CONTENTS

1 KEY PRINCIPLES

Communication

Inadequate verbal and written communication are the most common cause of serious clinical and organizational errors. Recognized barriers to effective communication include gender, ethnic background, hierarchy and differences in communication styles. In order to overcome these barriers, NHS Improvement endorses the standardized SBAR communication tool to structure the way healthcare professionals communicate information.

Barriers to effective communication in healthcare

Interprofessional communication	Standardized tools like SBAR have been developed to bridge the differences between e.g. doctors and other HCPs. It is also recognized that interprofessional learning and simulated practice is a helpful approach to overcoming these barriers.
Fear of failure	In healthcare, mistakes are often viewed as a personal failure. This barrier can be challenged and overcome with a team culture in which professionals are able to raise concerns and admit errors in a safe environment.
Human factors, stress and fatigue	Healthcare workers operate under stress and heavy workload. It is vital that there are communication structure mechanisms e.g. checklists with failsafe mechanisms and team debriefs to reduce the chance of error.
Team instability	The nature of the peri-operative working environment means that theatre teams are rarely consistent. A stable team in which the same individuals often work collaboratively has been shown to improve communication through developed relationships and understanding of colleagues.
Inconsistent technology	Technology can enhance communication within healthcare, e.g. shared technology systems, including patient record sharing between primary and secondary care departments and specialities.
Hierarchy	Hierarchy within healthcare remains a substantial barrier to the free flow of information. Teams can feel intimidated, preventing them from speaking up and challenging seniors, even in critical situations.

Effective handover

Handover between shifts should include:

- adequate time without interruptions
- clear leadership responsibility throughout
- exchange of sufficient and relevant information
- discussion around clinically unstable and unwell patients, with clear plans
- description and assignment of uncompleted tasks.

Sources: 1000 Lives Plus (2011); Royal College of Physicians (2015).

How to achieve effective communication

Effective communication requires active development and prioritization from organizations, team leaders and each individual. The Royal College of Physicians guidance for 'Improving Teams in Healthcare' provides these simple steps to consider:

- Introduce yourself and clarify your role.
- Listen attentively and allow people to complete their thoughts.
- Ask questions for clarification.
- Check understanding of what has been said.
- Invite opinions from those who have not spoken.
- Be aware of communication barriers, e.g. hierarchy.
- Use objective, not subjective language.
- Show mutual respect.
- Consider setting: right place, adequate time, no distractions.
- Be aware of body language, both given and received: facial expressions, eye contact and posture.

Source: Royal College of Physicians (2017).

Patient communication

It is important to build trust and create a therapeutic relationship with patients, who may be in discomfort and feeling vulnerable. The first step is to introduce yourself before delivering care. When Dr Kate Granger was being treated for post-operative sepsis in the course of terminal cancer, she noticed that there was often no introduction and no attempt to connect by hospital staff. She founded the 'Hello, my name is...' campaign to ensure that person-centred, compassionate care starts with a personal connection.

Sources/bibliography: 1000 Lives Plus (2011) *Improving Clinical Communication Using SBAR*: www.1000livesplus.wales.nhs.uk/sitesplus/documents/1011/T4I%20%283%29%20SBAR.pdf; Bostwick J, Kerry A, Mills K (2019) C*linical Pocket Reference: Fundamental Care*, Oxford: Clinical Pocket Reference; Hello My Name Is (2019): www.hellomynameis.org.uk/; NHS Improvement (2018) *SBAR Communication*: https://improvement.nhs.uk/documents/2162/sbar-communication-tool.pdf; NHS Institute for Innovation and Improvement (2010) *Safer Care: SBAR*: www.england.nhs.uk/improvement-hub/wp-content/uploads/sites/44/2017/11/SBAR-Implementation-and-Training-Guide.pdf; Royal College of Physicians (2017) *Improving teams in healthcare. Resource 3: Team Communication*, London: RCP: www.rcplondon.ac.uk/projects/outputs/improving-teams-healthcare-resource-3-team-communication; Royal College of Physicians (2015) *Acute care toolkit 1*, London: RCP: www.rcplondon.ac.uk/guidelines-policy/acute-care-toolkit-1-handover.

Accountability and responsibility

Liability, duty of care and negligence

Personnel working in the peri-operative setting must understand their legal and ethical responsibilities with regard to their duty of care to the patient.

Criminal liability: The wrong is regarded as being against society and must be proven 'beyond all reasonable doubt.' Action is taken to punish the defender, with verdict and sentencing decided by a judge and jury.

Civil liability: The wrong is between individuals, with one taking action against another. The person(s) can be 'sued' or found liable, but judgement is in civil courts with no jury. In law, a civil wrong is known as a 'tort.' The law of tort is concerned with the prevention or allocation of losses to one person by another. This is known as tortuous liability.

Healthcare professionals are accountable not only through general law, but also through their contract of employment and regulatory body. The **duty of care** for each profession is outlined within the standards of conduct, performance and ethics set out by their regulatory body. Professional regulatory bodies, e.g. the Health and Care Professions Council (HCPC), the Nursing and Midwifery Council (NMC), have the power (granted by Parliament) to draft detailed rules. Failure to comply could result in disciplinary action and/or removal from the register.

An example of a breach of duty of care could be a practitioner performing an action they are not competent to complete and making an error which leads to patient harm. The HCPC states *'You must keep within your scope of practice by only practising in the areas you have appropriate knowledge, skills and experience for.'* Therefore, a practitioner found to

have breached this code would become liable for **negligence**. Negligence refers to injuries sustained as a result of medical error or omission during the course of an investigation or operation.

The practitioner's employer can also be held accountable for breaches to duty of care, through vicarious liability. This occurs when the employer is liable for harm caused to a patient by the negligence of one of its employees. The patient is not given a choice of healthcare professional; instead the employer selects staff, assesses competence, and allocates responsibilities and duties. Therefore, the employer can also be held accountable through vicarious liability.

A practitioner can refuse to be involved in some or all aspects of an individual patient's care because of certain personal moral or religious beliefs. This right is called conscientious objection, but it cannot be applied during emergency situations where there is risk to the patient's life.

Indemnity insurance

The HCPC states that operating department practitioners must have a professional indemnity arrangement in place as a condition of registration. When registering, the professional will be asked to declare that they have one in place and it provides the appropriate level of cover. The arrangement will need to provide cover appropriate to your practice and be sufficient to meet any liability that could be incurred if a successful claim is brought against you. A professional body, trade union or insurer can advise professionals on the level of cover needed, decided by the following:

- the practice area(s) in which the registrant is working
- the service users with whom the registrant will work
- the risks involved in the practice of the registrant.

The NMC also requires nurses, midwives and nursing associates to ensure that an indemnity arrangement is in place before they can practise within the UK.

The majority of registrants will already meet this requirement because they are employed in an environment where their employer indemnifies them. It is the self-employed, such as agency workers, who need to make their own professional indemnity arrangement directly through an insurer.

Further information can be found at the following links:

www.hcpc-uk.org/globalassets/registration/attachments/professional-indemnity-and-your-registration.pdf

www.nmc.org.uk/registration/staying-on-the-register/professional-indemnity-arrangement/

Sources/bibliography: Association for Perioperative Practice (2016) *Standards and Recommendations for Safe Perioperative Practice*, 4th edn, Harrogate: AfPP; Health and Care Professions Council (2016) *Standards of conduct, performance and ethics*: www.hcpc-uk.org/standards/standards-of-conduct-performance-and-ethics/; Nursing and Midwifery Council (2018) *Standards: The Code*: www.nmc.org.uk/standards/code/read-the-code-online/.

Clinical roles within the peri-operative environment

Registered Operating Department Practitioner (ODP)

ODPs are registered with the Health and Care Professions Council (HCPC). They provide specialist, skilled care and support during each phase of a patient's peri-operative journey. As well as some care in the pre-operative phase, ODPs commonly work throughout the three main disciplines of peri-operative practice:

- anaesthetic phase (anaesthetic practitioner)
- surgical phase (scrub/circulating practitioner)
- recovery phase (recovery practitioner)

Registered Nurse (RN)

RNs are registered with the Nursing and Midwifery Council (NMC). They provide skilled care and support during each phase of a patient's peri-operative journey. Theatre nurses will work in each of the four peri-operative areas:

- pre-operative phase (pre-assessment, admissions)
- anaesthetic phase (anaesthetic practitioner)
- surgical phase (scrub/circulating practitioner)
- recovery phase (recovery practitioner)

Note: The Association of Anaesthetists recommends that RNs working within an anaesthetic practitioner role complete a recognized post-qualification anaesthetic practice-based module, including work-based learning and competencies.

Assistant Practitioner (AP)

APs are non-registered support staff who have completed a two-year foundation degree qualification. They work under the supervision of a registered practitioner (e.g. ODP, RN). The registered practitioner remains accountable for the appropriate and effective delegation of activities and must ensure the AP is competent. Roles for APs in the peri-operative environment vary depending on local trust policy; examples include:

- acting in a suitable surgical scrub practitioner role under direct supervision of a registered practitioner.
- recovering suitable post-operative patients in the PACU under direct supervision of a registered practitioner.

Note: In a situation where an AP feels they do not have the necessary skills or ability, they must alert the registered practitioner immediately.

Registered Nursing Associate (RNA)

RNAs are support staff who have completed a two-year foundation degree qualification; they are registered with the NMC and can work independently within defined parameters of practice, under the direction of a registered healthcare professional (e.g. ODP or RN). Roles for RNAs in the peri-operative environment vary depending on local trust policy; examples include:

- acting in a surgical scrub practitioner role with support from the surgical team.
- recovering suitable post-operative patients in the PACU

Theatre Support Worker/Healthcare Assistant

These unregistered support staff assist the surgical team in the anaesthetic, surgical and post-anaesthetic areas. Examples of responsibilities include, but are not limited to:

- support and care for patients throughout their surgical journey
- assist with accurate documentation of theatre records
- act within the circulating role during surgical procedures
- assist with theatre decontamination and disposal of clinical waste
- assist with checking daily theatre equipment and restocking of clinical and support areas
- assist with the safe dispatch, arrival and set-up of surgical instruments, loan kits and consumables.

Porter

Support staff with main responsibilities including but not limited to:

- transferring patients to/from the surgical ward and other clinical areas
- disposal of theatre waste
- maintaining stores and equipment, including medical gases
- liaising with other departments including blood bank and laboratories.

Anaesthesia Associate

Formerly called a Physicians' Assistant (Anaesthesia), an ODP/RN or

science graduate who has successfully completed a postgraduate diploma. Anaesthesia associates work within an anaesthetic team under the direction and supervision of a consultant anaesthetist.

Examples of duties include, but are not limited to:

- implementing the anaesthesia care plan including the induction of, maintenance of and emergence from anaesthesia
- initiating and managing appropriate fluid and blood replacement therapy
- positioning of patients to assure optimal physiologic function and patient safety
- participating in quality assurance processes to improve patient care
- planning and implementing post-operative care in conjunction with staff from the PACU
- deputizing for anaesthetists in a variety of situations
- pre-operative assessment of patients
- interpret diagnostic data to identify relevant potential problems
- taking patient history and performing physical examinations.

Surgical First Assistant (SFA)

The role of SFA is undertaken by a registered practitioner working under the direction of the operating surgeon. The SFA is commonly a registered ODP or RN who has successfully completed a nationally recognized programme of study, such as:

- HCPC-approved undergraduate BSc (Hons) ODP with SFA competencies
- a validated University module that meets the nationally recognized standards underpinning the knowledge and skills required for the role.

Approved modules for SFAs must follow the recommendations of the Perioperative Care Collaborative (PCC) position statement for the Surgical First Assistant (PCC 2018). Principal duties of the SFA include but are not limited to:

- assisting with patient positioning, including tissue viability assessment
- male and female catheterization
- skin preparation and draping prior to surgery
- use and maintenance of specialist surgical equipment relevant to the area of work
- superficial and deep tissue retraction with cutting of superficial sutures
- handling of tissue and manipulation of organs for exposure or access
- nerve and deep tissue retraction under the direct supervision of the operating surgeon

- cutting of deep sutures and ligatures under the direct supervision of the operating surgeon
- assisting with haemostasis in order to secure and maintain a clear operating field, including indirect application of surgical diathermy to body tissue*
- use of suction as guided by the operating surgeon
- camera manipulation for minimally invasive surgery
- application of dressings and assistance with the transfer of patients to post-anaesthetic care unit (PACU).

*Application of direct haemostats or Ligaclips® to vessels and case bandaging are the remit of the surgeon, supervised surgical trainee or surgical care practitioner, not the SFA.

Note: Practitioners acting in the SFA role must not assume the additional duties of the surgical care practitioner at any time.

Surgical Care Practitioner (SCP)

SCPs have completed a two-year programme at master's level, accredited by the Royal College of Surgeons (RCS), extending their scope of practice, and are registered. In the second year of the programme, the individual chooses a surgical specialism, and the RCS basic surgical skills course is required. SCPs have clinical responsibility to the consultant surgeon and are line-managed as part of the surgical team.

The main duties of the SCP include, but are not limited to, the following:

- clinics: seeing specific pre-operative patients and listing them for surgical procedures
- pre-operative assessment processes, including clinical examination and enhanced recovery education
- arrangement of pre- and post-operative investigations as part of the multidisciplinary team (MDT)
- participation in the consent process in their areas of practice
- surgical procedures as part of the MDT for the respective surgical speciality under the supervision and direction of the operating surgeon
- acting as first or second surgical assistant
- daily ward rounds, making assessments and formulating plans for post-operative care
- writing operation notes and taking notes on ward rounds
- post-operative care, including wound assessment, initial treatment and identification of surgical problems and complications

- evaluation of care, including the discharge process and follow-up care arrangements
- research, development, education and audit within the surgical department.

Note: SCPs should follow the RCS professional standards of ethical practice for registered practitioners working in advanced surgical roles. Further information at: www.rcseng.ac.uk/careers-in-surgery/surgical-care-team-hub/surgical-care-team-roles/surgical-care-practitioner/

Learners within the peri-operative environment

The peri-operative environment offers unique learning opportunities, including for: operating department practitioner, various branches of nursing (e.g. adult, children) and midwifery, assistant practitioner and nursing associate learners, paramedics and radiography students.

Practice Educator

The HCPC recognizes the supervisor of practice for an ODP student as a 'practice educator'. The requirements for practice educators are outlined in the updated Standards of Education and Training (2017) document.

The HCPC no longer specifies that practice educators supervising ODP students must have a recognized mentorship qualification. The revised standards state:

- Practice educators must have relevant knowledge, skills and experience to support safe and effective learning and, unless other arrangements are appropriate, must be on the relevant part of the Register.
- Practice educators must undertake regular training appropriate to their role, learners' needs and the delivery of the learning outcomes of the programme.

Sources/bibliography: Association for Perioperative Practice (2016) *Surgical First Assistant Competency Toolkit*, 3rd edn, Harrogate: AfPP; Health and Care Professions Council (2017) *Standards of Education and Training*: www.hcpc-uk.org/globalassets/resources/standards/standards-of-education-and-training.pdf; Perioperative Care Collaborative (2018) *Position Statement: Surgical First Assistant*: www.afpp.org.uk/filegrab/sfa-position-statement-final-april-2018.pdf?ref=2181; Royal College of Surgeons (2018) *Surgical Care Team – Surgical First Assistant*: www.rcseng.ac.uk/careers-in-surgery/surgical-care-team-hub/surgical-care-team-roles/surgical-care-practitioner/; Royal College of Surgeons (2016) *A Question of Balance – The Extended Surgical Team*, London: RCS: www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/question-of-balance/.

Système International (SI) units of measurement

The seven base SI units	Derived units
Length – metre, m	**Force** – newton, N (= $kg/m/s^2$)
Mass – kilogram, kg	**Pressure** – pascal, Pa (= N/m^2)
Time – second, s (also abbreviated as 'sec')	**Energy** – joule, J (= Nm)
Amount of substance – mole, mol	**Volume** – cubic metre, m^3 or litre, L or l (upper or lower case) (1 m^3 = 1000 L)
Thermodynamic temperature – kelvin, K	
Electric current – ampere, A	
Luminous intensity – candela, cd	

The mole is the basic unit of amount of substance, and measures the number of atoms or molecules present. It is sometimes applied to pharmacological substances.

The newton, the unit of force, is used in descriptions of cricoid pressure (see *Operating Department Practice* pp. 29–30). A force of 10 N is approximately equal to the weight of 1 kg.

Medical gas pressure is measured in kilopascals (kPa). Temperature is often expressed in degrees celsius rather than kelvin, but the two scales have divisions of the same size, although they have a different zero.

Multiples of SI units

1 kilogram (kg)	= 1000 grams (g)
1 gram (g)	= 1000 milligrams (mg)
1 milligram (mg)	= 1000 micrograms (mcg)
1 microgram (mcg)	= 1000 nanograms (ng)
1 litre (l)	= 1000 millilitres (ml)
1 millilitre (ml)	= 1000 microlitres (mcl)
1 kilopascal (kPa)	= 1000 pascal (Pa)

Source/bibliography: Bureau International des Poids et Mesures (2014) *The international system of units: SI Brochure*, 8th edn (updated), Sèvres: BIPM: www.bipm.org/en/measurement-units.

2 ANAESTHESIA

Neuromuscular blockades and antagonists

Mechanism of action

Transmission of signals along the nerves to the skeletal muscles depends on the neurotransmitter acetylcholine crossing the synapses. Muscle relaxants block this transmission, either pre-synaptically, by inhibition of acetylcholine synthesis, or post-synaptically, by preventing uptake at the acetylcholine receptors. All clinically important drugs act on the post-synaptic site.

Acetylcholine briefly depolarizes the motor end plate of the synapse, that is, alters the electrical state of the nerve membrane, thus transmitting the signal. It is then broken down by acetylcholinesterase (cholinesterase), an enzyme found in blood and tissue.

The action of muscle relaxants is reversed by their antagonists, accelerated by acetylcholinesterase.

Neuromuscular blockade relaxes and paralyses the skeletal muscles, and is used:

- to facilitate major surgery
- to allow the intubation of the trachea during anaesthesia (relax vocal cords/deep general anaesthesia (GA)
- for prolonged periods for patients on intensive care units.

Patients may still be conscious and aware of pain if other anaesthetic interventions are not used in conjunction with muscle relaxants. The full triad of anaesthesia requires muscle relaxation, analgesia and unconsciousness.

There are two categories of blocking agents:

- depolarizing agents act as acetylcholine agonists, mimic acetylcholine and bind to skeletal muscle receptor sites, and thus blocking further muscle stimulation. That is, they mimic the action of acetylcholine on the post-synaptic receptors but break down more slowly than acetylcholine, thus preventing repolarization of the membrane that would render it ready for further neuromuscular transmission.
- non-depolarizing: agents act by competitively blocking acetylcholine receptors so that at the motor end plate, in some cases also blocking ion channels. Roughly 70–80% of the receptor sites must be blocked before normal nerve transmission stops.

Sources/bibliography: Barber P, Robertson D (2015) *Essentials of Pharmacology for Nurses*, 3rd edn, Maidenhead: McGraw-Hill/Open University Press; McFadden R (2019) *Introducing Pharmacology for Nursing and Healthcare*, 3rd edn, Abingdon: Routledge; McGavock H (2015) *How Drugs Work: Basic Pharmacology for Healthcare Professionals*, 4th edn, Boca Raton: CRC Press; Scarth E, Smith S (2016) *Drugs in Anaesthesia & Intensive Care*, 5th edn, Oxford: Oxford University Press.

3 SURGERY

Handling specimens

Human Tissue Act (2004)/Human Tissue (Scotland) Act (2006)

Areas of practice covered by the act include:

- the storing of tissue
- transplant services, including living organ donation
- post-mortem services
- anatomy schools or departments
- sites displaying human material
- storage and use of deceased patients
- removal of human tissue, including human cells (except hair and nails from living people), live gametes and embryos created outside of the human body
- blood (except for treatment) and other bodily fluids.

Sources/bibliography: Human Tissue Act (2004): www.hta.gov.uk/policies/human-tissueact-2004; NHS Organ Donation and Transplantation *Human Tissue (Scotland) Act (2006)*: www.odt.nhs.uk/odt-structures-and-standards/regulation/the-human-tissue-scotland-act-2006/.

National Safety Standards for Invasive Procedures (NatSSIPs)

NatSSIPs were created by the patient safety arm of Health Education England to bring together national and local learning from the analysis of never events, serious incidents and near-misses in one set of recommendations.

Healthcare providers will review their local standards on a regular basis to ensure these are informed by national standards and relevant professional guidance.

NatSSIPs define Local Safety Standards for Interventional Procedures (LocSSIPs).

Never event: a serious incident that is wholly preventable because guidance or safety recommendations that provide strong systemic protective barriers are available at a national level and should have been implemented by all healthcare providers. Never events tend to occur due to lapses in both human and organizational factors, for example deviation from the WHO surgical safety checklist (see *Operating Department Practice* pp. 3–5). NHS Improvement regularly publishes a list of never events. The 2018 list includes strategies to eradicate a number of preventable errors.

Never events include:

- wrong site surgery
- wrong implant/prosthesis
- retained foreign object post-operation
- misplaced naso- or oro-gastric tubes

- wrongly prepared high-risk injectable medication
- IV administration of epidural medication
- overdose of midazolam during conscious sedation
- opioid overdose of an opioid naïve patient
- transfusion of ABO incompatible blood components
- transplantation of ABO or human leukocyte antigen (HLA) incompatible organs
- wrong gas administered
- failure to monitor and respond to O_2 saturation
- air embolism
- misidentification of patients
- maternal death due to post-partum haemorrhage after elective caesarean section.

Sources/bibliography: NHS England (2015) *National Safety Standards for Invasive Procedures (NatSSIPS)*, London: NHS England: www.england.nhs.uk/wp-content/uploads/2015/09/natssips-safety-standards.pdf; NHS Improvement (2018) *Never Events List*, London: NHS Improvement: https://improvement.nhs.uk/documents/2266/Never_Events_list_2018_FINAL_v5.pdf.

The 'dirty dozen'

Twelve human factors contribute to safety incidents. Examples of ways to reduce the possibility of problems caused by human error are given below.

Lack of communication	See *Operating Department Practice* pp. 8–11
Lack of teamwork	See *Operating Department Practice* pp. 5–6
Lack of assertiveness	Positive team environment Lack of awareness
	Communication; checklists; cross-checking
Lack of knowledge	Checklists; continuing professional development; learning from others
Complacency	Following (written) procedures; cross-checking
Distraction	Cross-checking; checklists; completing tasks before responding to interruptions
Fatigue	Cross-checking; sleep, diet and exercise
Pressure	Assertiveness; realistic assessment of requirements
Stress	Communication; peer support; sleep, diet and exercise
Lack of resources	Forward planning
Norms	Assertiveness; communication; positive team environment

Sources/bibliography: Carthey J (2018) Creating Safety II in the Operating Theatre: The Durable Dozen!, *J Perioper Pract*, doi: 10.1177/1750458918815558; Dupont G. (1993) *The Human Factors "Dirty Dozen"*: www.skybrary.aero/index.php/The_Human_Factors_%22Dirty_Dozen%22.

4 RECOVERY

Nutrition

Micronutrients and vitamins

Micronutrient	Function
Vitamin A	Needed for vision in dim light, maintenance of skin and tissue, acts as an antioxidant protecting the body from free-radical damage
Thiamin (vitamin B1)	Required for release of energy from carbohydrate
Riboflavin (vitamin B2)	Essential for utilizing energy from food
Niacin (vitamin B3)	Essential for utilizing energy from food
Pyroxide (vitamin B6)	Involved in the metabolism of amino acids
Folate (vitamin B9)	Required in rapidly dividing cells and in pregnancy to reduce the risk of neural tube defects in the child
Cobalamin (vitamin B12)	Part of cell metabolism, needed by rapidly dividing cells
Vitamin C (ascorbic acid)	Needed for maintenance of connective tissue; acts as an antioxidant protecting the body from free radical damage; prevents scurvy
Vitamin D	Ensures constant supply of calcium in the blood, thus helps to maintain bone minerals
Calcium	Facilitates growth, maintains healthy bones and teeth
Phosphorus	Necessary for energy release within the cell and other metabolic processes; present in phospholipids which make up neural tissues and cell membranes
Magnesium	Key for enzyme function in energy utilization
Sodium	Crucial for maintaining water balance and nerve and muscle function

Potassium	Works in conjunction with sodium for cell function; important in normal heart muscle function; shown to reduce blood pressure
Chloride	Crucial for maintaining water balance and nerve and muscle function
Iron	Component of haemoglobin in red blood cells and myoglobin in muscle, needed for transporting and storing oxygen; component of some enzymes
Zinc	Assists wound healing and part of enzyme activity
Copper	Found in a number of enzymes
Selenium	Helps to control metabolism in the thyroid gland; immunity, reproduction and promotion of antioxidants
Iodine	Component of hormones from the thyroid gland.

Sources/bibliography: Department of Health (2012) *Manual of Nutrition*, 12th edn, London: TSO; British Nutrition Foundation (2016) *Nutrition Requirements:* www.nutrition.org.uk/attachments/article/234/Nutrition%20Requirements_Revised%20Oct%202016.pdf; Scientific Advisory Committee on Nutrition (2011) *Dietary reference values for energy*, London: TSO: www.gov.uk/government/publications/sacn-dietaryreference-values-for-energy.

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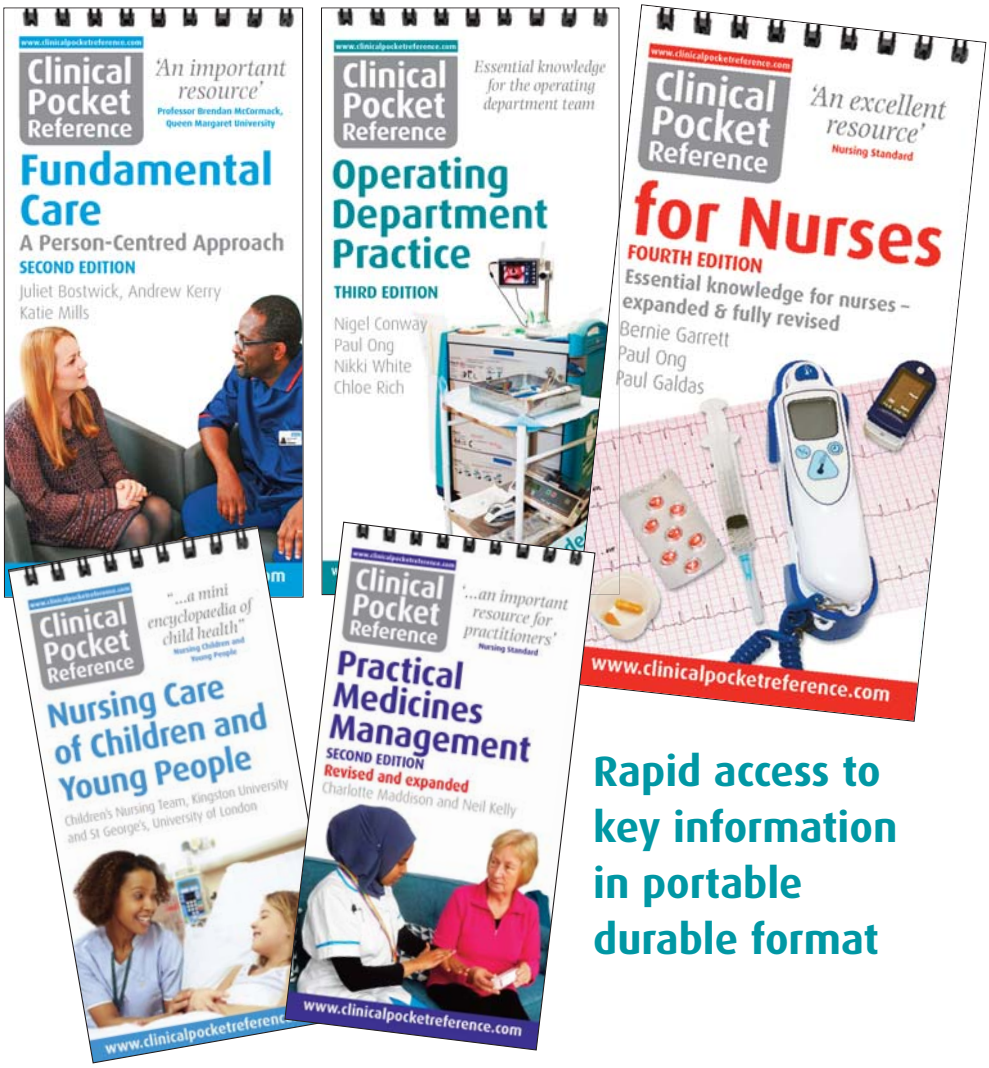

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