



The ROYAL COLLEGE of
OPHTHALMOLOGISTS

Ophthalmology Service Guidance

Theatre facilities and equipment

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1 Introduction

Ophthalmology accounts for around 6% of all NHS procedures, with 700,000 elective admissions per year of which 400,000 are cataracts and over 95% are day case in England. This document will concentrate on the facilities and equipment for provision of ophthalmic major surgery but will touch on requirements for minor operation (see also RCOphth Standards for intravitreal injections).

2 Types of procedure room

The type of surgery undertaken and the method of anaesthesia used will dictate the level of theatre provision required. Minor surgery (e.g. chalazion and other minor eyelid surgery), and sterile procedures such as intravitreal injections do not require a dedicated operating theatre. A suitably equipped procedure room or “clean room”, which can be in the outpatient area, may be used. This should be risk assessed and approved as suitable by the hospital infection control team. Many small procedures such as corneal suture removal, and anterior chamber tap, can be performed at the slit lamp using aseptic technique. Basic provision in all areas where procedures are undertaken should include ensuring enough room to incorporate storage of key equipment and consumables, a couch/slit lamp as required, and sufficient space for movement and positioning of staff and patient, the facilities for hand hygiene with the options of washing and alcohol gel, a good source of illumination, a sharps bin, and a supply of sterile equipment and gloves.

All other surgery should be undertaken in a dedicated operating theatre. In practice, it is frequently necessary to share facilities. If the theatre must be shared with other specialties, risk of contamination is minimised by sharing with “clean” specialties such as orthopaedics, and segregating clinical sessions enabling sufficient air exchange and cleaning to take place. A method of regular deep cleaning practice should be agreed and documented by theatre teams and domestic service providers. The practice should be formally risk assessed and approved by both the ophthalmology and infection control teams

Day surgery requires the same level of theatre provision as inpatient surgery for any given operation. If local anaesthesia without sedation is used, there is no need to provide the same level of recovery facilities and patients can return to a postoperative seated area. Ophthalmic surgery under general anaesthesia or sedation requires the usual facilities for the administration of anaesthesia and post-operative recovery.

3 Theatre design

Good design makes a positive contribution to staff morale and allows surgical procedures to be carried out efficiently under conditions that maximise the safety and comfort of the patients. There are minimum standards for theatres which are set out by the Department of Health & Social Care, and a catalogue of detailed requirements are outlined in the references at the end of the document (particularly HTM03-01). Surgical room requirements usually include communications base/reception, admissions lounge with patient changing facilities, waiting area, interview examination room, staff support areas (changing room,

toilets, team reporting station), storage (for instrument packs, fluids, consumables and disposables, fire hazard, medicines fridges/freezers, equipment, stationery, linen and specimens), disposal (dirty utility, disposal hold, domestics room), recovery, theatre suites comprising of scrub, prep room, operating room and anaesthetic rooms, and sometimes office and training areas.

Much of the design of the building, rooms and equipment will flow from a careful consideration of the patient care pathway and what is delivered in the day surgery unit, or in the outpatient area. Consultation with key stakeholders is key to a successful and compliant theatre design. Key stakeholders include ophthalmic surgical teams, infection control team, estates, facilities, equipment (EBME), sterile services department (SSD), pharmacy and patients. Consideration needs to be given, for example, on where the pre-operative assessment and supporting investigations, such as biometry or optical coherent tomography imaging, will occur; or on whether patient education facilities will be needed such as a video room or a room for nursing education of the patient. Both staff and patients need to be actively involved in the design. It is important when planning any ophthalmic surgical facilities to have accurate data on the present and likely future activity based on local health care needs and any likely reconfigurations of care in the region. Also consider the range of surgical activity envisaged (e.g. adults and children, post-operative adjustment of sutures) and anaesthetic type used (e.g. purely local anaesthetic, or general anaesthetic or sedation patients). There can be significant benefits to the ophthalmic theatre facilities being near the outpatient department, for rapid access to staff and investigations including those required unexpectedly. Site visits to other ophthalmic units to see how they are laid out are very valuable for those designing new units or for those re-designing existing facilities; and bodies such as Getting it Right First Time (GIRFT) and the RCOphth can signpost to other units who are efficient or performing well.

Key aspects of theatre design

The design of the facility should facilitate uninterrupted and efficient patient flow. On their operation day, patients make the journey through some or all of: main reception area; admission suite; sub-waiting area; anaesthetic room; operating theatre; recovery; discharge lounge. The operating theatres should be on the same floor as the admission and recovery areas. Non-authorized staff should be prevented from entering staff areas. Security locks with close proximity card entry are the preferred option.

Reception areas should be warm, welcoming, well lit, and suitable for use by all. The reception desk should be located so that it commands a clear, unobstructed view of the main entrance and waiting room and the patient entrance to the clinical area. The design of the reception desk should be of a high quality and allow access for disabled people. Space should be provided for photocopying, faxing, printing equipment and the disposal of confidential waste paper etc. In the absence of computerised medical records, a secure records store will be required. The reception desk should have a direct computer link to the whole hospital system.

The waiting area should be large enough to accommodate the waiting patients and some relatives or carers. Appropriate décor and natural daylight should create a calm and relaxing atmosphere. Appropriate good quality seating is required including for bariatric patients. Space should be available for wheelchair users and those using walking aids. The furnishings

and fittings should be easy to clean, disinfect and maintain. Beverage-making facilities should be available at all times. A television should be provided. An appropriate number and location of toilets including wheelchair-accessible WC is essential. For high throughput ophthalmic lists, the seating area is ideally as near as possible to the ophthalmic theatre. Consideration should be given to maintaining confidentiality, privacy and dignity, including for clinical discussions, especially in open plan waiting and admission areas.

Consulting room: There should be at least one consulting room with a slit lamp and other ophthalmic examination equipment including visual acuity testing, which is big enough for clinician, patient and carer to move safely and comfortably and which allows a clinical examination, discussion about the procedure and marking of the surgical side. The room will require a clinical hand-wash basin, wall-mounted alcohol hand rub, liquid soap, gloves and paper towels, a desk with networked computer facilities (for Electronic Patient Records and imaging), and internal telephone. Depending on what surgery is undertaken, it may also need an examination couch or reclining chair. The door should be wheelchair accessible and have an integral privacy screen to prevent interruptions.

Anaesthetic rooms: Although some healthcare providers have theatres without their own anaesthetic room, and there are pros and cons for this, most theatre departments will have one anaesthetic room for each theatre; without this, pressure maintenance in theatre can be compromised and there must be specific ventilation arrangements to compensate. Anaesthetic rooms are believed to be beneficial in terms of increasing rapid throughput, theatre utilisation and flexibility of use as well as for privacy. The minimum space required in each anaesthetic room is 19m². The room should be large enough to accommodate at least four people as well as the patient and it is essential to be able to access the patient from all sides. One set of double doors should open from the corridor into the anaesthetic room, with another set opening into the operating theatre. Each set of doors should be wide enough to admit the patient and associated equipment, minimum clear opening width of 1600 mm, and close quietly. Obscured vision panels are required in all doors. Automatic doors should be capable of standing in the open position. A clinical hand wash basin and appropriate storage cupboards with accessible benchtop are essential.

Prep rooms: If there is an ultraclean ventilation theatre, there is the option to not have a separate prep room. In this situation, the instruments can be laid out under the ventilation canopy. There must be also an alternative location for the storage of immediate back-up sterile supplies, supplementary instrument packs and other items such as suturing material and sterile fluids. Where a preparation room is omitted, an anaesthetic room must be provided.

Otherwise there must be a prep room and it is not permitted for two or more newly built theatres to share a single preparation room, due to the potential risk of cross-infection via the ventilation airflows.

The preparation room is used for preparing sterile instrument trolleys. Storage space will be required only for lotions, suture materials, sterile fluids, instrument and supplementary packs required for a list. Instrument packs and other sterile supplies for the day's operating list are delivered to the preparation room of each theatre from the sterile goods area of the bulk store. The preparation room should provide storage and suitable work surfaces for the laying-up of instrument trolleys. It should be large enough to open packs and maintain a sterile field, accommodate a minimum of two members of staff. Due to rapid ophthalmic

turnover, the preparation room will need to be large enough to accommodate a number of instrument trolleys - a room of at 12-20 m² is required. Direct access will be required from the preparation room to the theatre and the doors should be wide enough for instrument trolleys to enter without contamination. A wall-mounted sharps box is required. Prep room doors should be kept shut at all times, except when staff are moving through them with trolleys or to access stores in prep room. Surgical trolleys should not be laid up ahead of the next-but-one patient case due to risk of contamination whilst stood in prep room

Scrub space: It is not essential to have a door between the scrub room and theatre, and there are three options for scrub space:

- A dedicated scrub and gowning room for each operating theatre with sufficient space for a minimum of three people (minimum size 11 m²);
- One scrub and gowning room shared between two operating theatres, both of which should be directly accessible with sufficient space for a minimum of six people, with three people scrubbing back to back;
- A recessed scrub and gowning area within the theatre room with sufficient space for a minimum of three people. With a recessed scrub area it is essential that it is located away from the area containing laid-up instrument trolleys in order to prevent water contamination.

All scrub troughs should have curved sides with no plugs, have no overflows, and be fitted with non-touch taps which must not be directed over the waste outlet. Mixer taps should be used, as very hot or very cold water discourages hand-washing. The rim of the scrub sink should not have an internal lip as this is an infection control risk, and the splash-back should be a single waterproof sheet or seal mounting with polyurethane or wall glaze. There should be sufficient space around the basin to wall mount hand antiseptic solutions and paper towels, and a clock with second hands to enable surgical timing of scrub. Provision for gown packs and sterile glove selection should be facilitated.

Theatre room: A standard size of at least 55m² and a minimum clear height of 3000 mm between the finished floor level and ceiling is required for all major operating theatres including ophthalmic theatres and the recommended shape is approximately square. Doors through which beds or trolleys will pass should be wide enough to allow easy passage with attachments, and doors should be able to stand in the open position. All doors should be fitted with vision panels capable of being obscured and should close quietly. All doors to the operating room should be kept closed to enable optimum ventilation performance. A surgeon's panel will enable clinical staff to assess working conditions such as temperature, humidity and some units can facilitate lighting control.

The building structure should be capable of supporting the loads generated when the ceiling-mounted medical supply unit is installed.

Dirty utility: It is common to provide an individual dirty utility with every theatre but a dirty utility can be provided for every two or four theatres. The room should be large enough to enable cleaning of theatre equipment, and disposal of the contents of bedpans, urine bottles, vomit bowls, washbowls etc. A disposal unit consisting of sink and hopper with concealed cistern should be provided. Mops and buckets for immediate use in theatre are stored here, and a deep sink is required. Mechanical extract ventilation and hand-washing facilities should also be provided.

Contaminated re-usable instruments and equipment can be stored in a distribution trolley in the dirty utility prior to the distribution trolley being taken to the disposal hold to await collection from the sterile services department. Space is not required for holding materials for disposal or reprocessing since sacks and bags, once full, should be closed and taken to the disposal hold to await collection. The dirty utility can also be used as a holding bay for contaminated clinical equipment where it is cleaned prior to being taken to the equipment service room for maintenance.

Reporting room: A small room or area is beneficial for surgeons to record each completed operative procedure. Any such room should be located close to the operating theatres and can be shared by several people at one time and needs a desk with a computer terminal as well as an external telephone. If surgeons are recording operation details in theatre, they should have an area to do so. If using EPR they need an additional terminal or laptop that can be used by the theatre staff to do so.

Recovery: Many ophthalmic day case patients will not require formal recovery areas. Where it is provided, the size of each space should be large enough to accommodate an adult bed with additional space for the monitoring equipment and to ensure immediate access for staff in case of emergency. For more details see references.

Staff areas: Within or very near to the theatre areas there should be rest facilities where staff can relax and take beverages and snacks, a coffee or dining table and chairs to eat and drink in comfort. The room should have windows with a pleasant outlook, and a telephone and contain or have direct access to the beverage bay. There should also be changing rooms with separate rooms and toilets for males and females.

Laser adaptation: If laser procedures are being undertaken there are the following requirements:

- There should be no reflective surfaces or bright door handles.
- There should be a light warning when laser is being undertaken, located in the corridor above the theatre door.
- Windows need to be completely blacked out. Operating theatre windows require laser-proof blinds with electrical interlocks to the laser machine ideally, or electronically-controlled opaque glass or double-glazed windows with inset blinds.
- Staff and the patient must wear appropriate eye protection when laser equipment is in use. The appropriate eye protection should be readily available in each theatre.
- Operating microscopes must have appropriate filters if required e.g. for endolaser.

4 Ventilation and control of the environment

Ventilation is a means of removing and replacing the air in a space. In its simplest form this may be achieved by opening windows and doors. Mechanical ventilation systems provide a more controllable method. Simple mechanical systems consist of a fan and collection or distribution ductwork; more complex systems may include the ability to heat and filter the air passing through them.

Where a specialised ventilation plant is provided as part of the protection measures required for surgical theatres, there is a statutory requirement it be correctly designed, installed commissioned, operated and maintained. The local exhaust ventilation (LEV) section of Control of Substances Hazardous to Health (COSHH) requires that the plant be inspected and tested at least every 14 months by a competent person and that management maintain comprehensive records of its performance, repair and maintenance. Annual validations are a statutory requirement for Care Quality Commission (CQC) and Health and Safety Executive (HSE). These do not necessitate microbiology testing unless the theatre facility is being commissioned or major estates works has been undertaken within the theatre or directly involving the air handling ductwork to the ventilation unit.

Operating departments and theatres have specialised ventilation requirements and use positive pressure ventilation of filtered air for four main functions:

- To dilute airborne contamination.
- To control air movement within the suite such that the transfer of airborne contaminants from less clean to cleaner areas is minimised.
- To control the temperature and, if necessary, the humidity of the space.
- To assist the removal of, and dilute, waste anaesthetic gases.

The fixed volume of air supplied is usually expressed in terms of the resulting number of air changes per hour (ac/h) within the space being ventilated, and the requirement for all operating theatres including ophthalmic (unless minor ops) built after 2007 is 25 ac/hr. Note that the arrangements for older theatres are slightly different. Theatres built before 2007 are subject to older guidance (HTM2025) and require a minimum of 20 air changes per hour for an operating room.

It should be understood that the term day case theatre refers to the practice of patient care and not the standard of theatre ventilation required for ophthalmic day case procedures.

The ventilation for prep rooms needs consideration also. Preparation room “sterile pack store” (SPS) is where it is intended to lay-up instruments in the operating room, and in this case the preparation room will simply be used as a sterile pack store. This requires 10 ac/hour. Preparation room “lay-up” is when the preparation room is used as an instrument “lay-up” room, in which case it should be regarded as being of greater cleanliness than the operating room, and the design should minimise the transfer of air from the operating room to the preparation room. It requires > 25 ac/hour.

Shared preparation rooms: where the preparation room is to be shared between two theatres, should be at a higher pressure (35 Pa) than either of the theatres, even if it is only to be used as a sterile pack store.

Note that all windows should be fixed non-openable to assure the clean environment, and assist airflow.

The temperature and humidity control of the environment should be controlled to between 18°C to 25°C, and humidity below 70% room humidity. It is helpful if the theatre team can locally control the temperature for their and the patient’s comfort.

Clinical staff must check that the theatre environment is fit for use prior to the day’s surgery commencing. This includes checking that the ventilation provision to each theatre suite is

working. Some systems have integral alarms to alert staff to outage, this might be auditory or a warning light. It is imperative that teams are trained in the procedure to follow if ventilation is prevented for any period of time.

5 Mobile surgical systems

It is possible to establish a suitable environment for ophthalmic microsurgery within a clean draft free clinical room using a mobile surgical hood such as the Surgicube. The Surgicube comes in a range of sizes and is a modular system requiring construction within a suitable room and directs a flow of ultraclean air over the operating area. There are different logistics to running ophthalmic lists within such a system and units need to liaise with manufacturers to ideally see the arrangement in action in another unit in order to make the decision about whether this can work in their setting.

6 Theatre equipment

Operating microscopes

Operating microscopes can be ceiling mounted or free standing. If a ceiling-mounted microscope is installed, a rigid supporting structure is required, otherwise vibration may occur. A disadvantage in this type of microscope is the downtime of the operating theatre when the microscope is being maintained, and subsequently a potential reduction in flexibility of theatre usage. However, if free standing microscopes are used, movement should be minimal and any issues about transportation and storage of these bulky yet delicate instruments must be planned carefully.

Essential features include co-axial illumination and foot pedal controls. The assistant's microscope should have a stereoscopic view similar to the surgeon's view.

There should also be:

- Video camera with screen for live viewing by theatre staff and the facility to record the operation digitally for later review, training or personal/departmental quality improvement purposes.
- Vertically adjustable eyepieces.

Operating table/surgery trolley/chair

The operating surface should be readily adjustable for height and tilt. The equipment used will depend on local arrangements, but should take into account each unit's layout and individual surgeons' ergonomic requirements. It should be possible to break the table for the comfort of the patients and the headrest should be adjustable both vertically and with tilt. Rapid head down tilt should be possible for general anaesthesia cases. Caution should be exercised to ensure that any controls cannot be inadvertently operated, particularly during surgery, especially with models with electric controls with "memory" positions.

Phacoemulsification

Operating theatres for cataract surgery should be equipped with phacoemulsification machinery. This should be maintained and updated regularly. Vitrectomy capability and other intraocular instruments for the management of complications are essential. Staff must know where these are and how to use them, even if only used occasionally. The equipment

should be used and regularly maintained in strict compliance with manufacturers' instructions. Units relying on a single machine may consider the potential hazards of a technical problem occurring justify the purchase of a "back-up" device.

The manufacturer's requirements concerning the cleaning and sterilisation of the hand pieces should be followed. Single-use items should not be re-used. See College device decontamination guidelines for details.

Other operating equipment

This should include a cryo-surgery system, bipolar cautery and an indirect ophthalmoscope and lenses. Additional equipment will be required depending on specialisation.

Two examples are:

- Vitreoretinal surgery: vitrectomy machine and consumables, laser, gas/air/fluid exchange systems, silicone oil pump, image inverter for the operating microscope etc.
- Paediatric cases: could include refraction equipment, operating gonioscopes, strabismus sets, probing sets, hand held tonometer, etc.
- Theatre staff should work closely with their surgeon to identify what equipment is required how it will be used and how to procure and maintain it.

Surgical instruments

Suitable sets of surgical instruments must be available for each operating list well in advance. Extra sterile instruments should be available for occasional use and back up as spares. Items marked as "single use" should not be re-used. Only in exceptional circumstances should surgery proceed if there is no back-up set of surgical instruments.

There should be enough instrument trolleys to cater for the operating list. In practice this means, at least three trolleys. Agreement should be reached at the planning stage about the minimum level of reusable instruments and consumables that should be retained in the department.

Decontamination of devices including use of disposables, tracking, CJD risk, SSD and storage is described in detail in the RCOphth decontamination guideline.

Miscellaneous theatre room equipment

There should be ample provision of theatre chairs/stools. For the surgeon and assistant these should have hydraulic height adjustment. Armrests should be available as an option. The lighting should include high-intensity operating light units and fully variable background lighting. Other equipment should include x-ray viewing via a PACS system or a light box, clock with stop-watch facility, dry-wipe permanently wall-mounted easily visible marker board at least 800 mm x 600 mm, video viewing and recording system and, ideally, facilities for playing recorded music. Each operating theatre should have a clinical workstation and computer terminal so that the staff can retrieve information and input patient data without leaving the theatre. A work surface is required for the computer and for writing purposes. This should be large enough for paper records and a large operation record book. There should be, either in theatre or in the reporting room (see above), facilities for recording operating details, ideally in an electronic format that will allow ready access for audit including submission to the national cataract audit.

The theatre and anaesthetic room should be adequately soundproofed to minimise intrusive external noise during surgery and promote a calm, relaxed atmosphere. Lifting and handling equipment including hoists should be available including provision for bariatric patients.

7 Anaesthesia and resuscitation

Typically, more than 90% of ophthalmic procedures are carried out using local anaesthesia. However, no local anaesthesia procedure is entirely without risk of systemic adverse effects. For any operation, all theatre staff must be regularly trained and able to perform basic life support, understand local resuscitation arrangements, and there should be a resuscitation trolley easily and quickly available.

For patients receiving GA or deep sedation, standard provision of anaesthetic gases, drugs and equipment and a full resuscitation service is required to the level of national anaesthetic guidance.

For patients undergoing local anaesthetic ophthalmic surgery, there needs to be provision in accordance with the RCOphth and RCoA guidelines on ophthalmic anaesthesia 2012 which include:

- Oxygen and suction available.
- Monitoring in the form of pulse oximetry, ECG and non-invasive BP available.
- All ophthalmic units should have formal policy for dealing with medical emergencies should they occur. Appropriate backup from a cardiac arrest/medical emergency team should always be available.
- At least one person available with Immediate Life Support (ILS) or equivalent qualification, who should be supported by staff with the knowledge and skills to assist in resuscitation.
- Where the unit is free-standing and there is no immediate access to a formal cardiac arrest team there should be at least one person with Advanced Life Support (ALS) or equivalent.
- Ideally, an anaesthetist should be available in the theatre complex, particularly when needle blocks such as peribulbar, retrobulbar, and sub-Tenon's blocks for difficult cataracts, or when complex or long cases are being performed.
- If an anaesthetist is not available in the hospital or ophthalmic unit, peribulbar or retrobulbar techniques should only be used if appropriately skilled staff are immediately available in the operating theatre.
- If an anaesthetist is not immediately available, the operating ophthalmologist is directly responsible for the management of any untoward event and should have the appropriate skills to safely manage resuscitation, or to have these skills within the theatre team.
- For isolated units or where procedures are performed outside a main theatre complex, clear, agreed and regularly tested protocols and pathway must be in place to enable the patient to receive appropriate advanced medical care, including intensive care.

8 Drugs and therapeutic agents

An ophthalmic theatre should have provision for storage of various drugs, both anaesthetic and ophthalmic. A lockable controlled drugs cupboard is required as well as a lockable drugs fridge in the anaesthetic room. An appropriate range of ophthalmic drugs is required and these need to be stored in accordance with modern medicines management practices.

Ophthalmic theatre drug use is a specialist area. Drugs that are routinely administered in an eye theatre as standard practice may not be licensed for such use, e.g. the addition of adrenaline into intra-ocular irrigating solutions. Other drugs, such as subconjunctival, intra-cameral or intravitreal antibiotics, may also be used in a non-licensed manner. It is important that, if extra solutions or drugs are added to irrigating fluids, their effect on the pH and ocular tolerance is known and managed accordingly. Similarly, administration of antibiotics must be via the correct route and follow recommended doses. Avoid where possible, theatre staff making up intraocular drugs from recipes and multi-dose vials. Avoid vial sharing and, where possible, always use pre-prepared, individually packaged and licensed preparations.

Be particularly aware of the potential danger of using preserved hydroxypropyl methylcellulose (HPMC) marked for “external use” during intraocular procedures. Great care is required in managing antimetabolites for glaucoma surgery. It is generally advisable to collaborate closely with local pharmacy colleagues in sourcing appropriate preparations and managing any risk using risk assessment and local guidelines or policies for provision and administration of any off licence, unusual or high risk ophthalmic theatre drugs.

9 Minimising risk of contamination – infection control advice

See above for advice on dedicated vs multispecialty ophthalmic theatres and ventilation.

It is essential the clean to dirty workflow within theatres is maintained, and clean and dirty elements are kept separate. The standard of theatre finish must be high and conform to current hospital building notes. The walls and ceilings must be cleanable and in good condition. Damaged door frames, walls and ceilings may become contaminated and a reservoir for microorganisms and are difficult to clean.

Although airborne sources are a potential source of contamination, the patient's skin is the usual source of bacterial intra-ocular infection (endophthalmitis). Skin prep is therefore crucial. The main source of airborne contaminants is from theatre staff. Overall dispersion is increased by staff movement and numbers. Other sources are less significant and include improperly filtered outdoor air, contaminated fabrics worn by staff and contaminated air backtracking from outside the theatre. Airborne micro-organisms enter surgical wounds either directly or indirectly via instruments.

Bacterial contamination of the air is highest during patient entrance and exit; therefore about to be used sterile trays should not be opened or left uncovered until the onset of the next patients operation. They should be laid up in an adjacent prep room or can be in theatre if there are the appropriate ventilation arrangements. Limiting personnel movement reduces air turbulence and the introduction of infectious material. Therefore, there should be restricted access to the operative zone, which includes the operating theatre and

preparation area, and door opening should be minimised. Doors should never be left propped open.

The use of face-masks during surgery has not been conclusively demonstrated to reduce infection rates. There is some evidence that their use reduces contamination of the operating site, and that such contamination is more likely to occur as a result of the surgeon speaking. However, wearing masks can also cause problems with steaming of glasses impeding a clear view, which is particularly important in microsurgery. The RCOphth supports ophthalmic surgeons wearing masks but this is not mandatory. The wearing of sterile gloves should be mandatory for all cases.

Cleaning: A designated person should supervise the cleaning of an operating department with planned preventative maintenance programmes in place as part of infection control. Cleaning should be carried out according to national standards, infection control guidelines and local policies. This should be monitored as part of quality control. Adequate space should be provided for the convenient local storage of cleaning equipment and materials. The theatre department staff are responsible for the standard of cleaning within their department and must monitor regularly the compliance with minimum standards set by the infection control team. Independent audits should be undertaken regularly with domestic services and estates teams.

Planned Preventative Maintenance: This should be arranged with the estates teams to enable safe access and communication on working facilities. It is an essential part of maintaining the condition of theatre facilities.

10 Out of hours and emergency surgery

Ophthalmic patients should have access to emergency theatre if required. If this is not feasible within a unit, locally agreed arrangements should exist for “out of hours” referral of emergency patients to where theatre facilities exist. See RCOphth Guidance Emergency eye care in hospital eye units and secondary care for details.

11 Inpatient facilities

Although the vast majority of ophthalmic care is outpatient or day case, there are still many ophthalmic units, especially large regional units, requiring some inpatient facility.

Ophthalmic patients who may require inpatient care include:

- Planned day cases who run into problems.
- Emergency admissions requiring intensive medical and nursing treatment and/or urgent surgery.
- Patients who for social or geographical reasons need to stay in hospital.
- Complex medical ophthalmology cases, patients undergoing complex corneal, vitreoretinal or adnexal surgery involving prolonged general anaesthesia or where close monitoring in the early postoperative period is required.

Where only day care or 5-day ward facilities exist, appropriate, robust and documented arrangements must exist to allow safe care of the ophthalmic patient requiring inpatient care, including unexpectedly after day care procedures. It may be prudent for neighbouring units to agree protocols for inter-hospital transfers. Where independent sector facilities are contracted to undertake surgery locally it is vital that service level agreements for such possibilities are catered for and agreed well in advance with all stakeholders.

It is ideal if ophthalmic patients can be nursed on dedicated ophthalmic wards rather than mixed surgical or medical wards to minimise the risks of hospital acquired infection of ophthalmic patients and to optimise expertise. This is often difficult to justify where resources are limited. Nursing staff need to be adequately trained in how to provide care for ophthalmic conditions including an understanding of ophthalmic medicines management and administration.

Other important aspects

It is important also to ensure that there is *adequate medical cover for inpatients* including out of hours. This includes the need for urgent medical treatment such as resuscitation and management of significant systemic illness. The hospital at night programme is relevant here but arrangements must be clear, agreed and documented.

Infection control: It has been traditional to say that one or more separate/single rooms should be available for care of ophthalmic patients with infections such as endophthalmitis or keratitis, if they are to be nursed near to other ophthalmic cases. In reality, the risk of transfer to is uncertain, for instance, preoperative patients. However, this is considered best practice. There should also be specific infection control management for the use of shared equipment such as slit lamps

Ophthalmic equipment: Depending on the size of the ward, one or more fully equipped ophthalmic examination rooms are required.

Size and layout: Consideration will need to be given to separating male and female patients, the case-mix of the unit, the nature of the emergency workload and the timetable of theatre lists (which may require more beds on certain days of the week). If there is a significant unpredictable emergency workload, there needs to be enough capacity to avoid cancelling elective work.

Authors: Melanie Hingorani, RCOphth, Chair of Professional Standards

Dr Manjusha Narayanan, on behalf of the Microbiology Specialty Advisory Committee, Royal College of Pathologists

With thanks and acknowledgement to the Theatres and Infection Control Teams from Moorfields Eye Hospital.

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