

ERS TASK FORCE

Respiratory intermediate care units: a European survey

European Respiratory Society Task Force on epidemiology of respiratory intermediate care in Europe

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Severe chronic obstructive pulmonary disease (COPD) patients, especially those with chronic respiratory failure, may frequently require periods of intensive treatment, monitoring, nursing and, occasionally, ventilatory assistance in order to overcome acute exacerbations. Ventilatory assistance is only rarely provided in the conventional ward [1], therefore admission to an intensive care unit (ICU) is often needed [2]. ICU, however, are very precious and expensive resources where nursing costs represent a major expense [3]. Patients with acute on chronic respiratory failure may experience a prolonged stay in the ICU not only because of the severity of their illness which precipitates the underlying acute respiratory failure (ARF) [2], but also because of ICU-related complications [4]. For these reasons the treatment of acute on chronically ill patients in these areas creates ethical [5] and economic concerns [6, 7].

It has been reported that ~40% of the patients admitted to ICUs never received active intensive care, including mechanical ventilation [8–10]. Only ~40% of patients with ARF due to pulmonary disease needed to be invasively ventilated [11, 12]. However, in some

countries, such as the UK, with a severe ICU bed shortage, the vast majority of ICU admissions require mechanical ventilation.

A recent Italian survey carried out on 99 ICUs showed that COPD was the dominant underlying chronic disease in patients admitted to the Italian ICU, and the need for cardiorespiratory monitoring was the most frequent indication for admission (31.2%) [13].

These studies clearly indicate that in some centres there is an "overutilisation" of ICU resources for monitoring purposes, and that acute on chronic respiratory failure could be managed in many patients without invasive ventilation.

Patients with chronic respiratory failure, especially those with underlying COPD, very often suffer from a high frequency of acute exacerbations, which, when requiring invasive mechanical ventilation, may be associated with life-threatening complications [4]. Furthermore, it has been reported that in COPD patients with ARF the greater part of their ICU stay was devoted to weaning the patient from mechanical ventilation, and this weaning period accounted for 59% of the total duration of mechanical ventilation [14].

All the above considerations can be cited to justify the increased number of specialised respiratory intermediate care units (RICU) in the USA [15–18]. The direct and indirect economic advantages of these settings compared to the traditional ICU have been reported previously. The advantages are linked to lower nursing staff requirements [18] and to the better utilisation of the ICU through the appropriate admission of patients who really need intensive treatment [19]. Conversely, the discharge from the ICU to RICU becomes possible in chronic patients who have recovered from the most acute phase of the critical illness, but still require intensive nursing or physiotherapy, before they can be weaned from the ventilator [20].

Besides the economical factors, there are other advantages which favour the RICU as a care site for these patients. Unlike the ICU, the RICU offers greater privacy and easier visitor access for the patients. This may contribute to the "healing" process and may help facilitate the discharge from hospital, especially for those patients who require long-term oxygen therapy and/or home ventilatory support [21, 22].

While North American pneumologists embrace intensive respiratory care within their specialty, in many European countries specialists in respiratory medicine have no, or only a marginal, role in the treatment of severe ARF due to pulmonary and thoracic insufficiency, even though these conditions fall within their field of specialisation [23]. Despite this situation, in Europe there are several RICUs headed by pneumologists [22], which are specifically devoted to the treatment and monitoring of acute on chronic respiratory insufficiency. The organisational models and resources utilised differ between countries and frequently within individual countries [24–29].

The Intensive Care Assembly of the European Respiratory Society has formed a Task Force (TF) "Epidemiology of Respiratory Intermediate Care in Europe" for the purpose of evaluating the exact distribution, organisation and levels of service provision in respiratory units which treat or monitor patients with severe ARF in Europe.

Methods

The aim of this survey, conducted from November 1999 to January 2000, was to collect data on all the respiratory units within Europe by means of a questionnaire. Although the initial goal was to obtain a census of respiratory units in as many European countries as possible, for organisational reasons, such as the lack of contacts able to provide data in certain countries, the census mainly concerned European Community countries, Turkey and Norway.

The questionnaire was located on the website devoted to the TF [30] and was sent by e-mail to the members of TF of the following European Countries: Belgium, Denmark, France, Germany, Greece, Iceland, Italy, Spain, Sweden, Turkey, and the UK. Each member of the TF was a guarantor of the survey in their own country. Data from Austria, the Netherlands, Finland, Norway and Portugal were collected by TF members from Germany, Belgium, Sweden and Spain. Each member of the TF, upon their own knowledge of the health system of their own country and/or of the countries assigned to them, sent a questionnaire to the pneumology and emergency departments, and general ICUs which, in their opinion, were potentially able to have a respiratory unit. When no reply was received, a telephone reminder was made until the data relative to all the questionnaires sent were obtained.

The questionnaire is shown in the appendix and included 59 items. Two months were allowed for questionnaire completion and data collection. Any point of ambiguity was clarified by e-mail and phone survey. In order to enter the requested data, each centre to whom the questionnaire was sent and each TF member accessed the website by means of specific passwords.

The criteria reported in table 1 were adopted in order to define an RICU. Furthermore, in order to evaluate all the levels of care currently existing in Europe, the following criteria were used: staffing, equipment, admission criteria, and type of mechanical ventilation employed. Thus, three levels of care were

Table 1. – Criteria adopted by the components of Task Force in order to define a respiratory intermediate care unit

Criteria for admission	Type of intervention and equipment	Staffing
Single organ failure (respiratory failure)	Noninvasive mechanical ventilation	A minimum of one nurse to four patients (throughout 24 h)
Acute respiratory failure requiring monitoring (but not necessarily mechanical ventilation)	Availability of life support ventilators Conventional mechanical ventilation by an artificial airway should be provided when necessary and the patient should be transferred to the ICU	Doctor immediately available 24 h·day ⁻¹ with the same profile as the senior doctor
Tracheostomy ventilated patients coming from ICU (post-acute or weaning)	Minimum monitoring required (Oximetry, ECG, noninvasive blood pressure, respiratory rate) for each bed	Unit under supervision of at least one senior doctor (with training in pneumology and in noninvasive and invasive mechanical ventilation) Availability of respiratory physiotherapist

ICU: intensive care unit; ECG: electrocardiogram.

Table 2. – Definition of the three levels of care

	Respiratory ICU	RICU	RMU
Major Criteria			
Nurse:patient ratio per shift	>1:3	1:3 or 1:4	<1:4
Bed equipment	Polyfunctional monitors [#] Life support ventilators	Polyfunctional monitors [#] Mechanical ventilators (for NIV, with availability of life support ventilators)	Polyfunctional monitors [#] Mechanical ventilators (for NIV)
Treatment	Lung or more than one organ failure	Lung failure (one organ failure)	Lung failure (one organ failure)
Attending physician	24 h	Immediately available 24 h	On call (within the hospital)
Mechanical ventilation	Invasive and noninvasive when needed	Noninvasive and invasive when needed	Noninvasive when needed
Minor criteria			
Bronchoscopy	Inside unit	Inside unit	Inside or outside unit
ABGA	Inside unit	Inside unit	Inside or outside unit

ICU: intensive care unit; RICU: respiratory intermediate care unit; RMU: respiratory monitoring unit; NIV: Noninvasive mechanical ventilation; ABGA: arterial blood gas analyser. [#]: Oximetry, electrocardiogram, noninvasive blood pressure, respiratory rate. All major criteria and at least one of the minor must be satisfied to include a unit in this level.

identified: the respiratory ICU, the RICU and the respiratory monitoring unit (table 2). In order to better understand the level of care provided by each unit, these were classified as either independent wards or as wards inside other wards. In the first case, the unit was run by a devoted, specialised physician and staffed with nurses and doctors specifically assigned to the unit; in the second case, the unit shared its personnel with the unit in which it was located.

Results

The data of the census were collected from November 1999 to January 2000. Seventy-eight questionnaires were returned from the following countries: Italy (26; 33.3%), Germany (21; 26.9%), France (11; 14.1%), Turkey (9; 11.5%), UK (8; 10.2%), Spain (2; 2.6%), and Austria (1; 1.3%). In the other countries where the census was also carried out (Belgium, the Netherlands, Norway, Finland, Greece, Iceland, Portugal and Sweden) there were no respiratory units. Data from Denmark were missing. From the 78 questionnaires received, the following information was obtained: 1) type of hospital where the units were located (university hospitals 39.5%, university-affiliated hospitals 22.4%, community hospitals 25%, rehabilitation centres 6.6%, other hospitals 6.6%); and 2) number of beds devoted to the treatment and monitoring of critically ill patients with respiratory disorders.

From a total of 4,886 pneumology beds in the hospitals where these units were located, 472 beds were devoted to the treatment and monitoring of critically ill patients. The number of pneumology beds was underestimated because 10 units did not provide this data.

Among the 78 questionnaires received, 10 (12.8%) were discarded because critical information was missing and they could not be correctly classified according to the criteria adopted in tables 1 and 2. Consequently, the 68 units which provided sufficient information were included in the analysis.

Geographical distribution and type of units

The distribution of units in each country is reported in table 3. Whereas these units were lacking in seven countries, the majority of them were present in Italy, Germany and France, followed by the UK, Turkey, Spain and Austria.

According to the three levels of care, 12 units were classified as respiratory ICUs, with Italy and France sharing the highest rate; three units acted as a general ICU in their hospital. Forty-two units were classified as RICUs, with Germany and Italy being the leading countries; 14 units were classified as respiratory monitoring units, mainly located in Italy. The total number of beds for respiratory units in each country is reported in table 3 and the median number of beds in each unit, according to the three levels of care, is shown in table 4.

Location

Among the 68 units included in the present analysis, 17 were independent wards, 48 were located inside other wards (40 in the pneumology ward, six in the general ICU, two in the emergency area), and three did not provide this information. The location of the three different levels of care is shown in figure 1.

Type of intervention according to different levels of care

The data received from 11 units was incomplete, and consequently 57 units were included for the analysis. The prevalence of mechanical ventilation and monitoring in these units during 1999 is shown in figure 2.

In respiratory ICUs, invasive mechanical ventilation was performed in the majority of cases (58%), whereas 23% of patients underwent noninvasive mechanical ventilation (NIV) and only 19% needed

Table 3. – Distribution of 68 respiratory units according to the three levels of care

Country	Respiratory ICU	RICU	RMU	Total units n	Total beds n
Italy	4 (33.3)	13 (30.9)	7 (50)	24	124
Germany	1 (8.3)	15 (35.7)	2 (14.3)	18	147
France	4 (33.3)	5 (11.9)	0	9	93
Turkey	1 (8.3)	4 (9.5)	2 (14.3)	7	33
UK	1 (8.3)	3 (7.1)	3 (21.4)	7	58
Spain	1 (8.3)	1 (2.4)	0	2	11
Austria	0	1 (2.4)	0	1	6
Belgium	0	0	0	0	0
Denmark					
The Netherlands	0	0	0	0	0
Norway	0	0	0	0	0
Finland	0	0	0	0	0
Greece	0	0	0	0	0
Iceland	0	0	0	0	0
Portugal	0	0	0	0	0
Sweden	0	0	0	0	0
Total	12	42	14	68	472

Data are presented as n or n (%). ICU: intensive care unit. RICU: respiratory intermediate care unit; RMU: respiratory monitoring unit.

monitoring. In the intermediate unit, the three types of intervention ranged from 31%, for invasive mechanical ventilation, to 37% for monitoring only; NIV was performed in 32% of patients. In the monitoring unit, the majority of interventions were NIV (52%), or monitoring only (35%), whereas invasive mechanical ventilation was performed only in tracheostomised patients (12%), chronically dependent on mechanical ventilation.

Patient population and infective complications

During 1999 the total number of patients admitted to the 55 units which provided the requested data was 11,890; 3,123 in intensive units, 6,276 in intermediate

units, and 2,491 in monitoring units. Among these, 34 units, which admitted 6,803 patients, reported a rate of nosocomial pneumonia of 8%. The reported rate of

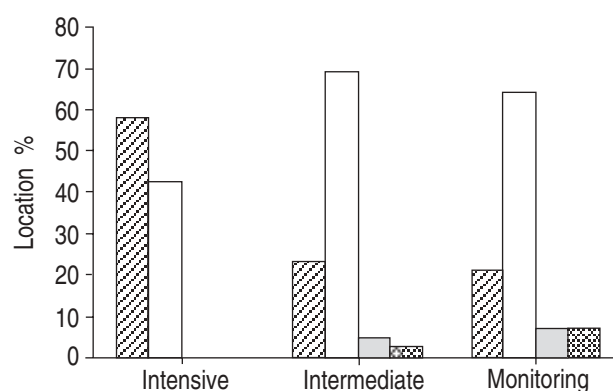


Fig. 1. – Location of the three different levels of care. ▨: independent ward; □: inside pneumology ward; ■: inside general intensive care unit; ■: inside emergency area.

Table 4. – Median of beds in each unit according to the three levels of care

Country	Respiratory ICU	RICU	RMU
Italy	6 (4–8)	4 (4–9)	4 (2–10)
Germany	17	8 (2–11)	11 (6–16)
France	11 (10–18)	10 (4–11)	0
Turkey	6	4 (3–6)	5
UK	6	5 (4–10)	6 (4–23)
Spain	6	5	0
Austria	0	6	0
Belgium	0	0	0
Denmark	0	0	0
The Netherlands	0	0	0
Norway	0	0	0
Finland	0	0	0
Greece	0	0	0
Iceland	0	0	0
Portugal	0	0	0
Sweden	0	0	0
Total	7 (4–18)	6 (2–11)	6 (2–23)

Data are presented as n or n (range). ICU: intensive care unit; RICU: respiratory intermediate care unit; RMU: respiratory monitoring unit.

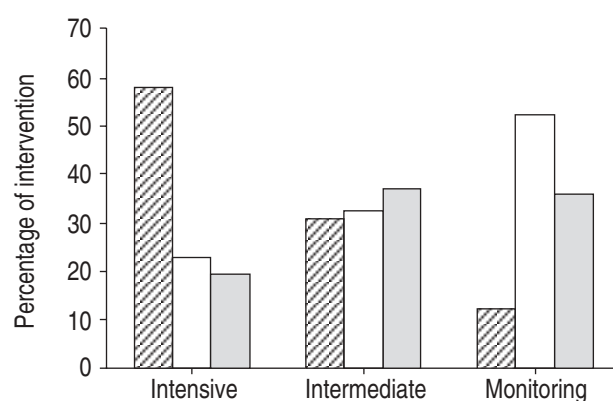


Fig. 2. – Type of intervention according to the three different levels of care. ▨: invasive mechanical ventilation; □: noninvasive mechanical ventilation; ■: monitoring.

nosocomial pneumonia in the three levels of care was 10%, 8%, and 5% in the intensive, intermediate, and monitoring units, respectively. *Pseudomonas* spp. and *Staphylococcus aureus* accounted for 39% and 29% of cases, respectively.

Discussion

To the authors' knowledge, few studies [22, 31] have been published on this topic before the present survey. These papers [22, 31] contain specific indications on technical equipment, location, architectural structure and staffing of the RICU. The report by NAVA et al. [22] on the European situation was based on a personal communication given by recognised authorities in some countries.

The data from this census show that, despite the lack of specific rules and a recognised specific training for pneumologists in intensive care, pneumologists run many respiratory care units offering different levels of care in Europe. However, the distribution of these units throughout Europe is markedly uneven. A possible explanation may be the different traditions for the treatment of patients with acute on chronic respiratory failure in specifically dedicated settings. Whereas in France and Italy at the end of the 1960s and at the beginning of the 1970s, the need for a close monitoring and intensive treatment in critically ill patients with acute on chronic respiratory failure, led to the opening of an ICU in some respiratory departments [26, 28], in other European countries, such as the UK and Spain, there has never been a similar tradition [24, 29].

In Italy, the European country with the highest number of respiratory units, the adoption of models such as the RICU, has been strongly conditioned by the Associazione Italiana Pneumologi Ospedalieri, the most representative association of respiratory medicine, through: 1) the promotion of cultural and educational activities which, despite the lack of laws on formal training in this sector, have stimulated the interest of pneumologists in the field of respiratory intensive care; and 2) an intensive campaign aimed at stimulating the awareness of administration and political bodies at local and regional level for the formal recognition of the role of the RICU within the organisation of the health system, despite the lack of relevant national laws.

Another important factor which has contributed to the opening of RICUs directed by pneumologists is the evidence that noninvasive ventilatory techniques are effective for the treatment of acute on chronic respiratory failure in COPD [32, 33]. More recently, some papers have suggested that NIV can be successfully used in other conditions, such as ARF in immunocompromised patients, pulmonary oedema and after bilateral lung transplantation [34–37]. The confirmation of such data through the use of NIV on a higher number of patients will widen the field of application of NIV and, consequently, create the need to implement RICUs.

Another important result of the census is that there are differently graded levels of care which are provided in these units. The majority of units were

classified as offering an intermediate level of care characterised by a nurse:patient ratio of at least 1:4, by the treatment of single organ failure and by the routine use of noninvasive monitoring and ventilatory techniques. Twenty-one per cent of the units were classified as monitoring units, with a lower nurse:patient ratio than intermediate (<1:4), and where invasive ventilation was restricted to a small number of tracheostomised patients. Eighteen per cent of the units were characterised by a nurse:patient ratio >1:3, by the ability to treat multiple organ failure and by the frequent use of invasive ventilatory techniques. These were classified as ICUs (among these, three acted as a general ICU in their hospital).

These data should represent the starting point in characterising the different patterns of care in the field of respiratory medicine. The monitoring unit may be situated in a pneumology ward in hospitals for acute patients, in which the availability of a general ICU is mandatory in order to manage patients needing invasive ventilation and/or monitoring. These units should be able to act as a step-up unit for the treatment of acute on chronic respiratory failure with noninvasive ventilation, and as step-down unit for patients discharged from the general ICU who require a further period of monitoring.

The RICU should be functionally integrated with the emergency room, the general ICU and the medical or other wards. These units should be characterised by a higher autonomy than the monitoring units because of the higher level of care, equipment and expertise in the management of the artificial airways by the medical staff. Consequently, patients with acute on chronic respiratory failure of any degree of severity should be admitted to these units with the exception of those who are already intubated. Furthermore, critically ill patients with weaning problems could be admitted to the RICU, thereby freeing beds in the general ICU for a more appropriate use [38].

The highest level of care reported by the census (respiratory ICUs) partially corresponds, in terms of admission criteria, staffing and equipment, to the model of general ICU which is the most common in all European countries. In some cases (three of 12), these respiratory ICUs, directed by pneumologists, performed general ICU functions in their hospital. It is evident that, before European pneumologists can have a more comprehensive role in the conduction of the medical general ICU, alongside the currently prevailing professional positions (intensivists, anaesthesiologists), it will be necessary to change the process of education and training of the pneumologist in Europe to also include critical medicine, in line with the American system [39]. The European Respiratory Society and the European School of Respiratory Medicine should have a key role in the promotion and further enhancement of the training of the pneumologist. This upgrading of the pneumologists' training process in Europe represents an essential step towards the further development of the respiratory intermediate care and monitoring unit in Europe.

The strategic decision to offer different levels of care depends on the following: local epidemiology of chronic respiratory disorders, the organisational model

of the hospital, economic resources, and the level of training in the intensive care of chest physicians. The first point has been investigated recently by PLANT et al. [40] who found that in a typical UK general hospital serving a population of 250,000, 72 COPD patients each year were admitted needing NIV. This demand is probably an underestimate because the study included only patients with respiratory acidosis on admission and did not take into account those who deteriorated later. Also, patients other than COPD were not included [40].

A low rate of infective complications is expected in RICUs because of the low number of patients needing invasive mechanical ventilation [41]. The present survey shows that the rate of nosocomial pneumonia was ~8%, ranging from 5–10%, according to the level of care. However, these data were retrospectively collected and diagnostic criteria for nosocomial pneumonia were not defined. This information must therefore be interpreted with caution. Prospective studies are needed to address this issue.

A recent editorial [42], accompanying an analysis of advantages and disadvantages of intermediate care units, concluded with the recommendation to combine intensive and intermediate beds in a single unit instead of separating both, arguing that this is the current situation in many European ICUs. However, this assumption is not supported by epidemiological data, and is in conflict with recent guidelines published on the subject [43]. Although to the authors' knowledge there are no data regarding the intermediate care unit as a whole in Europe, the present survey shows that only 9% of RICUs are combined with a general ICU, whereas most of these units are located in pneumology wards (59%) or are independent units (25%).

Few data are available on the activities performed in such respiratory units. A recent three-month prospective cohort study carried out in 26 Italian RICUs examined the characteristics of 756 patients admitted during this period [44]. In the majority of cases, upon admission, ARF was caused by COPD exacerbation (60%). The reasons for admission were mechanical ventilation in 63% of cases, weaning in 8%, and monitoring only in 29% of cases; these data are in line with the present survey (fig. 2). The predicted mortality according to the Acute Physiology And Chronic Health Evaluation II score was 22% while the actual mortality rate was 16% [44]. This information suggests that in units with a lower level of care than a general ICU, it is possible to treat patients with acute on chronic respiratory failure successfully.

The method used to carry out this census could be criticised in that it is based on the personal knowledge of those responsible for the census in the countries concerned. This could have led to an underestimation of the respiratory units present in the countries where the census was carried out. However, this potential risk should have been minimised by the fact that those responsible for the census have a thorough knowledge of respiratory medicine in their respective countries.

The data from the present survey show a dynamic new reality in the field of respiratory medicine. On the basis of the results, there is a need to consider a significant increase in the number of respiratory

care units in Europe. To estimate the overall requirement and impact it is necessary to: 1) carry out a prospective cohort study in order to evaluate the characteristics of patients admitted, type of interventions and outcome; and 2) to perform a cost-benefit and cost-effectiveness analysis of respiratory intermediate care units.

Appendix: Items of the questionnaire

Name of institution

Full address
Nation
Public health system/Private system
Chief/Director
Local project leader
Phone/Fax
E-mail
Official acknowledgement of respiratory intermediate care unit
National health system/Regional health system/Other
Year in which the respiratory intermediate care unit became operative

Hospital characteristics

University hospital/University-affiliated hospital/Community hospital/Rehabilitation centre/Other
Number of hospital beds
Total number of pulmonology beds
Number of inhabitants in the area where the hospital is located
Catchment area: Local/Regional/National

Structural characteristics of the respiratory intermediate care unit

Number of beds
Number of rooms containing beds
Maximum of patients per room (n)
Minimum of patients per room (n)
Floor area available for each bed (m²)
Availability of a central nursing station for patient surveillance: Yes/No
Hand-washing facilities: In each room/Only in a few rooms/Outside the room
Unit setting: Open/Closed
Location: Inside the pneumology ward/Inside the medicine ward/Inside the emergency area/General intensive care unit/Independent ward/Other
Location of the general intensive care unit: In the same building (number of beds)/In the same hospital (number of beds)/In other hospitals (distance of the closest (km); number of beds)
Comments

Technical equipment

Mechanical ventilators:
Home positive pressure ventilators (n; not life support)

Volume preset (% of total)
 Pressure preset (% of total)
 Pressure support (% of total)
 Intensive care unit positive pressure ventilators
 (n; life support)
 Iron lung (n)
 Poncho, cuirass (n)
 Polifunctional monitors (n)
 Pulse oxymeters (n)
 Electrocardiogram monitors (n)
 Respiratory mechanics monitors (n)
 Blood gas analyser: Inside respiratory intermediate
 care unit/Outside respiratory intermediate care unit
 Polysomnograph: Inside respiratory intermediate care
 unit/Outside respiratory intermediate care unit

Facilities

Echocardiography facilities: Yes (inside the ward/
 outside the ward)/No
 Bronchoscopy facilities: Yes (inside the ward/outside
 the ward)/No

Staff

Presence of a medical coordinator: Yes/No
 Qualification: Pneumologist/Intensivist/Anaesthesiol-
 ogist/Internal medicine/Other
 Total number of physicians: Full-time/Part-time
 Number of chest physicians: Full-time/Part-time
 Number of anaesthesiologists
 Number of intensive care specialists
 Physicians on duty: At least one 24 h/At least one
 during the day and on call by night
 Need for specific training in intensive care medicine
 before commencing work in respiratory intermediate
 care unit for chest physicians? Yes/No
 Presence of a nurse coordinator: Yes/No
 Number of nurses in the respiratory intermediate care
 unit
 Fixed (total number)
 Maximum number of nurses per shift
 Minimum number of nurses per shift
 Auxiliary nurses per shift (n)
 Need for specific training before commencing work in
 respiratory intermediate care unit for nurses?
 Yes/No
 Number of physiotherapists: Full-time/Part-time
 Number of respiratory therapists: Full-time/Part-time

Characteristics of patients and intervention

Total number of patients admitted in 1999
 Patients with invasive mechanical ventilation (%)
 Patients with noninvasive mechanical ventilation (%)
 Patients not ventilated (%)
 Indicate the three most frequent diseases in patients
 admitted to respiratory intermediate care unit
 Total nosocomial pneumonia in the unit
Staphylococcus aureus pneumonia (%)
Pseudomonas pneumonia (%)

Participants to the census. Austria: H. Zwich
 (Vienna); France: P. Camus (Dijon); P. Krempf
 (Toulouse); P. Huchon (Paris); P. Chailleux
 (Nantes); J.F. Derenne (Paris); T. Similowski
 (Paris); C. Godard (Montpellier); J.M. Polu
 (Nancy); M. Curnier (Clichy); V. Jounieaux
 (Amiens); C. Mayaud (Paris); Germany:
 H. Teschler (Essen); H. Wanke (Oberhausen);
 T. Podszus (Hof); H. Worth (Fürth); W.
 Nowak (Wangen); H. Magnussen (Grosshans-
 dorf); K.H. Ruhle (Hagen); G. Goeckenjan
 (Immenhausen); P. Criée (Bovenden-Lengler);
 G. Siemon (Donaustauf); H. Schatz (Bochum);
 V. Schulz (Heidelberg); H. Lode (Berlin); W.
 Bohning (Bad-Lippspringe); Busse (Halle); G.
 Riegger (Regensburg); O. Karg (Gauting); W.
 Seeger (Giessen); H. Klein (Magdeburg); P. Von
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 (Vicenza); T. Todisco (Perugia); A. Murgia
 (Cagliari); M. Moretti (Modena); G. Consigli
 (Parma); D. Sella (Trento); A. Potena (Ferrara);
 M. Rossi (Arezzo); A. Petraglia (Salerno);
 L. Pesce (Cittadella); M. Vitacca (Gussago);
 G. Garuti (Gaiato); C. Sturani (Mantova); E.
 Guffanti (Casatenovo); A. Vianello (Padova);
 A. Lo Coco (Palermo); S. Cacciani (Rome); M.
 Schiavina (Bologna); A. Rossi (Pesaro); C.
 Mollica (Rome); L. Gandola (Crema); C.F.
 Donner (Verona); V. Rastelli (Sondalo); A.
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 M. Unlu (Ankara); F. Kosar (Istanbul); T.
 Celikel (Istanbul); D. Alper (Ankara); A.
 Akkoclu (Izmir); N. Ekim (Ankara); N. Ozyar-
 dymcy (Bursa); UK: J.P. Watson (Leeds);
 J.M. Shneerson (Cambridge); J.A. Wedzicha
 (London); W. Kinnear (Nottingham); V. Mak
 (London); C. Davidson (London).

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