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GUIDELINES

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Recommendations on minimal requirements for Intensive Care Departments

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Introduction

The objectives of an Intensive Care Department (ICD) are the monitoring and support of failing vital functions in critically ill patients, in order to perform adequate diagnostic measures and medical and/or surgical therapies to improve outcome. Successful intensive care medicine depends on a meticulous interaction between human, technological and spatial resources.

The purpose of the following recommendations is to provide a guide for those who are planning a new department or to adapt an existing one. It should, however, be clear that most of the recommendations are not based on scientifically well documented evidence but rather express the consensus of a group of opinion leaders (see Task Force members) involved in intensive care medicine. As such, the recommendations represent a European average, and adaptations on local situations may be necessary. Many existing ICDs may be unable to comply with some recommendations because of structural and other constraints.

The recommendations are presented here as a condensed list of items and are described in more detail in a booklet "Minimal Requirements for Intensive Care Departments". It is available at the ESICM secretariat.

Levels of care

Human, technological and spatial resources are dependent on the level of care (LOC). In order to solve this problem, the members of the Task Force scored the necessity of an item according to three levels of care (Table 1) depending on the nurse/patient ratio.

Table 1

Level of care	Nurse/patient ratio	Approximate number of full-time equivalents to run 1 ICD bed
III (highest)	1/1	6
II	1/1.6	4
I (lowest)	1/3	2

The need for nurse manpower can be calculated taking into account : the number of shifts per day, the number of beds in the unit, the number of days the unit is operating per week, the desired occupancy rate, extra manpower for holidays, illness and level of care, and the number of days that each professional is working per week. The reader is referred to the ESICM report on "Management of Intensive Care : guidelines for better use of resources" by D. Reis Miranda, A. Williams and Ph. Loirat, published by Kluwer Academic Publishers (1990).

Different LOCs may be present in the same ICD. According to the LOC, each item is scored with either
E = Essential
D = Desirable
O = Optional
– = Not required

Intensive Care Medicine is in constant evolution. Periodic revisions of these recommendations will be necessary.

Minimal requirements for intensive care departments

Level of care	III	II	I
Operational guidelines			
I. Intensive Care Department			
The intensive care department represents a distinct organisational and geographic entity with specific characteristics in the hospital (medical, nursing, paramedical, technical, geographic environment)	E	E	E
II. Functional criteria			
II.1. Multidisciplinary approach			
Besides the 24 h coverage of the medical staff of the ICU, the following physicians should be on call and available:			
1. Anaesthesiologist	E	E	E
2. General surgeon	E	E	E
3. Neurosurgeon	E	E	O
4. Cardiovascular surgeon	E	D	O
5. Thoracic surgeon	E	D	O
6. Infectious disease specialist/ microbiologist	E	E	D
7. Cardiologist	E	E	D
8. Gastroenterologist (emergency endoscopies)	E	E	D
9. Nephrologist	E	D	O
10. (Neuro)Radiologist	E	E	D
11. Trauma surgeon	E	E	D
12. Neurologist	E	E	D
13. Urologic surgeon	D	D	O
14. Obstetric-gynaecologic surgeon	D	D	O
15. Respiratory disease specialist	D	D	O
16. Hematologist	D	D	O
17. Pathologist	O	O	O
18. Orthopaedic surgeon	E	D	O
II.2. The size of the functional unit in the ICD			
is minimally 6 beds	D	D	D
and maximally 8 beds	D	D	O
II.3. The ICD medical staff			
II.3.1. A Director of the ICD is appointed.	E	E	E
This Director of the ICD is a physician who			
1. is qualified in intensive care medicine and his own speciality (anaesthesiology, surgery, internal medicine and paediatrics) (except Spain)*	E	E	E
2. is able to give clinical, administrative and educational direction to the ICD	E	E	E
3. is regularly involved in the care of patients in the department	E	E	E
4. has the administrative task of unit management including diagnostic and therapeutic protocols	E	E	E
5. has final responsibility for the quality, safety and appropriateness of care in the department	E	E	E
6. is knowledgeable about developments in intensive care medicine	E	E	E
7. participates in the continuing training in intensive care medicine in teaching hospitals	E	E	E
8. cannot occupy other top level medical directorships and spends 75 % of his/her clinical activity in the ICD	E	E	D
9. has the ability to review the appropriate use of ICD resources in the hospital	E	E	D
10. is available to the ICD 24 h a day, 7 days a week for administrative and clinical problems (or provides an equally qualified alternative)	E	E	E
II.3.2. Medical staff members are physicians			
1. qualified for intensive care medicine and their own speciality of either anaesthesia, surgery, internal medicine or paediatrics (except Spain)*	E	E	D
2. number of physicians available per functional unit of 6–8 beds	5	4	3
3. with responsibility concerning			
3.1. state-of-the-art treatment of the critically ill patient in a 24 h in-house coverage** system	E	E	D
3.2. admission and discharge criteria	E	E	E
3.3. patient care including at least two clinical rounds a day	E	E	E

Level of care	III	II	I
3.4. immediate availability and rotation in a continuous on-call system	E	E	E

* In Spain a specific training in intensive care medicine exists without the requirements of a primary speciality.

** These requirements may be fulfilled by senior residents capable of handling emergency situations provided that an attending physician is on call and available within 20 min.

II.4. Nursing staff			
1. A head nurse for the ICD is appointed with authority and responsibility for the appropriateness of nursing care and has	E	E	E
– extensive experience in intensive care nursing	E	E	E
– previous management experience	E	E	D
The head nurse is prepared to participate			
– in the training of unit staff	E	E	E
– in continuing education	E	E	E
– in research activity	E	D	D
2. Nursing staff			
The intensive care nurse is additionally trained in intensive care nursing.	E	E	D
Nurse/patient ratio	1/1	1/1.6	1/3
Number of nurse full-time equivalents needed to run one bed	6	4	2
The workload per ICU nurse does not exceed 40–50 TISS points [12, 13]			
They must participate in continuing training	E	E	E
II.5. Physiotherapist: a dedicated physiotherapist available per 12 beds	E	E	D
II.6. Technician: available on 24 h basis	E	D	D
II.7. Radiology technicians: available around the clock	E	E	E
II.8. Dietician: available during working hours	D	D	D
II.9. Medical secretary: one medical secretary/12 beds	E	E	E
II.10. Cleaning personnel – familiar with ICU environment and infection-prevention protocols	E	E	E

Design recommendations

I. Planning team	E	E	E
Director of ICD	E	E	E
Head nurse	E	E	E
Architect	E	E	E
Administrator	E	E	E
Engineer	E	E	E
Safety officer	E	E	E
Hospital infection specialist	E	E	D
Representatives of referring departments	D	D	D
II. Floor plan + communications			
Distinct entity	E	E	E
Controlled access	E	E	E
Separate public and professional/ supply traffic	E	E	D
No through traffic	E	E	E
Priority horizontal access from:			
– Emergency Department	E	E	D
– Operating Theatre	E	E	E
– Recovery Room	E	E	D
– Laboratory	D	D	O
– Functional testing facilities	D	D	O
Size:			
Department at least 6 beds	E	E	D
Functional subunits of 6–8 beds	D	D	O
2.5–3 times surface of specific patient care area	E	D	D
III. Accommodation			
III.1. Patient area			
– minimum space adult cubicle			
– 25 m^2/bed single room	E	E	D
– 20 m^2/bed common room	E	E	D
– rectangular floor plan	E	E	E
– 2.5 m traffic area beyond working area	E	E	D
– wide doorways (bed passage)	E	E	E
– isolation rooms: to common rooms ratio			

Level of care	III	II	I
– 1–2/10	E	E	D
5–6/10	D	O	–
equipped with anteroom of 2.5 m^2	E	D	O
– daylight source per cubicle	E	E	E
III.1.1. Management functions in patient room/area			
a. Communication			
telephone hospital	E	E	E
telephone external	E	E	E
intercom	E	E	D
emergency code alarm system	E	E	D
clock + calendar	E	E	E
b. Administrative equipment			
flow sheet charting surface	E	E	E
shelves (files, X-rays)	E	E	E
c. Negatoscope	E	E	E
d. Storage: lockable cupboard (medication, …)	E	E	E
e. Separate pass through cupboard clean/dirty material	E	E	D
III.1.2. Visual observation of the patient			
Patient line of vision			
– nurse	E	E	E
– external window	D	D	D
III.1.3. Services per patient area			
III.1.3.1. Bedside layout			
– priority of access to head and neck of patient	E	E	E
– sockets and service outlets with minimal hindrance to nursing care	E	E	E
III.1.3.2. Electric power source per bed			
– 16–20 grounded sockets (minimal 12 for LOC I)	E	E	D
– 1 grounded socket for radiology equipment per 2 beds	E	E	E
III.1.3.3. Vacuum per bed			
– 3 outlets	D	D	O
– 2 outlets	E	E	D
III.1.3.4. Oxygen per bed			
– 4 outlets	D	D	–
– 3 outlets	E	E	D
– manual ventilation system and airway maintenance material	E	E	E
	E	E	D

Level of care	III	II	I
III.1.3.5. Compressed air per bed			
– 3 outlets	E	D	O
– 2 outlets		E	D
III.1.3.6. Tubing for facultative gas (e.g. NO)	D	D	–
III.1.3.7. Water supply			
2 sinks in each room	E	E	E
Hand disinfection facility per bed	E	E	E
Elbow/foot operated faucets	E	E	E
Hand-drying facility (disposable paper towels)	E	E	E
Self-sterilising heated traps	D	D	O
III.1.3.8. Radio and TV socket	D	D	D
III.1.3.9. Monitoring and computer equipment in patient areas			
III.1.3.9.1. Monitoring			
– modular systems	E	E	E
– uniformity with OR, ED	D	D	D
– trending capability	E	E	D
– visible and audible alarms	E	E	E
– unobstructed comfortable viewing	E	E	E
– simultaneous display 4-wave forms and selectable digital values for			
1. EKG	E	E	E
2. arterial pressure	E	E	E
3. central venous pressure	E	E	E
4. multiple purpose pressure channel (intracranial pressure, Swan-Ganz …)	E	D	O
5. temperature (central/cutaneous)	E	E	E
6. pulse oxymetry	E	E	E
7. continuous monitoring of ventilation	E	E	D
8. pressure control endotracheal cuff	E	E	E
9. non-invasive arterial pressure monitoring	E	E	E
10. cardiac output and derived values	E	E	O
11. alarm recording and hard copy	E	E	D
Additional monitoring			
1. oxymetry of inspired gases	E	E	D
2. pulmonary function	D	D	O
3. mixed venous saturation	D	D	O
4. arrhythmia detection	D	D	O

Level of care	III	II	I
5. electronic urine output measurement	O	O	O
6. ST-T analysis	D	D	D
7. patient-weighing systems	E	E	D
8. indirect calorimetry	O	O	O
III.1.3.9.2. Computer systems at bedside			
1. trend analysis of on-line measured parameters	D	D	O
2. calculation of derived values	D	D	O
3. hard copy of visual display and trends	D	D	O
4. automatic reports of all directly measured and calculated parameters	D	D	O
5. communication with laboratory and diagnostic departments	D	D	D
6. drug dosage, adverse effects information	D	D	D
7. stock management of drugs, disposables	D	D	D
8. charging therapeutic acts	D	D	O
9. printing of laboratory labels	O	O	O
10. analysis and report of patient acuity data	O	O	O
III.2. Central nursing station			
A spacious and commodious area containing	E	E	E
1. shelves for forms/library	E	E	E
2. satellite pharmacy (lockable drawers)	E	E	E
3. computer terminals	E	E	D
4. telephone, intercom and emergency call system	E	E	E
5. satellite storage sterile/ non-sterile material	D	D	D
6. drug preparation area	D	D	D
7. visual display for incoming patient monitoring signals and alarm recording	E	E	D
8. air-conditioning, adequate lighting, clock, hand basin	E	E	E
III.3. Storage			
– maximum 30 m distance from patient area	E	E	E
– separate entries from patient area and supply route	D	D	D
III.3.1. Storage for consumables (5 m^2/bed)	E	E	D
III.3.2. Storage for durable equipment (5 m^2/bed)	E	E	D
III.3.3. Storage for emergency and transport equipment	E	E	E
– case for emergency drugs and transport of IC patients (1 per 6 patients)	E	E	E
– transport monitoring (EKG invasive, non-invasive blood pressure monitor, pulse oxymetry, respiration monitoring) transport ventilator, suction unit mounted on bed-attachable trolley	E	E	D
– defibrillator, adult/paediatric paddles, rechargeable battery, display, recorder	E	E	E
– pacemakers	E	E	D
– emergency trolley (extended drug and resuscitation equipment 1/8 beds)	E	E	E
– transportable radiological apparatus	E	E	D
III.4. Utility			
Clean utility room (15 m^2)	E	E	E
Dirty utility room (25 m^2) with separate way out	E	E	E
III.5. Nurses' office (15 m^2)			
– clerical space	E	E	E
– telephone, intercom, notice boards, alarm system bedside calls	E	E	E
III.6. Medical office (20 m^2)			
– one per full time ICU physician	E	E	E
– telephone-intercom-alarm registration	E	E	E
– computer terminal (access to patient monitoring data, laboratory and diagnostic departments)	D	D	D
III.7. Secretariat (20 m^2/8 ICU beds)	E	E	D
III.8. Staff lounge (24 m^2/8 ICU beds)	E	E	E
Separate room (spacious, private)			
– locker room, changing room	E	E	E
– toilets M & F	E	E	E
– showers	E	E	E
– telephone, intercom, emergency code alarm system	E	E	D

Level of care	III	II	I
III.9. Physician's bedroom			
(15 m^2/8 ICU beds	E	E	D
– adjacent to unit	E	E	E
– telephone, alarm code system, television	E	E	E
– toilet/shower	E	E	E
III.10. Laboratory (15 m^2)			
– *emergency* laboratory located in ICD	E	E	O
– refrigerator	E	E	E
– telephone intercom	E	E	D
– bench space and 12 electrical points	E	E	D
III.11. Technical workshop (28 m^2)	E	E	D
III.12. Kitchen (25 m^2)	D	D	D
III.13. Reception area and relatives' rooms	E	E	D
15 m^2/8 ICU beds or 1.5–2 chairs/bed	D	D	D
2 × 10 m^2/8 ICU beds – bed + shower	O	O	–
Toilet facilities	E	E	D
III.14. Receptionist's office (10 m^2)	E	E	D
Position with access control to unit	E	D	O
Separate professional and visitor entrance	E	E	O
Telephone, intercom	E	E	D
III.15. Special procedures room/therapy room (35 m^2)	D	D	O
Meets patient room standards	E	E	E
High intensity lighting	E	D	O
Scrub up	E	E	E
III.16. Seminar/conference room (40 m^2)	E	E	D
Audio-visual equipment	E	E	D
Classroom arrangement	D	D	O
Telephone-intercom-alarm code signal	E	E	D
III.17. Computer room (20 m^2)	D	D	O
III.18. Cleaners' room (3–4 m^2/8 beds)	E	E	E
Water supply and disposal sink	E	E	E
Shelves	E	E	E
III.19. Interview room (15 m^2)	D	D	D

Level of care	III	II	I
III.20. Corridors and elevators			
Separated patient, professional and public corridors	D	D	O
Oversized elevators	E	E	E
III.21. Floor coverings			
Seamless, semi-conductant, chemically inert	E	E	E
III.22. Wall decoration and ceiling			
Easy to clean, low sound transmission	E	E	E
Neutral restful colours	E	E	E
IV. Fire Safety			
IV.1. General: annual practice of an emergency safety plan	E	E	E
IV.2. Floor plan on display: showing exits, fire hoses, control panels services hazard areas	E	E	E
V. Central services			
Control switches, shut-off valves and monitoring located adjacent to ICD	E	E	E
V.1. Electricity			
Patient areas and computers served by standby power source	E	E	E
V.2. Vacuum – capable of developing – 500 mm Hg (adjusted to local standards)	E	E	E
V.3. Medical oxygen at 5 bar (adjusted to local standards)	E	E	E
V.4. Medical compressed air at 5 bar (adjusted to local standards)	E	E	E
V.5. Ventilation/heating			
Air conditioning/heating in all rooms	E	E	E
Humidity 30–60 %	E	E	E
V.6. Water supply and plumbing			
Two sinks at entry of each patient care area	E	E	D
Elbow/foot activated mixing taps	E	E	E
Self-sealing dialysis trap per patient area	D	D	D

Level of care	III	II	I
Separated public and staff toilet facilities	E	E	E
V.7. Lighting			
General illumination 150 foot-candles	E	E	E
Night illumination 20–100 foot-candles	E	E	E
VI. Communications			
VI.1. Telephone			
– two external lines/8 beds	E	E	E
– in-hospital line in each patient area	E	E	E
– in-hospital line in each architectural entity	E	E	E
– secretariat 2 internal/1 external line	E	E	E
– emergency phone bypassing hospital switchboard	E	D	D
VI.2. Intercom			
– all ICD rooms	E	D	D
– with key departments (blood bank, pharmacy)	D	D	D
VI.3. Alarm call			
– alarm call button per bed	E	E	E
– alarm call signal in nursing station, staff lounge, conference room, physician bedroom	E	E	E
– alarm call signal on staff location system	E	E	E
VI.4. Local communication with isolation rooms	D	D	O
VI.5. Nurse call system per bed	E	E	E
VI.6. Personal call systems			
Medical staff	E	E	E
Head nurse	E	E	E
Physiotherapist	D	O	O
Technician	D	D	D
Referring physician	D	D	D
VII. Management of equipment			
VII.1. Consumables: Stock control	E	E	E
VII.2. Durable equipment			
VII.2.1. Continuous updated selection policy	E	E	D
VII.2.2. Lockable storage facilities	E	E	E
Only serviced items available	E	E	E
VII.2.3. Equipment log cards	E	E	E
VII.2.4. Sterilisation in central hospital service	D	D	D
Disinfection of endoscopic material in ICD	D	D	D

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