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Guideline

Guidelines for designing a digestive disease endoscopy unit: Report of the World Endoscopy Organization

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A dedicated digestive disease endoscopy unit is structurally and functionally differentiating rapidly as a result of increasing diagnostic and therapeutic possibilities in the last 10–20 years. Publications with practical details are scarce, imposing a challenge in the construction of such a unit. The lack of authoritative information about endoscopy unit design means that architects produce their own design with or without consulting endoscopists working in such a unit. A working group of the World Endoscopy Organization discussed and outlined a practical approach for design and construction of a modern endoscopy unit. Designing the layout is extremely important, necessitating thoughtful planning to provide comfort to the endoscopy staff and patients, and efficient data archiving and transmission during endoscopic services.

Key words: construction, design, digestive disease, endoscopy, mobile hospital, unit

INTRODUCTION

IN MANY HOSPITALS, endoscopy was first introduced by carrying out gastroscopies in an all-purpose room or operating theater. The rapid development of endoscopy with all its diagnostic and therapeutic possibilities meant that endoscopy units had to be remodeled or newly built as the demand for endoscopic procedures increased. This led to the need for minimum requirements in the design and construction of endoscopy units.[1] The lack of authoritative information about endoscopy unit design meant that architects produced their own design with or without consulting the endoscopists working in such units.[2,3]

In practice, the majority of smaller units still do not fulfil the criteria set by the British Society of Gastroenterology nearly 25 years ago.[1] A minimum of two endoscopy rooms is essential for a small unit to enable parallel examinations of upper and lower endoscopy and a three-room endoscopy suite for units carrying out 3000 endoscopies per year.[1,2] The third room including X-ray is necessary for fluoroscopic endoscopic procedures such as endoscopic retrograde cholangiopancreatography (ERCP), endoscopic ultrasonography (EUS) and dilations.[4] It also permits flexibility in dealing with emergencies and added cases without interrupting the routine list.

Endoscopy has continued to expand. These guidelines have been developed by a working group from the World Endoscopy Organization as a design tool to assist medical staff, architects and management teams to better understand the available choices. Before undertaking such a project, the design team should understand more about the functional requirements necessary for proper operation of the endoscopy unit.

AIMS AND OBJECTIVES

THE AIM OF an endoscopy facility is to provide high-quality diagnostic and therapeutic endoscopy services.[4] A comfortable environment for patients that maintains both privacy and dignity is mandatory in both private and public hospitals. A safe environment for staff that caters to their personal and professional needs is an essential requirement to ensure optimal efficiency and productivity.

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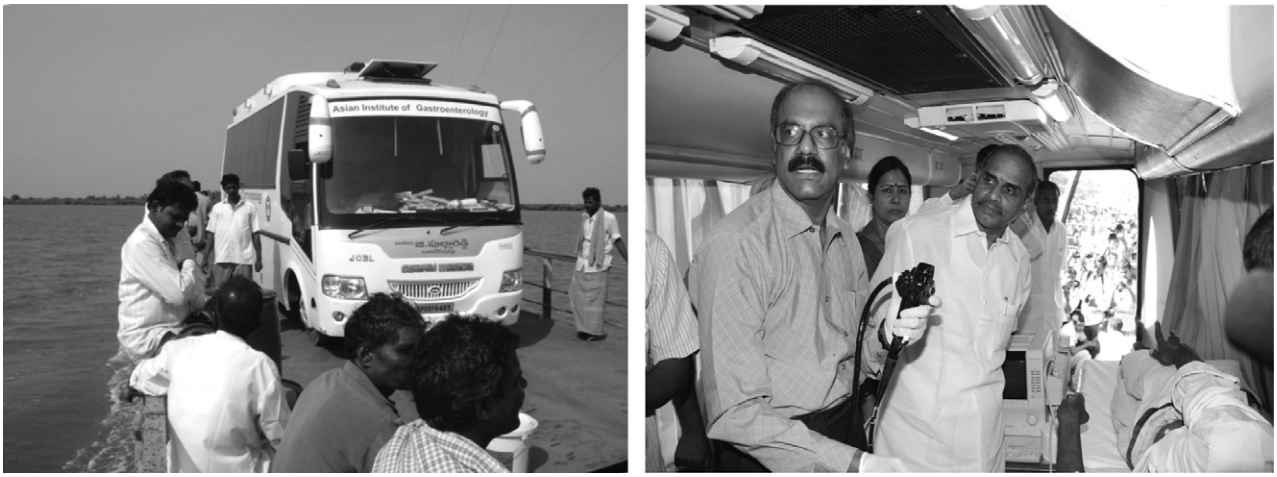

Figure 1 Mobile endoscopy bus with Prof. D.N. Reddy doing an endoscopy in the bus.

GENERAL CONSIDERATIONS

ENDOSCOPY UNITS MAY be sited in acute hospitals, stand-alone facilities or in large urban or rural areas. However, the basic requirements for design do not differ with regard to the internal facilities which remain the same with the differences dependent on the scale of the unit and its location. The digestive disease endoscopy unit is best divided into functional areas, such as:

- reception and waiting area
- preparation/recovery area
- endoscopy area
- support area: cleaning and storage
- staff and administration area
- education and training area.

Mobile endoscopy units have been launched in South Africa and India and are a promising concept that offers the capability of diagnostic and therapeutic endoscopic procedures among patients from areas with limited accessibility to modern health care.[5,6] The mobile endoscopy bus initiated by the Asian Institute of Gastroenterology in Hyderabad, India includes a bus customized as a mobile hospital that consists of separate enclosures for the upper gastrointestinal (GI) endoscopy and colonoscopy unit, transabdominal ultrasonography facility and a basic laboratory facility.[6] The bus is accompanied by a team of physicians, endoscopists and technicians along with a mobile telemedicine unit (Fig. 1). All endoscopic procedures and data from field locations are transmitted to the main telemedicine station of the parent institute. The entire endoscopy unit is equipped with a battery-powered inverter and a servo stabilizer to supply energy for the procedures. The bus is also modified with the capability to draw power from external sources. Oxygen and compressed air is provided by an externally loaded oxygen cylinder and a suction apparatus. The bus also has a constant water supply from an inbuilt water tank with a sink with a hands-free powered tap. The endoscopies are conducted unsedated and manual cleaning of the endoscopes is done as per standard guidelines. This Indian model should be considered for other remote areas all over the world.

In-hospital units should be located in a space where they do not open into a public waiting room or a high-traffic public corridor. Access to hallways by patients or staff who do not work in the endoscopy unit should be restricted.

Most endoscopies are carried out on a day-stay basis, allowing greater convenience for patients and less disruption to other hospital services. It also allows for a more efficient use of resources by scheduling groups of similar procedures. If a unit needs more than 200–500 X-ray screenings a year, then its own X-ray room is essential, which in a basic unit would be the third room.[4]

In the acute hospital setting, where possible, the endoscopy unit should be sited close to the emergency room, intensive care facility, acute wards and the operating room, in order to facilitate endoscopy in emergency cases. An alternative is a well-equipped trolley to service these units (Fig. 2).

ENDOSCOPY UNIT

Size of endoscopy unit

THE SIZE OF the unit should be adequate to cope with both current and future needs.[4,7] In order to estimate the required capacity, current workload must be assessed accurately after applying quality-control measures to ensure the appropriateness of the procedures and to take into account changes that may occur. The endoscopy unit may need to

Figure 2 Trolley endoscopy.

factor a requirement for bronchoscopy or an increase in workload caused by the introduction of new referral guidelines and future pressures such as screening programs in general. The number of procedure rooms required can be calculated as set out in Figure 3.[3] The space required for an outpatient endoscopy service, and day clinics for gastroenterology should be at least 1000 m^2.

Education and training

Where possible, a seminar room should be sited within the unit to allow training sessions for staff working within the unit. It is desirable to provide CCTV with two-way audio links to and from the endoscopy room in order to maintain patient privacy and to avoid overcrowded procedure rooms. The seminar room should have facilities for playing DVD/CD-ROM material and have internet connection. If space permits, the provision of an endoscopy workstation with models or simulators facilitates teaching and practice for endoscopists early in their career (20 m^2).

Information management and technology

Computer systems are essential for the successful operation of an endoscopy unit and ideally an integrated system should

- Daily Projected Volume = $\frac{\text{ANNUAL PROJECTED VOLUME}}{\text{WORKING DAYS PER YEAR}}$
- Capacity per Room (RC) = $\frac{\text{NUMBER OF WORKING HOURS}}{\text{AVERAGE PROCEDURE TIME + TURNABOUND TIME}}$
- Number of Endoscopy Rooms (ER) = $\frac{\text{DAILY PROJECTED VOLUME (DV)}}{\text{CAPACITY PER ROOM (RC)} \times 0.7 \text{ (ACTIVITY FACTOR)}}$

Volume calculator for an Endoscopy Unit

Figure 3 Volume calculator for an endoscopy unit.

be installed, although stand-alone systems are a reasonable compromise, provided they cover the essential items of data capture and management: maintaining an appointment system, scheduling of endoscopy lists, recording and reporting of endoscopy procedures and audit of quality-assurance indicators.

As technology becomes more complex, more information has to be managed. Additional desirable information technology (IT) facilities include: tracking of decontamination procedures with linkage to equipment used on individual patients, control of stock and ordering, ability to access reports from other departments, such as laboratory and histology. Planning should take into account the sites within the unit where data entry and retrieval are required, together with areas that require hard copy output.

Supply and storage

Careful consideration should be given to supply, storage and disposal systems. This should take account of the systems already in use by the hospital and the stock of accessories required. Areas to be considered include sterile supplies (single use), accessories, pharmaceutical supplies (including special requirements for controlled drugs), linen, catering supplies, and office supplies.

Frequency of delivery and collection will predict the size of storage and disposal areas required and a departmental stock control system maximizes the efficiency of storage. As a result of the increasing number of instruments, accessories, disposables, reserve equipment, linen and medication, we calculate a storage area of at least 12 m^2 to be required.

Staff changing facilities

Changing facilities should include the provision of lockers, showers and toilets for staff. In calculating the requirements,

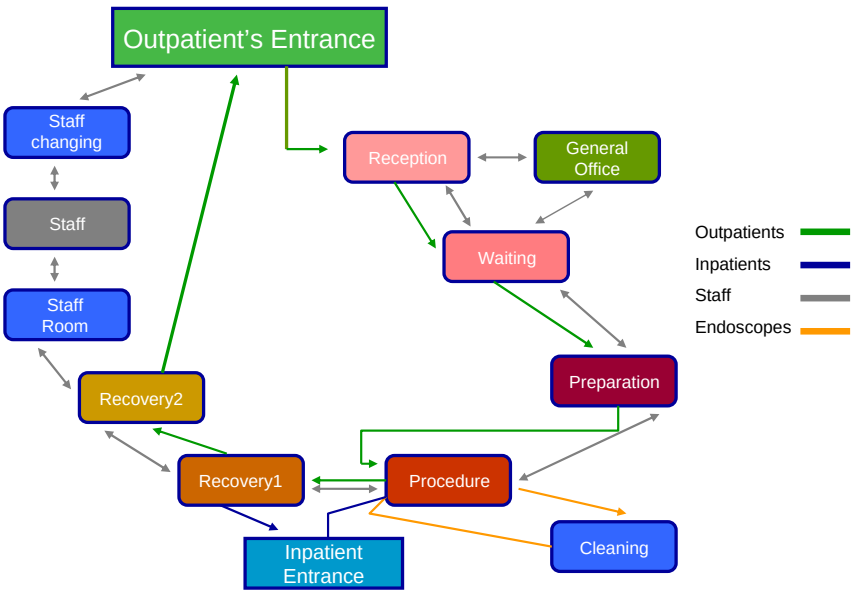

Figure 4 Discussing the flow of a future unit is essential before the designing process.

the following should be taken into consideration: total number of users (full time and part time), largest numbers of users likely to be present at any one time, the proportion of the total users by sex, and possible occasional users such as trainees on endoscopy courses.

Domestic services

Accommodation is required for storing department cleaning equipment and as a base for domestic services staff. The size and content of the space will be determined by the scope and extent of the services provided from it.

Catering facilities

Patients should have the opportunity to receive light refreshment and beverages for consumption during the recovery period. It is assumed that staff will attend the hospital staff dining room for main meals, although facilities are required in the endoscopy unit for staff to relax, and to prepare and consume snacks and beverages, especially when on-call or during weekend services.

Detailed functional and design requirements

The unit should be planned to provide patients with individual attention and adequate privacy in a high-quality facility that is easy to manage and operate. Work flows should be considered according to the following principles:

- patients and supplies to progress in one direction
- patients awaiting endoscopy do not meet treated patients (except at points of entry/exit)
- cross-over circulation points should be avoided
- double handling of patients and supplies should be minimized
- staff travel reduced.

A schematic diagram of an effective flow of a future unit is shown in Figure 4 and an example of a well-planned unit is shown in Figure 5.

Patient-related activities

The essential concept of unit design is to cater for the needs of the patient by reducing anxiety and ensuring privacy. Natural lighting, colors and the use of art help to create a calming environment. The patient's journey through the endoscopy unit can be separated into the following areas:

- entrance/exit
- reception and waiting
- preparation for the procedure
- procedure
- recovery and discharge.

Entrance/exit

Two entrance/exit routes should be provided, one for inpatients and one for outpatients. Entrances should be clearly signposted. Inpatient entrances should be wide enough to allow for passage of patients in beds. Outpatient entrances should take into account access for disabled or wheelchair patients.

RECEPTION AND WAITING AREA

THE RECEPTION AREA accommodates the initial processing and admission of all scheduled and unscheduled patients. It should be spacious enough to avoid a sense of

Figure 5 Example of a modern endoscopy unit with integrated staff facilities and an outpatient clinic situated around the endoscopy unit for easy hands-on supervision.

overcrowding and provide an open, friendly facility to avoid the sense of a barrier between patient and staff. The overall impression must be of high-quality design that combines efficiency with elegance. Patients' escorts and staff must be able to talk and exchange information with ease.

The reception desk should be adjacent to the general administrative office and close to the main waiting area. The administrative office needs to be large enough to accommodate all administrative staff, the storage of health records and stationery. There must be adequate IT, telephone, fax and internet facilities for communication, booking and audit activities.

The main waiting area should provide an informal comfortable and relaxing environment with domestic-type finishes and furnishings. Different types of seating are required and should include those suitable for elderly people and children. There should be space for patients in wheelchairs and for people using walking aids. Consideration should be given to the provision of low-level background music and/or a TV/video system which may help patients relax and alleviate the boredom of waiting, particularly for children.

The waiting area should be overseen by the reception counter, and have easy access to the patient preparation rooms. Its size should be designed on the basis of the appointments system. This must take into account doctors who may be quicker or slower than others, the types of procedures scheduled and the accompanying persons who will occupy seats while the patient is in the examination room. In addition, there will be patients and accompanying persons waiting for the next procedure and others waiting for the previous patient still in the recovery area.

Toilet facilities should be adjacent to this area, catering for male, female and disabled patients. Colonic preparation necessitates extra visits to toilets and a sufficient number of facilities must be available.

Patient preparation/staff base

The staff base acts as a focal point for staff who will be managing the assessment and preparation of patients prior to their procedure. There must be access to patient records and nursing assessment forms. The staff base should be suitably sited to allow the patient changing rooms and sub-wait area to be overseen.

Changing rooms are required where a patient can undress in privacy and put on theater clothing. Intake rooms (or cubicles) are needed for patients to give their medical history, allow baseline observations to be carried out and enable confidential discussions with the staff; for example, taking informed consent. There must be a relaxing area for them to wait until it is time to be escorted to an endoscopy room.

Patient preparation rooms should be adjacent to the main waiting area, and be provided with toilet facilities, ideally including bidets. There should be easy access from the patient preparation rooms to the endoscopy rooms. The number of patient preparation rooms will depend on the throughput of the endoscopy rooms. Generally, one patient preparation room for each endoscopy room will be adequate, with an additional one containing a trolley for non-ambulatory patients. Pressure on the number of patient preparation rooms resulting from fast throughput of patients will be relieved by the inclusion of a sub-wait area. A preparation room for giving enemas, prior to flexible sigmoidoscopy should be included in this area.

The width of the entrance and corridors should be broad enough to allow for the transportation of beds, stretchers and wheelchairs. The standard door width should be 1.28 m. The opening should have sliding doors as in operating theaters. Doorways with the normal width of 1.10–1.18 m, and doors turning on hinges present many problems for moving beds into endoscopy rooms. It must be possible to turn beds around in corridors.

ENDOSCOPY ROOM

THE IDEAL ROOM is organized with a centrally located patient trolley under a dual articulated arm ceiling boom system, specifically designed to support endoscopic medical equipment (Fig. 6). Each endoscopy room should be a minimum of 6 m × 5 m to be capable of accommodating a range of diagnostic and therapeutic endoscopic procedures. At least one room should be constructed (at least 37 m^2) to allow for the use of an X-ray image intensifier and for giving general anesthetics or propofol, with the required monitoring equipment.

In contrast to midazolam sedation, propofol can decrease the areas required for recovery. Endoscopy rooms dedicated to ERCP practice have the greatest need for organized accessible storage of innumerable devices.

Easy access is required for the movement of trolleys or beds into and out of the room. The doors should accommodate this. Two separate entrance/exit doors should be provided to allow for the entry of clean instruments and for the removal of used endoscopes at the end of the procedure.

During an endoscopic procedure, the trolley with the patient should be located in the center of the room, with the endoscopist standing at one side of the trolley and room for endoscopy assistants at both ends of the trolley, for both patient monitoring and assistance with accessories. The endoscope viewing monitor should be at the opposite side of the trolley to the endoscopist in order to provide uninter-

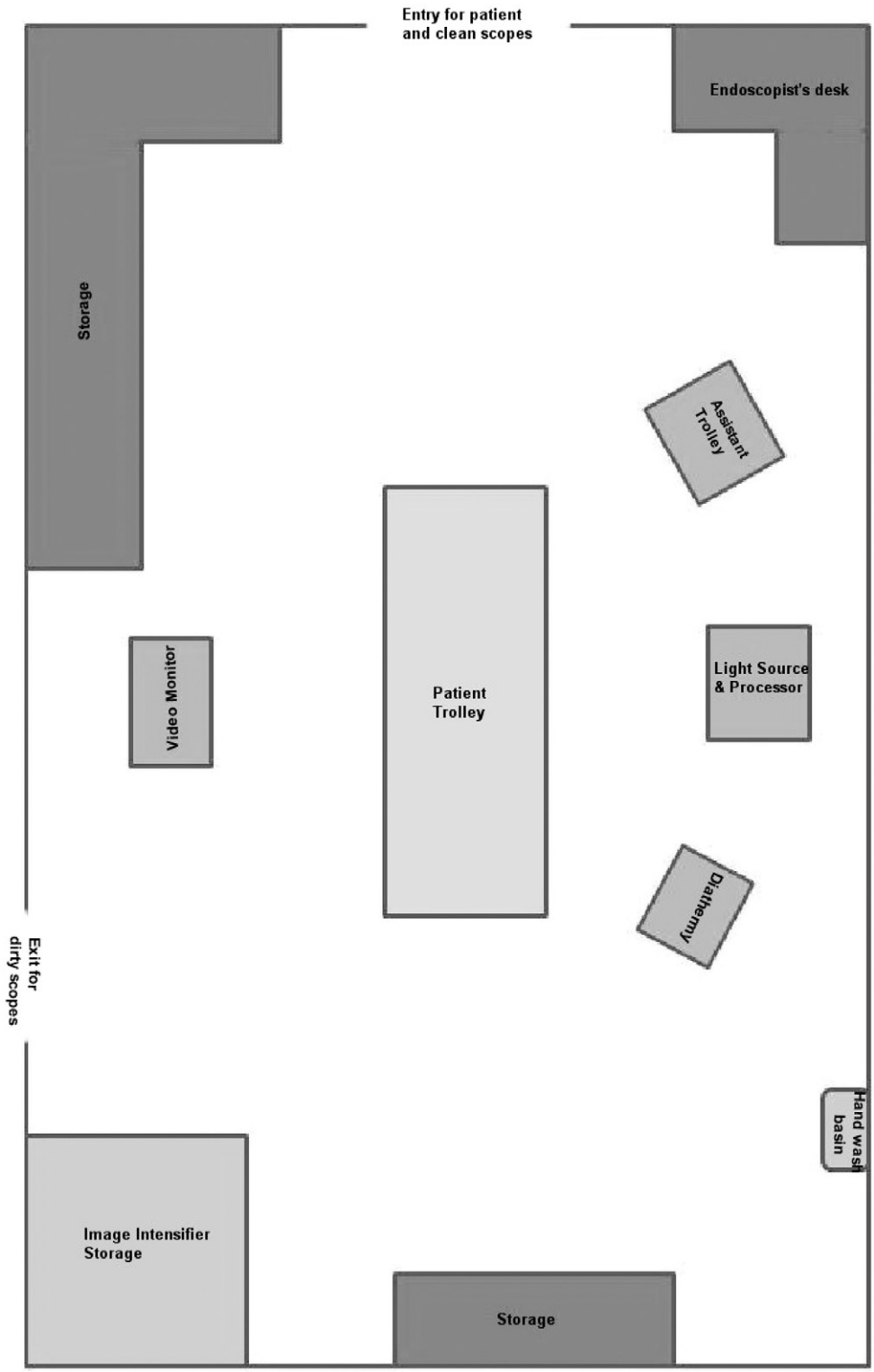

Figure 6 Sample layout of endoscopy room.

rupted views of the procedure. The room should be laid out into two main areas, the endoscopist area and the assistant area, to allow ergonomic planning of the facilities required by each. A sample drawing for such a room is shown in Figure 6.

The endoscopist area should include clinical hand-wash facilities and a small office workstation where the endoscopist may sit to dictate, write or enter endoscopy results on a computer. Printer facilities for this should be available.

The assistant area should include a work surface with inset sink, and units for the storage of endoscope accessories, small quantities of clean and sterile supplies and drugs, including the temporary storage of controlled drugs. There should be direct access from the assistant area to the endoscope cleaning room to facilitate the reprocessing of endoscopic equipment, including the light source, processor, suction equipment, endoscope viewing monitor, video cassette recorder and printer, which may stand on trolleys or on wall-mounted shelves or in wall-mounted units. Other items of equipment should include appropriate monitoring equipment, such as a pulse oximeter, sphygmomanometer and ECG monitoring equipment. All rooms should be provided with piped oxygen and suction and adequate electrical socket outlets for ancillary equipment. Consideration should be given to providing appropriate services on ceiling-mounted pendants and to locating CCTV camera links to the seminar room so that view of appropriate activities is not obstructed. As for the nurse's perspective, we need to make their lives easier. The fewer wires and cables they have to deal with and the less equipment they have to move, the better they can focus on patient care.

Space planning inefficiencies in current units include: inadequate space in the intervention room, especially for fluoroscopic or other portable devices or carts. Planning for general anesthesia should focus on providing adequate space for anesthesia staff and equipment at the head of the bed and for storage of anesthesia equipment.

If an image intensifier is to be used, space must be allowed to maneuver and position the equipment. Storage areas for lead aprons worn by staff remaining with the patient during an X-ray procedure should be provided adjacent to screening rooms.

Natural daylight is appreciated by patients and staff and should be supplied directly by windows. If this is not possible, consideration should be given to the provision of 'borrowed' light, for example by means of windows across corridors. Patient privacy is of paramount importance and it may be necessary to install window blinds. Vertical-vane blinds can be adjusted to maintain privacy and still allow a good supply of natural light. Facilities to vary the light in the room should be available using dimmer switches.

The room should be adjacent to the first-stage recovery area to allow patients to be easily wheeled there on trolleys.

Endoscope cleaning room and storage

An endoscope cleaning room and storage area is required with a 'dirty' area where used equipment can be manually cleaned and tested and a separate 'clean' area where equipment can be disinfected and stored. These areas may be separated by 'pass through' endoscope equipment reprocessors.

If local policy elects, endoscope accessories may be sterilized and suction bottles may be automatically emptied, washed and disinfected; alternatively, these items may be returned to the sterile services department (SSD) for reprocessing. The 'dirty' area should be equipped with at least one double sink unit and a double drainer, a work surface and low-level cupboards for the storage of a working supply of consumables (such as enzymatic detergent). Clinical hand-washing facilities should also be provided.

A leak tester will be required to allow checking of endoscopes before reprocessing and sinks should be supplied with washing hoses to allow adequate rinsing. In the past, ultrasonic cleaners have been used for processing flexible endoscope accessories, but these are now considered to be ineffective and a potential source of contamination, with reusable accessories preferably cleaned and sterilized by the central SSD.

The 'clean' area of the endoscope cleaning room should contain the automatic endoscope reprocessors (AER), the number of which will be dictated by the number and throughput of rooms. The area should include storage areas for the decontamination solutions and appropriate personal protective equipment. This area should have negative pressure ventilation and fulfil the local health and safety ventilation requirements required for the specific decontamination solutions in use and adequate clinical hand-washing facilities. The clean area should be adjacent to the storage area for flexible endoscopes and reusable accessories. The use of purpose-designed drying cabinets should be considered for the storage of clean endoscopes.

The endoscope cleaning room 'dirty area' and 'clean' storage area should have separate direct access from the rooms, preventing cross-over of 'dirty' and 'clean' endoscopes. Clean and dirty utility rooms are ideally placed with easy access from both the preparation and recovery areas. The former being used for storage of i.v. fluids, and disposable items such as i.v. cannulae etc. The dirty utility area should be fitted with a sluice sink, a sink unit with drainer, a hand-wash basin, a work surface, cupboards and shelves.

RECOVERY AREAS

VARIOUS ARRANGEMENTS FOR patient recovery are currently in operation. We recommend a two-stage process where the first allows for close monitoring immediately post-procedure and the second, a less intensively supervised area allows patients to wait for their escorts and receive refreshment.

High-volume units using traditional sedation and analgesia work efficiently with one intake space/trolley per endoscopist and two recovery beds/trolleys per endoscopy room. The use of rapidly metabolized sedation agents (propofol etc.) can reduce the need for recovery space, but they may require larger procedure rooms. This approach might result in a more flexible use of post-procedure areas (waiting, recovery and transport area).

First-stage recovery area

In the first-stage recovery area, trolleys or reclining chairs are used in an individual curtained space where the curtains may be partially or fully closed or open. Each curtained space should be provided with service outlets, including oxygen and medical vacuum, a patient/staff call system, pulse oximetry monitoring and a chair suitable for use by an escort. This area should have easy access from the endoscopy room. The patient should be able to dress in privacy, when fit to do so, before moving to the second-stage recovery area.

Second-stage recovery area

The second-stage recovery area is a type of open lounge, furnished with informally arranged seating and occasional tables. Patients complete their recovery here and are prepared for discharge. Light refreshments and beverages should be available. Toilet facilities will be required and provision of low-level background music and/or a TV/video system may be considered. This area should be located close to the main entrance by which patients will leave after discharge.

A staff base is required, as a focal point, within the recovery areas. It should be located in a position capable of overseeing both the first-stage and second-stage recovery areas. Patients and escorts should be able to easily identify the staff base. Space is required for equipment associated with computer-related activities.

Each patient will receive discharge instructions and may be issued with prescribed drugs or medicines. A resuscitation trolley bay, with space for parking a resuscitation trolley (with defibrillator), a mobile suction unit and a cylinder of oxygen on a trolley, should be located adjacent to the recovery staff base and with easy access to all spaces used by patients.

A beverage bay where staff and/or escorts can prepare light refreshments and beverages should be provided en-suite to the recovery areas.

INTERVIEW ROOM

MOST CONFIDENTIAL DISCUSSIONS with patients, including taking informed consent for treatment, will occur in the patient preparation rooms. However, an interview room should be provided where extended interviews and counseling can take place in greater privacy. It should be located conveniently for use by patients and their escorts as they enter and leave the unit in order to facilitate easy access for pre- and post-procedure counseling.

OFFICE ACCOMMODATION

OFFICES SHOULD BE provided for the unit director and nurse manager, together with a clinical administration office for nurses and medical staff. These should have access to laboratory results and the internet, for updating clinical information. The clinical office should ideally be placed adjacent to the recovery area.

CALCULATING THE NUMBER OF ROOMS REQUIRED FOR A UNIT

THE WORKLOAD PER annum must be forecast locally, taking into account past and present workload and possible changes in future workload as a result of referral guidelines and possible screening programs. Allowance should be made for emergencies (30 min per list) and training lists, where the capacity will be reduced by approximately 40%. We suggest a volume calculator, as has been developed previously (Fig. 3).[3]

The capacity of one room will depend on the type of procedure carried out and can be estimated by applying the following calculations. Each type of procedure is allocated a unit of endoscopic time (15 min), according to its complexity, as shown in Table 1. Each unit should allow up to 10–15 min to allow for proper patient and equipment turnaround plus report writing. Assuming a sessional time of 3.5 h and allowance of two units per session for emergency work, the capacities per room are as shown in Table 2.

Assuming a 5-day working week (excluding emergencies) and allowing one session for staff training and maintenance, there would be a total of 108 units available per week for

Table 1 Type of procedure and time required

Procedure	Time required (min)
Upper GI	15
Colonoscopy	30
ERCP	45
Therapeutic procedures or EUS	45

ERCP, endoscopic retrograde cholangiopancreatography; EUS, endoscopic ultrasonography; GI, gastrointestinal.

Table 2 Capacity per room

	Service list (*n*)	Trainees list (*n*)
Upper GI	12	8
Colonoscopy	6	4
ERCP/Therapeutic	4	3

ERCP, endoscopic retrograde cholangiopancreatography; GI, gastrointestinal.

routine endoscopies. Working on a 48-week year, this equates to 5184 units per year. If half of the lists were designated for training, then the total capacity would be 4147 units per year.

For example, if the demand for the service was 3000 upper GI endoscopies, 5000 colonoscopies, 600 ERCP and 300 therapeutic/EUS endoscopies per annum and half of the lists were designated for training, then a total of four procedure rooms would be required. However, in practice at this time in the Netherlands, approximately one room per 1000 examinations on a yearly basis is in use in large teaching hospitals with ERCP, EUS endoscopies and emergencies. In India, some units do 3000 ERCP per room on a single room, working 6 days per week in two sessions of almost 10 h per day.

COMBINED USE WITH INTERNISTS, SURGEONS AND PEDIATRICIANS

AN ENDOSCOPY UNIT is often also used by surgeons, internists and pediatricians. A statutory level of competence ought to be demanded from the different specialists using the unit.

BUDGET

ENDOSCOPY UNITS HAVE developed rapidly since the early 1980s. The budget should be proportional to facilities in radiology departments and/or operating rooms.

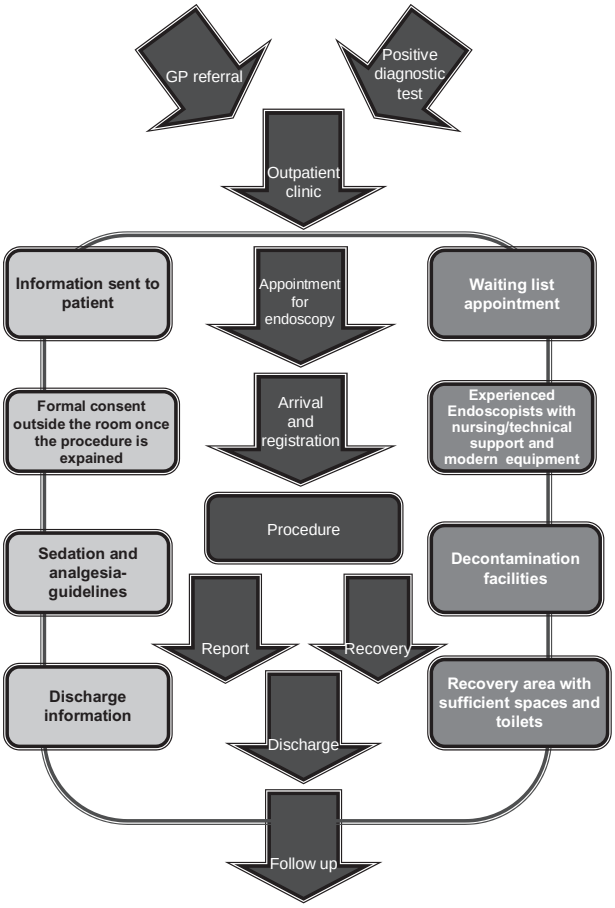

Figure 7 Endoscopic pathway.

The size of the budget should depend on the type of unit: basic units versus intervention endoscopy units. The budget for building new units should be based on standardized, present-day stipulations, and not based on remaining funds after other departments have been provided for. A specific equipment replacement program is important, as old equipment is less versatile and less reliable than modern equipment.

CONCLUSIONS

THE ENDOSCOPY SERVICE is a complex clinical pathway of care with multiple elements impacting on the efficiency and quality of the service. All these elements are essential when defining a new unit (Fig. 7).

Almost 25 years ago, the British Society of Gastroenterology (BSG) already recommended a minimum of three rooms for 3000 endoscopies per year.[8–10] This third room is mandatory for X-ray screenings such as ERCP, esophageal

stents and dilatations, or for flexibility in dealing with emergencies. Extra work in a so-called two-room unit interrupts the routine list. The amount of endoscopy teaching in the years to come both in public and private facilities will also have an impact on unit design.[4,10,11] A major deficiency in current endoscopy unit design is our failure to predict the growth in volume and the potential expansion of services over 5–10 years. The rapidly increasing volume and complexity of services demanded causes a strain on endoscopic facilities, design and unit management. The most difficult issue in designing an endoscopy unit lies in estimating its space requirement in 10 years time. The potential expansion of services requires an allowance for the construction of a unit that can either accommodate growth or expand into adjacent space.

Hospital-based endoscopy is less efficient and requires more space than practice in an ambulatory setting. This is due to the mix of inpatients, outpatients and time slots for emergency patients. Mobile units have been launched in India and are a promising development that could be of great value in remote areas of Australia, Africa, China, Brazil, Russia etc.[5,6,11] This article sets out some recommendations for the planning of a modern unit. In formulating these guidelines, the comfort and safety of patients are given priority.[12,13]

CONFLICT OF INTERESTS

AUTHORS DECLARE NO conflict of interests for this article.

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