-type: none"> 1. Describe the differential diagnosis of a swollen joint, including osteoarthritis, gout, pseudo gout, rheumatoid arthritis, neuropathic arthritis, septic arthritis and traumatic causes. 2. List the common pathological processes of a swollen joint. 3. Describe the systematic manifestations with some swollen joints. 4. State the logical assessment and principal investigations for patients with swollen joints. 5. Explain the emergency nature of an infected joint. 6. Describe the different management approach for native and prosthetic joints with infections. 7. Describe the principal non-operative and operative treatments of a swollen joint. 8. Summarise common complications of joint replacement surgery and how they might present. 	T&O
24.	Back pain and/or sciatica (including cauda equina syndrome)	<ol style="list-style-type: none"> 1. List the common causes of back pain. 2. Describe red and yellow flag signs. 3. Discuss the causes of back pain, including mechanical, non-mechanical, inflammatory and other causes, as well as vertebral fractures and neoplasia. 4. Describe the clinical examination and investigations for back pain, including where there is nerve involvement. 5. Identify patients who may need referral to physiotherapy or similar therapy. 6. Describe the indications for imaging and for surgical management of back pain, particularly emergency surgical management of back pain. 7. Discuss the impact of chronic back pain on the individual, their family and society. 	T&O Neuro
25.	Peripheral nerve injuries / palsies	<ol style="list-style-type: none"> 1. Describe the cellular process of peripheral nerve injuries. 2. List the different causes of peripheral nerve palsies and describe the Seddon Classification of peripheral nerve injury. 3. Compare and contrast symptoms and management of different mechanisms of peripheral nerve injury (eg the difference between upper and lower motor nerve lesions). 4. Describe the anatomy of the brachial plexus and its terminal branches. 5. Describe the dermatomal arrangement and corresponding terminal branches of sensory innervation to upper and lower limbs. 6. Explain compartmental motor innervation of the upper and lower limbs and important exceptions. 7. Describe physical features of radial, ulnar, medial and brachial plexus injuries, carpal tunnel syndrome and cubital tunnel syndrome. 8. Describe physical features of peroneal injuries and other causes of foot drop. 	T&O Neuro
26.	Raised intracranial pressure / Intracranial blood clots and intracranial mass lesions	<ol style="list-style-type: none"> 1. List the symptoms and signs of raised intracranial pressure (eg vomiting). 2. Describe the pathophysiology of raised intracranial pressure (including the Munro-Kelly doctrine). 3. Explain the assessment of a patient with possible raised intracranial pressure, intracranial blood clot or mass lesion. 4. Describe monitoring and interventions that may be possible, including decompressive craniotomy. 5. Describe hydrocephalus, its causes and treatment including shunts and external drainage. 6. Summarise sub arachnoid haemorrhage. 	

Learning objectives		Specialties	
27.	Limping child	<ol style="list-style-type: none"> 1. Discuss the differential diagnosis of musculoskeletal causes of limp. 2. Describe the common neurological conditions that cause limp. 3. Explain the significance of referred pain. 4. Discuss the reasons why a child may limp with reference to age. 5. Explain the genetics of the muscular dystrophies and the common hereditary ataxias. 6. Describe presentations of non-accidental injury in relation to the musculoskeletal system. 7. Describe the investigations required to differentiate causes of limp in children. 8. Describe the causes of limp associated with joint or bony problems and their treatments. 9. Describe the developmental anatomy of epiphyses and bones in the limbs. 10. Discuss issues around consent and children. 	Paed T&O
28.	Groin lump in child	<ol style="list-style-type: none"> 1. Assess and initiate management of a child presenting with groin pathology (including undescended testis, hernia, hydrocele and painful swellings of the genitalia), including appropriate communication with relevant family or carers. 2. Distinguish, through the history, physical examination and laboratory testing, testicular torsion, torsion of testicular appendices, epididymitis, testicular tumour, scrotal trauma and hernia. 3. Appropriately order imaging studies to make the diagnosis of the acute scrotum. 4. Determine which acute scrotal conditions require emergency surgery and which may be handled less urgently or electively. 5. Explain the descent of the testicles from the abdomen into the scrotum with the anatomical structures in this path of descent (eg, tunica vaginalis, epididymis). 6. Differentiate testicular tumour from a mass of inguinal origin (not possible to get above it, may reduce), cystic lesion (trans-illuminates), and a varicocele (easier to palpate with patient erect). 7. Describe the anatomy of the inguinal canal. 	Paed
29.	Consent for surgery including mental capacity	<ol style="list-style-type: none"> 1. Explain the need for informed consent. 2. Apply the principles of informed consent. 3. Describe the elements necessary for mental capacity to give informed consent. 4. Check for mental capacity, and recognise when an individual does not have capacity to give consent. 5. State the importance of written documentation, both for giving consent and documenting the information given to the patient and their supporters. 6. List the exceptional circumstances when you can rely on oral consent, and the need to document this. 7. List the common risks associated with all surgery (for example blood loss, infection and reaction to drugs used in surgery). 8. Describe the potential risks and benefits for common surgical procedures. Be able to change your explanation to ensure patient understanding. 9. Discuss issues with consent in children, how to assess competence and what steps to take if the parents' wishes are not in the best interests of the child. 10. Select and know how to complete the appropriate consent form for adults, children, patients lacking capacity and local anaesthetic cases. 	ALL
30.	Caring for the post-operative patient, including nutrition, enhanced recovery and the critically ill patient; advice re return to activities	<ol style="list-style-type: none"> 1. Describe the major fluid compartments of the body, the effect of osmolality and explain what may happen in common conditions (eg acute blood loss, dehydration, excessive fluid replacement). 2. Describe the clinical (bedside) assessment of hypovolaemia and hydration. 3. Discuss the rationale for routine intravenous fluid replacement in surgical patients and describe the commonly prescribed intravenous fluids. 4. Discuss the principles of blood transfusion of a surgical patient. 	ALL

		Learning objectives	Specialties
31.	Understanding wound healing	<ol style="list-style-type: none"> 1. Describe the process and stages of wound healing. 2. State primary, secondary and tertiary wound healing. 3. Explain the reasons for conducting a wound assessment. 4. Identify wound bed tissue types. 5. Describe the skin surrounding the wound and how this gives you information about the underlying disease and the effectiveness of current treatments. 6. Measure a wound. 7. State the need to assess pain in wound care. 8. Explain extrinsic and intrinsic factors which impact on wound healing eg nutrition. 9. State the basic principles of wound dressing. 10. Identify patients at risk of pressure sore development using the Waterlow score. 11. Summarise pressure ulcer classification. 	ALL
32.	Trauma	<ol style="list-style-type: none"> 1. List the interventions that may be required for head injury. 2. Explain the importance of nerve or vessel injury in trauma. 3. Describe the physiological response to injury. 4. State the principles of surgical treatment in a multi-injured patient. 5. Assess priorities during all phases of management following <i>ATLS</i> principles. 6. Know the importance of re-assessment of the patient with regards to earlier interventions. 7. Know the meaning and significance of a patient with polytrauma. 8. Discuss issue of missed injuries, management and documentation. 9. Explain primary and secondary survey. 10. Define triage and its importance. 11. State the importance of analgesia in the management of these patients. 12. Explain the different mechanisms of trauma injury (blunt v penetrating v crush v blast). 13. Discuss the importance of a continuum of care for the injured patient by a multidisciplinary team in which responsibility is actively shared. 14. Explain the importance of the <i>ATLS</i> strategy and systematic approach: rapid primary survey, concurrent resuscitation, secondary survey, continued re-evaluation and monitoring, investigation and definitive care. 15. Explain the role of radiological investigations (eg CT scanning) and interventions. 16. Explain the role of investigation and treatment is dependent on the haemodynamic status of the patient. 	ALL

	Learning objectives	Specialties
33. Sepsis and infection	<ol style="list-style-type: none"> 1. Define the following terms: systemic inflammatory response syndrome (SIRS), sepsis, severe sepsis, septic shock, and acute respiratory distress syndrome (ARDS). 2. Differentiate between SIRS, sepsis, severe sepsis and septic shock. 3. Explain the seriousness of sepsis. 4. Describe the typical clinical presentation, including signs, symptoms, vital signs, haemodynamic measures and laboratory tests, for each condition above. 5. Describe the microbiological causes of sepsis. 6. Describe the pathophysiology and mechanism of sepsis. 7. Describe the priorities for treatment of sepsis. 8. Give a description of a patient with sepsis, and select the most appropriate treatments. 9. Determine appropriate fluid resuscitation for sepsis with colloids or crystalloids. 10. Recommend an appropriate antibiotic regimen for treatment of sepsis based on patient characteristics and site of primary infection. 11. Explain the role of vasoactive agents in supporting the physiological function of a patient with sepsis, and be able to select the appropriate agent, given details of a patient's condition. 12. Describe an appropriate monitoring programme for patients with sepsis. 13. List the principles of diagnosis and management of sepsis. 14. State when to involve the infection control team. 15. State when to take appropriate microbiological specimens. 16. Follow local guidelines/protocols for antibiotic prescribing. 17. Carry out Sepsis 6 (BUFALO) recommendations within the first hour to reduce mortality (Sepsis UK) <ul style="list-style-type: none"> B – blood cultures U – urine output F – fluid A – antibiotics L – lactate (and haemoglobin) O – oxygen 	
34. Surgical safety	<ol style="list-style-type: none"> 1. Discuss the importance of a culture of safety: WHO checklist, minimising complications, learning from errors, communication and team-working, mortality and morbidity (M&M) meetings and how to manage a complication with the patient and family. 	

Fluid optimisation

1. Identify patients in need of fluid optimisation, especially pertaining to:
 - acute presentations with diarrhoea and vomiting
 - acute presentations where the patient has been immobile / debilitated for a prolonged period prior to admission (which has decreased fluid intake)
 - elderly patients with reduced renal function that makes fluid balance maintenance more challenging
 - drugs that lower renal fluid exchange functions
 - low BMI patients in whom 'normal' fluid loss volumes will be more significant.
2. Recognise the different types of fluid used for optimisation, especially Hartmann's, Normal 0.9% Saline and Dextrose.
3. Determine the correct volume and rate of administration.
4. Assess the volume of body fluid depletion, and how to administer fluid resuscitation to patients especially according to them being elderly / unfit / with impaired cardiac and/or renal function.
5. Monitor the progression of fluid optimisation.

Nutritional optimisation

1. Identify patients in need of nutritional optimisation, especially pertaining to BMI, serum albumin, frailty or triceps skin fold thickness.
2. List the physiological effects of protein-calorie malnutrition.
3. Identify the different types of nutritional support – oral, nasogastric, gastro/jejunostomy and parenteral.
4. Describe what total parenteral nutrition (TPN) entails, its associated risks, and the additional and particular parameters of care for these patients.

Safety Issues and Booking Patients for surgery

1. List the administrative steps to book a patient into the operating theatre and most recent investigation results (as well as drug chart and consent form details).
2. Describe the details of operative site marking.
3. Explain details of any specific patient preparation including whether cross matched blood is needed.
4. List the different types of bowel preparation indicated for operations to the large bowel or its surrounding tissues.
5. Describe the principles of and drugs used for anaesthetic premedication.

Antibiotic Thromboprophylaxis

1. Explain the principles behind antibiotic prophylaxis (including the specifics relating to high-risk patients) and the typical course duration.
2. State the standard prophylactic regimens established for particular operative procedures, and appreciate that these may be specific to the individual hospital trust policies and protocols.
3. Identify the types of thromboprophylaxis – mechanical, drugs (heparin / LMWH + doses), and antiplatelet or indirectly acting medications.
4. Identify the group of patients at highest risk for deep vein thrombosis.
5. Discuss the factors such as the specific procedure as well as the specific comorbidities that increase risk, and subsequently categorise patients according to these as low, medium or high risk.

35. Caring for the patient before and after surgery including fitness

Learning objectives

Specialties

The aims of pre-operative assessment

1. Including explaining procedures, their associated risks and after-care so that patients can make informed decisions.
2. Identifying co-existing medical conditions and how to optimise the patient's health, while appreciating the urgency of their operation.
3. Discuss improvable factors to help support patients to be as fit as possible (including smoking cessation, reducing alcohol, better nutrition and taking regular moderate physical exercise).
4. Identify patients with a high risk of perioperative complications and identifying their appropriate level of postoperative care.
5. Describe the process of discharge planning.
6. Identify the variables that provide prognostic information for all patients planning to undergo surgery.

Explain the details of the preoperative anaesthetic history and assessment, including airway assessment, previous anaesthesia exposure (and any adverse reactions)

1. List the basics of the ASA (American Society of Anaesthesiologists) Classification especially pertaining to individual comorbidities (such as angina, hypertension, diabetes, COPD, asthma) and understand that this accurately predicts morbidity and mortality or more broadly the 'fitness of patients' prior to surgery.
2. State the basics of assessing functional capacity and mouth opening.

Pre-operative Investigations

Identify the essential pre-operative investigations required for all surgical patients, including: blood tests (FBC, U+Es, creatinine) and ECG, also pregnancy test, sickle cell test and chest x-ray if appropriate.

1. Identify and explain the more specific pre-operative investigations required for individual patients according to condition, comorbidities or procedure being performed.
2. State the basic fasting guidelines for children and adults.
3. Explain the essential management of associated medical conditions, especially pertaining to the following conditions:
difficult airway, obesity, cardiac disease, respiratory disease, gastrointestinal disease, renal failure, diabetes, haematological disorders, obstructive jaundice, anaemia, sickle cell anaemia, allergic reactions, and those rendering patients at high risk; includes the appropriate additional investigations for specific illnesses – such as cardiopulmonary exercise testing to evaluate both cardiac and pulmonary function, as well as survival prediction indices – age, socioeconomic status and aerobic fitness.

The key skills and interventional procedures that should be covered

Essential interventional procedures, as mandated by the GMC

Interventional procedure and GMC – learning objectives 24–31 from <i>Tomorrow's Doctors</i>		
1	24. Use of local anaesthetics	Safe use of drugs that produce numbness and prevent pain, either applied directly to the skin or injected into skin or body tissues. Awareness of toxic doses. Ability to deal with anaphylaxis. Understanding of allergy, including to latex.
2	25. Skin suturing	Closing wounds in the skin by inserting stitches.
3	26. Wound care and basic wound dressing	Providing basic care of surgical or traumatic wounds and applying dressings appropriately.
4	28. Giving information about the procedure, obtaining and recording consent, and ensuring appropriate aftercare procedure.	Awareness of the risks and benefits of procedures and possible alternatives. Ability to communicate in a variety of ways to individualise the discussion with the patient or their supporters. Recognition of the barriers to communication inherent in a hospital/ clinic setting with which patients are not familiar, including heightened stress levels for the patient, which often impedes communication. Understanding of the importance of written documentation. Being clear in the observations required and communicating with those involved in aftercare, including handover.
5	29. Hand washing (including surgical 'scrubbing up')	Following a sequence to ensure clean hands and gloving without contamination.
6	30. Use of personal protective equipment (gloves, gowns, masks)	Following a sequence to fit mask, scrub, gown and gloves without contamination. Behaviour while using equipment. Appropriate doffing procedures to avoid contamination of self or environment.
7	31. Infection control in relation to procedures	Understanding the importance of minimising infection risk. This includes understanding team dynamics, avoiding contamination, commanding respect and adhering to local protocols.
8	32. Safe disposal of clinical waste, needles and other 'sharps'	Ensuring that these materials are handled carefully and placed in a suitable container for disposal.

Examination and other essential practical skills**Other skills an undergraduate should master, including examination skills**

9. Removal of stitches and staples
10. Applications of dressings and bandages
11. Examination of a lump (eg its size, consistency, location, mobility and whether it is tender, pulsatile or transilluminates)
12. Assessment of a wound
13. Examination for fitness for surgery (chest, heart, neck and mouth opening)
14. Examination of the abdomen
15. Digital rectal examination
16. Examination of the groin
17. Examination of the scrotum
18. Examination of the soft tissues of the neck
19. Examination of pulses
20. Examination of the breast
21. Examination of the hip
22. Examination of the knee
23. Examination of the back
24. Examination of the ear
25. Examination of the nose
26. Examination of the throat

Resources for enhanced surgical learning

It is essential that every medical student covers the basic 35 surgical conditions and 26 skills. For those who wish to enhance their learning about specific specialties, more detailed resources are available.

Learning in the operating theatre document	http://bit.ly/1F780oC
Association of Surgeons in Training	www.asit.org.uk
BOTA (British Orthopaedic Trainees Association)	www.bota.org.uk
The Royal College of Surgeons of England homepage and careers pages	www.rcseng.ac.uk www.rcseng.ac.uk/career

Specialty	Surgical specialty association		Syllabus document for medical students
Trauma & Orthopaedics	British Orthopaedic Association	www.boa.ac.uk	http://www.boa.ac.uk/training-education/boa-trauma-orthopaedic-undergraduate-syllabus/
General surgery (includes breast surgery)	Association of Surgeons of Great Britain and Ireland	www.asgbi.org.uk	
Urology	British Association of Urological Surgeons	www.baus.org.uk	http://www.baus.org.uk/EducationAndTraining/undergrad-syllabus
Ear nose and throat	British Association of Otorhinolaryngology	www.entuk.org	http://www.ncbi.nlm.nih.gov/pubmed/25100037
Plastic surgery	British Association of Plastic Reconstructive and Aesthetic Surgeons	www.bapras.org.uk	http://www.ijme.net/archive/3/integration-of-plastic-surgery-into-the-undergraduate-medical-curriculum.pdf
Vascular surgery	The Vascular Society of Great Britain and Ireland	www.vascularsociety.org.uk	
Neurosurgery	Society of British Neurological Surgeons	www.sbns.org.uk	
Paediatric surgery	British Association of Paediatric Surgeons	www.baps.org.uk	
Maxillofacial surgery	British Association of Oral and Maxillofacial Surgeons	www.baoms.org.uk	
Cardiothoracic surgery	Society for Cardiothoracic Surgery in Great Britain and Ireland	www.scts.org	

Please also see: **Anatomical society: Core curriculum in anatomy for medical students**
<http://www.anatsoc.org.uk/Education/CoreCurriculum/CoreCurriculumText.aspx>

Physiological society resources at: www.physoc.org

Appendix

Extracts from *Tomorrow's Doctors*

Tomorrow's Doctors (GMC, 2009) states the requirements of every doctor at the point of graduation. Many of the topics, outcomes and objectives can and should be delivered through surgically focused placements. Furthermore, many of the practical procedures are better provided during a surgical placement. It is also important also that the development of clinical judgement includes potentially surgical options, so undergraduates should have experience of this. *Tomorrow's Doctors* provides explicit reference to surgery as a learning opportunity and environment for structured clinical placements as follows in Table 4:

Table 4: Rationale for a surgical undergraduate curriculum from *Tomorrow's Doctors*

- 82. A clear curriculum plan will set out how the 'outcomes for graduates' will be met across the programme as a whole. The curriculum will include opportunities for students to exercise choice in areas of interest (page 47).
- 83. The curriculum will be structured to provide a balance of learning opportunities and to integrate the learning of basic and clinical sciences, enabling students to link theory and practice (page 47).
- 94. The curriculum must allow for student choice for a minimum of 10% of course time (page 50).
- 95. SSCs must be an integral part of the curriculum, enabling students to demonstrate mandatory competences while allowing choice in studying an area of particular interest to them (page 50).
- 103. The curriculum must include early and continuing contact with patients. Experiential learning in clinical settings, both real and simulated, is important to ensure graduates' preparedness for Foundation Year One (F1) training. Throughout the curriculum it should increase in complexity, and the level of involvement and responsibility of the student should also increase (page 53).
- 106. **Clinical placements must be planned and structured to give each student experience across a range of specialties, rather than relying entirely upon this arising by chance. These specialties must include medicine, obstetrics and gynaecology, paediatrics, surgery, psychiatry and general practice.** Placements should reflect the changing patterns of healthcare and must provide experience in a variety of environments including hospitals, general practices and community medical services. **Within each placement there must be a plan of which outcomes will be covered, how this will be delivered, and the ways in which students' performance will be assessed and students given feedback** (page 54).
- 169. The medical schools must track the impact of the outcomes for graduates and the standards should increase in complexity, and the level of involvement and responsibility of the student should also increase (page 53).

Table 5 lists learning outcomes expected in *Tomorrow's Doctors*, all of which can be mapped to the surgical curriculum and a surgical approach to assessment and decision-making.

Table 5: Learning outcomes from *Tomorrow's Doctors* relevant to surgical practice

The doctor as a scholar and scientist

- Explain normal human structure and functions.
- Explain the scientific bases for common disease presentations.
- Justify the selection of appropriate investigations for common clinical cases.
- Explain the fundamental principles underlying such investigative techniques.
- Select appropriate forms of management for common diseases, and ways of preventing common diseases, and explain their modes of action and their risks from first principles.

Doctor as a practitioner – the graduate will be able to carry out a consultation with a patient

- Take and record a patient's history, including family and social history, talking to relatives or other carers where appropriate.
- Elicit patient's questions, their understanding of their condition and treatment options and their views, concerns, values and preferences.
- Perform a full physical examination.
- Provide explanation, advice, reassurance and support.
- Perform a mental-state examination.
- Assess a patient's capacity to make a particular decision in accordance with legal requirements and the GMC's guidance.
- Determine the extent to which patients want to be involved in decision-making about their care and treatment.

Diagnose and manage clinical presentations

- Interpret findings from the history, physical examination and mental-state examination, appreciating the importance of clinical, psychological, spiritual, religious, social and cultural factors.
- Make an initial assessment of a patient's problems and a differential diagnosis.
- Understand the processes by which doctors make and test a differential diagnosis.
- Formulate a plan of investigation in partnership with the patient, obtaining informed consent as an essential part of this process.
- Interpret the results of investigations, including growth charts, x-rays and the results of relevant diagnostic procedures.
- Synthesise a full assessment of the patient's problems and define the likely diagnosis or diagnoses.
- Make clinical judgements and decisions, based on the available evidence, in conjunction with colleagues and as appropriate for the graduate's level of training and experience. This may include situations of uncertainty.
- Formulate a plan for treatment, management and discharge, according to established principles and best evidence, in partnership with the patient, their carers, and other health professionals as appropriate. Respond to the patient's concerns and preferences, obtain informed consent, and respect the rights of patients to reach decisions with their doctor about their treatment and care and to refuse or limit treatment.

16. Provide immediate care in medical emergencies

- Be able to perform a range of diagnostic procedures and measure and record the findings.
- Be able to perform a range of therapeutic procedures.
- Be able to demonstrate correct practice in general aspects of practical procedures.

23. Protect patients and improve care

- Place patients' needs and safety at the centre of the care process.
- Promote, monitor and maintain health and safety in the clinical setting, understanding how errors can happen in practice, applying the principles of quality assurance, clinical governance and risk management to medical practice, and understanding responsibilities within the current systems for raising concerns about safety and quality.
- Understand the importance of – and the need to keep to – measures to prevent the spread of infection, and apply the principles of infection prevention and control.

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The Royal College of Surgeons of England
35-43 Lincoln's Inn Fields
London
WC2A 3PE

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The Royal College of Surgeons of England
35-43 Lincoln's Inn Fields
London WC2A 3PE
T: 020 7869 6212
E: careers@rcseng.ac.uk

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