

8. Patients who died

Key findings

- Management of the airway, breathing, circulation, monitoring and oxygen therapy were generally rated highly. However, even in these categories a high proportion of cases (11, 16, 14, 13 and 14% respectively) were rated at the very poor end of the spectrum.
- The most worrying domains were ability to seek advice, appreciation of clinical urgency and supervision; 30%, 21% and 28% of cases respectively were rated at the very poor end of the spectrum.
- ICU admission was thought to be avoidable in 21% of cases.
- Care was classified as less than good practice in 47% of cases.
- In 41 cases where care was classified as less than good practice the deficiencies were considered to be of such significance that they might have contributed to death. This represents 33% of cases classified as less than good care and 11% of all cases reviewed that had sufficient data.

Introduction

The advisor group reviewed all available notes for those patients who subsequently died after admission to ICU. Of the 1,667 patients included in this study, 560 deaths occurred. From these 560 patients, 439 sets of case records were provided to NCEPOD. In addition to quantitative assessment, the advisors were asked to provide expert opinion on aspects of each case.

Appropriateness of referral

Table 1 shows that 92% of referrals to ICU were thought to be appropriate. In the remaining 8% of cases the advisors felt that referral was inappropriate due to very poor predicted outcome and the fact that ICU admission was not likely to be of benefit. In these cases it was felt that the medical team responsible should have been able to make the decision that critical care was not appropriate and to document this decision in the notes following discussion between a senior doctor and the patient and/or family.

Table 1. Appropriateness of referral to ICU		
Referral appropriate	Total	(%)
Yes	387	(92)
No	34	(8)
Sub-total	421	
Insufficient data	18	
Total	439	

The decision to refer patients to ICU is often difficult, based on the perceived likely benefits to the patient and the limited critical care resource that is available. These decisions are difficult and should ideally be informed by consultant medical staff. Table 2 shows the grade of staff that referred patients to ICU who were classified as expected to die or had a definite risk of dying.

Table 2. Patients classified as expected to die or definite risk of dying on admission to ICU by practitioner who referred them

Referring practitioner	No. of patients expected to die	(%)
Not referred by consultant physician	Referred by registered nurse	1
	Referred by SHO	36
	Referred by SpR Yr 1-2	30
	Referred by SpR Yr 3	30
	Referred by Staff / Associate specialist	8
	Other	7
Sub-total	112	71
Consultant physician notified in these cases?	Yes	45
	No	57
	Unknown	10
Referred by consultant	41	26
Referring practitioner not supplied	4	3
Total	157	

As can be seen from Table 2, 71% (112/157) of patients classified as expected to die, were referred to ICU by non-consultants. In this group of 112 patients, consultants were involved in the decision or process of referral in only 45 cases (40%). The low level of consultant physician input in this very sick group of patients must be questioned. It could be argued that consultant physicians should be involved in all patient referrals to critical care. One argument against this is that it would potentially introduce unnecessary delays and may not increase the appropriateness of referral. However, the structural changes in acute medicine that are being proposed by the Royal College of Physicians should increase the availability of consultants to participate in this process⁸. Furthermore it would seem difficult to argue that consultants, with the benefit of training and experience, would not make more appropriate decisions about the process of care than doctors still in training.

The involvement of consultant staff in intensive care in difficult decisions regarding admission of patients who may not benefit from the process of intensive care is also crucial. Table 3 shows that there was a higher degree of consultant input from critical care than medicine but that 23% of patients classified as likely to die were accepted to ICU without consultant involvement.

Table 3. Patients classified as expected to die or definite risk on admission to ICU by grade of accepting physician

Accepting grade	Number of patients where death was expected
Intensive care consultant	108
Staff Grade / Associate Specialist	4
SpR	17
SHO	7
Registered nurse	2
Other	3
Sub-total	141
Not answered	5
ICU questionnaire not available	11
Total	157

It is of vital importance that acutely unwell patients receive prompt therapy. Patients who require critical care often have limited physiological reserve and delays in providing appropriate therapy can worsen outcome. In the opinion of the advisors, 22% of this patient population were not referred to critical care at the correct time and were considered to be patients who could have potentially benefited from earlier referral (Table 4). Although this could be criticised as subjective opinion, it should be remembered that a significant number of patients had documented prolonged physiological disturbance (see chapter on Pre ICU care). There was no difference in the timeliness of referral by consultant or other grades.

Table 4. Timing of referrals to critical care

Referral at correct time?	Referring consultant	(%)	All others	(%)	Sub-total	Not answered	Total	(%)
Yes	55	(79)	165	(77)	220	69	289	(78)
No	15	(21)	48	(23)	63	18	81	(22)
Sub-total	70		213		283	87	370	
Insufficient data	3		22		25	13	38	
Not answered	3		22		25	6	31	
Total	76		257		333	106	439	

There are a number of patients who will not benefit from the process of intensive care, primarily due to lack of reversibility of pathophysiological process and lack of physiological reserve. It is also the reality that the supply of ICU beds is limited. It is therefore of great importance to carefully select patients who are to be admitted to ICU. In this population it was felt that 88% of admissions were appropriate (Table 5a). The remainder were thought to be inappropriate due to poor predicted outcome. As can be seen there was a small, but not statistically significant difference, in the appropriateness of admission when broken down by grade of referring staff. It should be of no surprise that consultants would be better placed to assess the appropriate level of care for their patients. Table 5b shows the grade of ICU staff who accepted the patients felt to be inappropriate admissions. As can be seen, 36% of these patients (17/47) were accepted by non-consultants, with consultant intensivists accepting the remaining 64%.

Table 5a. Appropriateness of admission to ICU

Admission appropriate	Consultant	(%)	All others	(%)	Sub-total	Not answered	Total	(%)
Yes	68	(93)	205	(86)	273	88	361	(88)
No	5	(7)	34	(14)	39	10	49	(12)
Sub-total	73		239		312	98	410	
Insufficient data	3		18		21	8	29	
Total	76		257		333	106	439	

Table 5b. Grade of ICU staff who accepted patients felt to be inappropriate admissions

Accepting grade	Total
Consultant	30
SHO	2
SpR	14
Staff Grade / Associate Specialist	1
Sub-total	47
Not answered	2
Total	49

Clinical management of cases

One aspect of the advisors expert opinion was whether or not there were clearly identifiable opportunities for different management. In particular were any of the admissions to ICU considered avoidable? Table 6a shows that 21% of admissions were considered avoidable and Table 6b shows the reasons for this decision. In 21 cases it was felt that different care (including earlier recognition of clinical deterioration) could have resulted in clinical improvement and avoided the need for ICU care. In 58 cases it was felt that due to the lack of reversibility of disease process, a treatment limitation order could have been made which would have included non-escalation to ICU care. This figure for potentially avoidable admissions is in keeping with the literature¹.

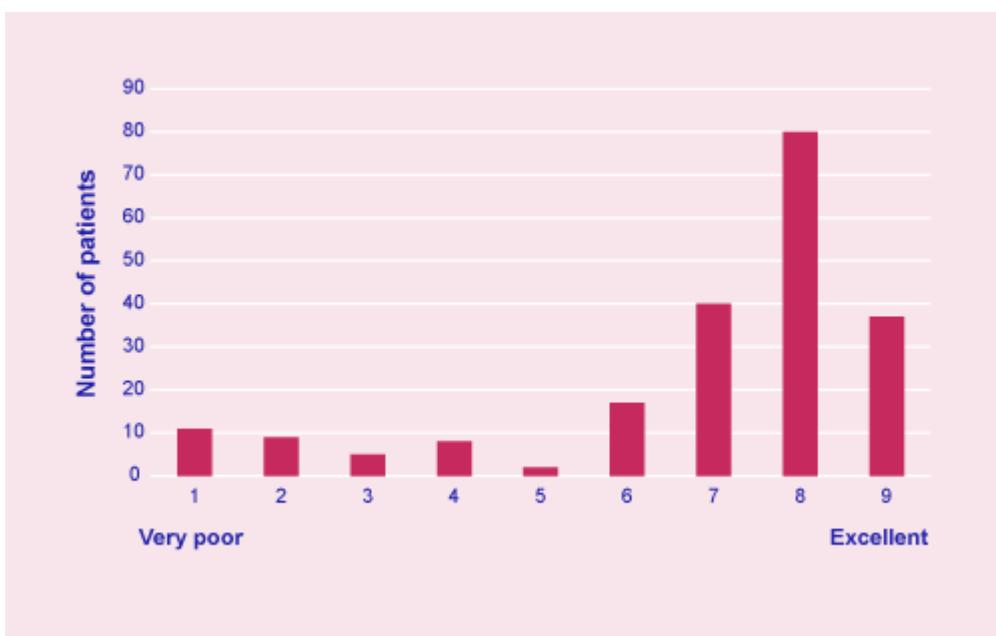
Table 6a. ICU admissions that were avoidable

Admission avoidable?	Total	(%)
Yes	83	(21)
No	313	(79)
Sub-total	396	
Insufficient data	43	
Total	439	

Table 6b. Reasons why admissions were considered avoidable

Reason ICU admission could have been avoided (Answers may be multiple)	Total n = 83
Different care could have prevented need for admission	21
Treatment limitation decision could have avoided admission	58
Other	9
Total	88

Each of the cases were graded on a nine point scale, where one = very poor and nine = excellent. Aspects of clinical management that were assessed using this method were: airway management, management of breathing, management of the circulation, use of monitoring and oxygen therapy. The findings are presented in Figures 1-5.

**Figure 1. Airway management n=209**

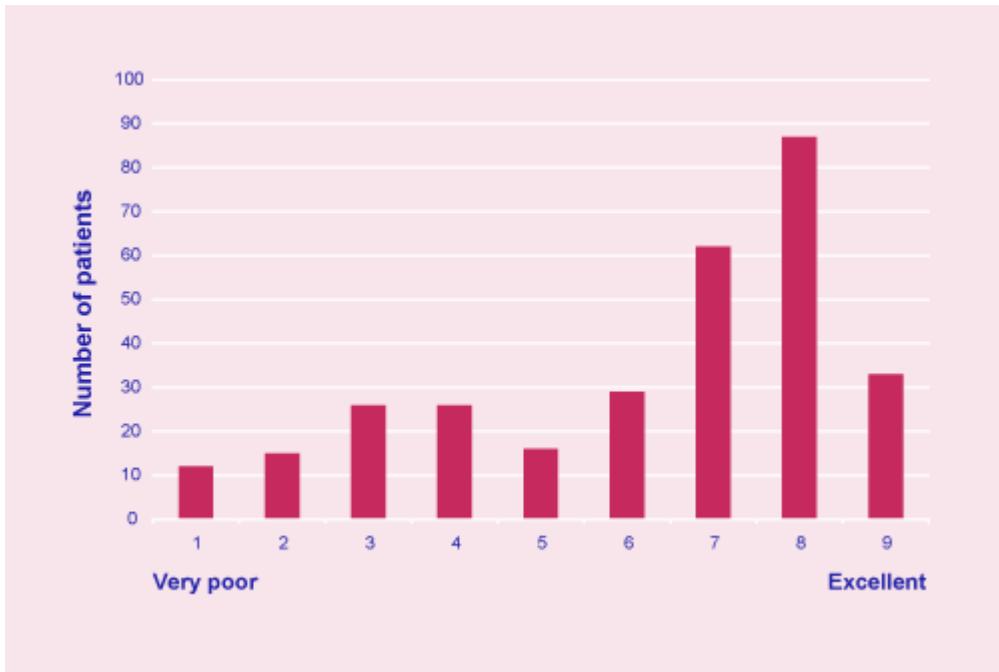


Figure 2. Breathing management $n=306$

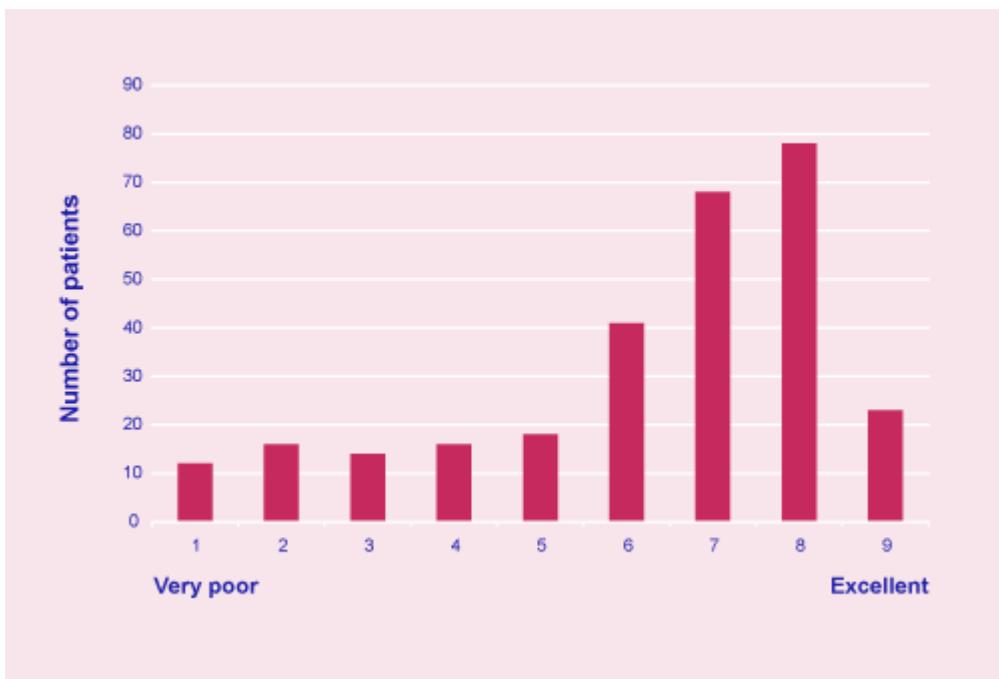


Figure 3. Circulation management $n=286$

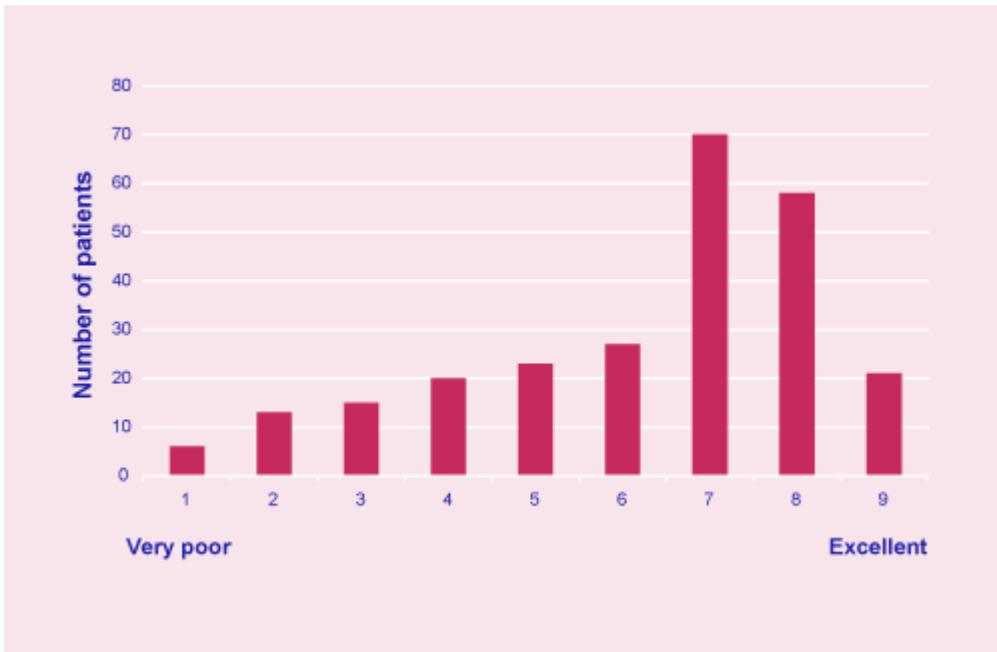


Figure 4. Monitoring $n=235$

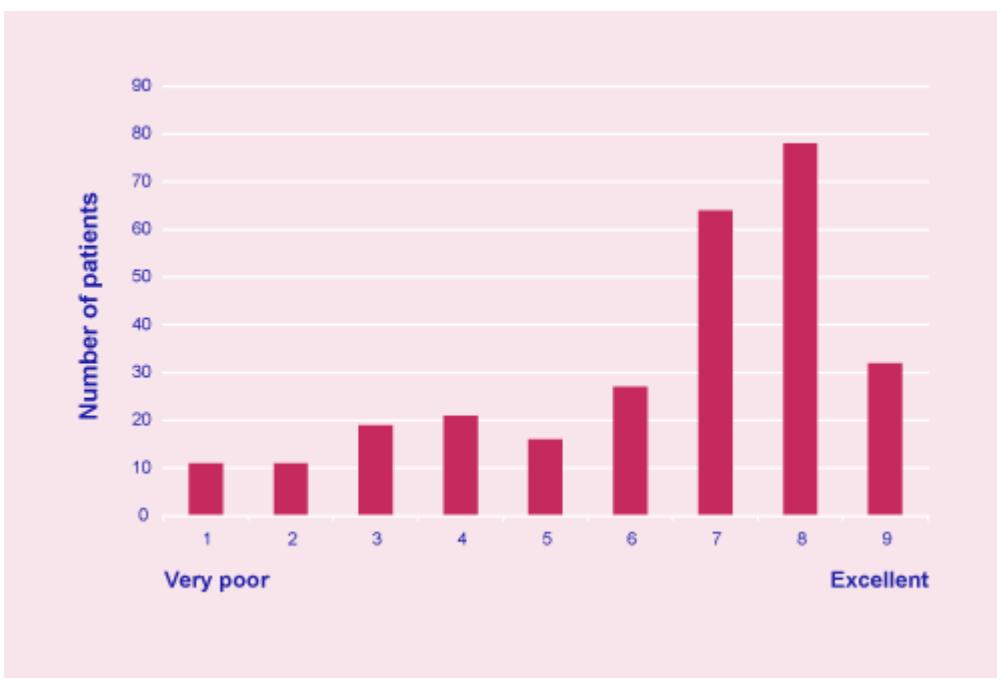


Figure 5. Oxygen therapy $n=279$

As can be seen, these domains were generally rated highly. However, although there is a skew to the higher end of assessment there were still a significant number of cases that gave cause for concern. Cases were rated at the very end of the spectrum (grades 1-3) with respect to management of the airway (11%), breathing (16%), circulation (14%), monitoring (13%) and oxygen therapy (14%). This is particularly worrying as previous work has shown that suboptimal management of these aspects of care may be associated with increased morbidity, mortality and avoidable admissions to critical care¹.

Supervision of cases

These findings, although of great concern, are not surprising. Such deficiencies in the ability of junior doctors have been demonstrated previously³¹. The past two years have seen an unprecedented and rapid change in established working patterns, driven by the imperative to meet the European Working Time Directive and compounded by the changes in training set out in the Chief Medical Officer's report *Unfinished business*³² and in the Department of Health's response *Modernising medical careers*³³. Shift work and fragmentation of the team due to the reduction in junior doctors' hours have led to poor continuity of care for patients and a loss of learning opportunities for trainees. The product of many of these changes is that junior medical staff are less able to manage the demands of acutely unwell patients. It is therefore vital to develop strategies such as outreach services and critical illness education packages that can bridge the deficiencies highlighted³⁴.

Case study

A patient in their late seventies presented as an emergency admission with a history of productive cough and breathlessness over the preceding 48 hours, associated with a high temperature and rigors. There was no past history of chest disease. A presumptive diagnosis of community acquired pneumonia was made. On admission notable findings were signs of consolidation at the base of the right lung, hypoxia on room air (SpO_2 64%) and on oxygen (SpO_2 89% on 15 l/min via rebreathing mask), tachycardia (135 beats per minute) and neutropenia. An arterial blood gas performed 12 hours after admission revealed a PaO_2 of 6.6 kPa on high flow oxygen. Over the next 24 hours the patient became more hypoxic and tachypnoeic. No consideration was given to the use of invasive or non-invasive ventilation in the setting of worsening hypoxia. The patient suffered a cardiac arrest 36 hours after hospital admission. After resuscitation the patient was transferred to ICU where death occurred 72 hours later. The diagnosis was subsequently confirmed to be pneumococcal pneumonia.

This case highlights the inappropriate use of oxygen therapy, since the plan that was followed did not relieve the profound hypoxia, and eventually led to cardiac arrest. In addition, it highlights the lack of appreciation of severity of illness and clinical urgency.

Other aspects of care that were assessed were ability to seek advice from senior doctors, appreciation of clinical urgency, clinical knowledge, organisational aspects of care and supervision. The findings are shown in Figures 6 to 10.



Figure 6. Ability to seek advice from senior doctors n=212

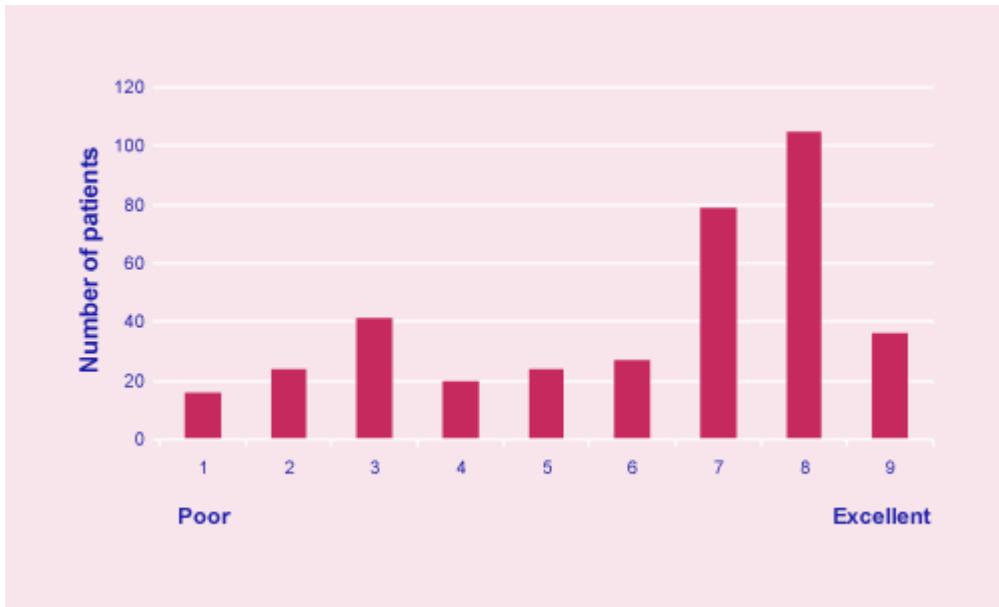


Figure 7. Appreciation of clinical urgency $n=372$

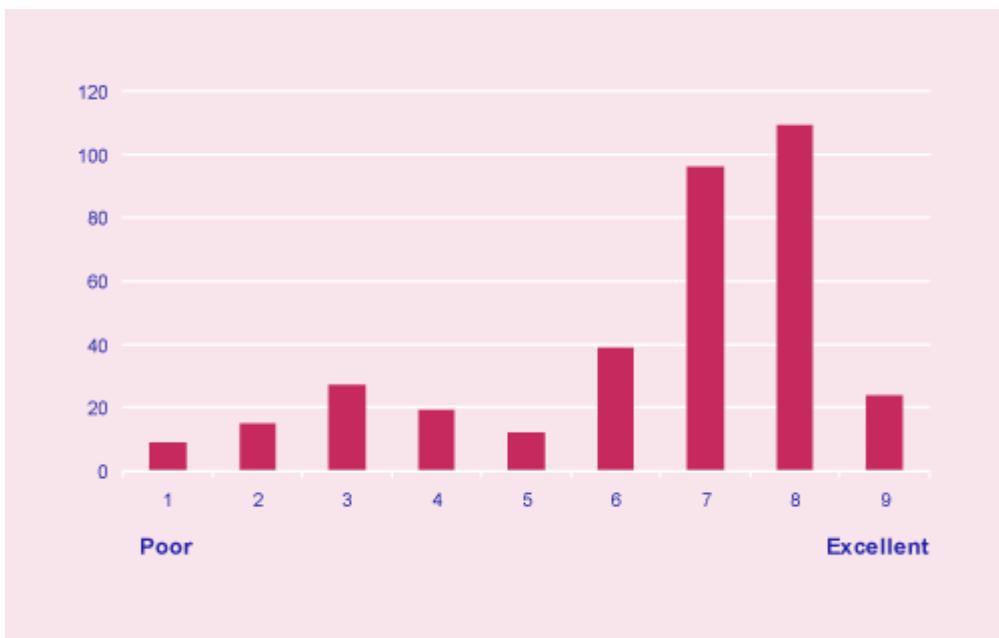


Figure 8. Clinical knowledge $n=350$

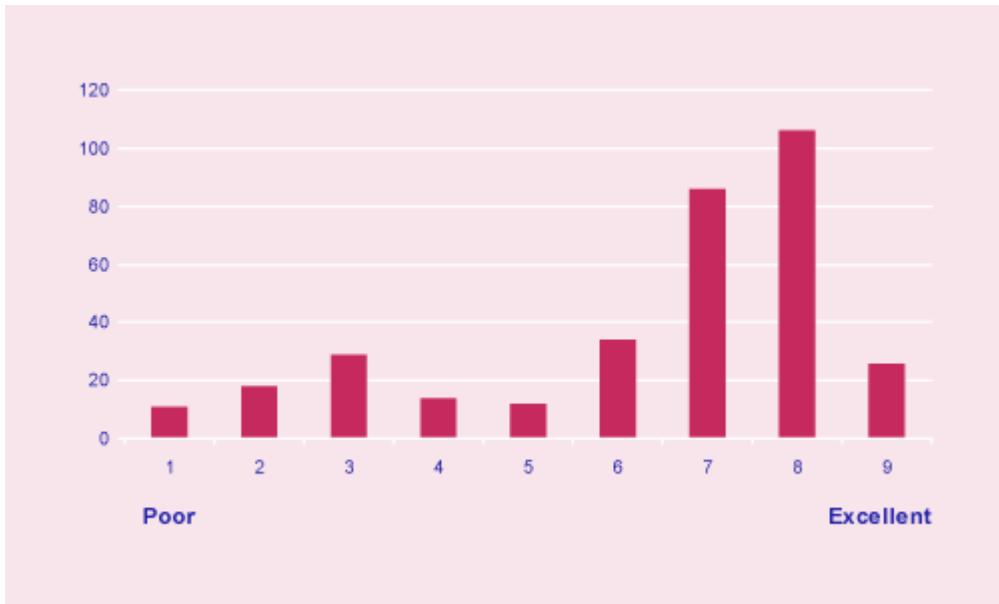


Figure 9. Organisational aspects of care n=336

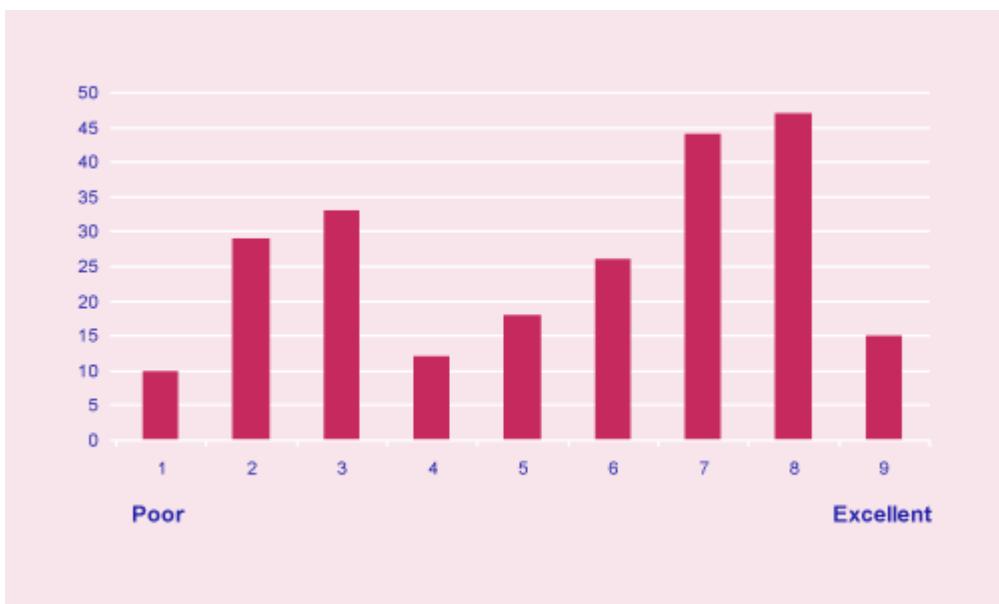


Figure 10. Supervision n=234

The most worrying domains were ability to seek advice, appreciation of clinical urgency and supervision; 30%, 21% and 28% of cases were rated at the very poor end of the spectrum (Grades 1-3). NCEPOD has previously recommended that surgical and anaesthetic trainees should readily seek senior advice and not operate unsupervised at night²¹. Similar recommendations for senior input have been made for patients with major trauma³⁵. However, few reports or recommendations regarding consultant input are available for the care of medical patients. As can be seen in this report there was a significant problem in seeking advice and consultant supervision. It appears that junior doctors in medicine are often providing care that would be improved by greater consultant input and supervision.

Case study

A patient in their early thirties was admitted following a significant overdose of coproxamol and codeine. They presented to hospital at 10:00 hrs and were combative and non-compliant with examination or investigation, and their Glasgow Coma Score was estimated to be 14. The patient was given haloperidol to try to manage their aggressive state. Over the next 12 hours they remained agitated and difficult to assess. At 23:00 hrs they were noted to be drowsier (GCS estimated at nine) and blood was eventually taken which revealed toxic quantities of paracetomol but no therapy was instituted due to their continued combative manner and lack of intravenous access. The medical SHO discussed the problem of agitation with the medical SpR who stated he would review soon. Over the next hour the patient started making tonic-clonic movements which were assessed by the SHO as not representing seizures. No further review or intervention occurred until two hours later when the patient was noted to be apnoeic and pulseless. After a prolonged resuscitation the patient was transferred to ICU, where they subsequently died.

This was a very difficult case to manage and the junior doctors found great difficulty in coping with an aggressive patient with a life-threatening, but entirely reversible, condition. There was no consultant physician input in this case, highlighting the problems of the failure of junior doctors to seek support and lack of consultants actively managing the acute medical take and supporting their medical team.

Case study

An elderly patient was admitted as an emergency under the care of the physicians with a history of shortness of breath and palpitations. Colonoscopy and biopsy had been performed five days earlier as an outpatient. They were admitted to the medical assessment unit and treatment was started for a supraventricular tachycardia. There was no previous history of heart disease. Despite rate control the patient remained unwell, the predominant feature being tachypnoea and hypotension. They remained on the ward for five days with clear deterioration in cardiovascular, respiratory and renal function. At no time did a consultant physician review the patient. Abdominal pain became a feature of their illness on the fifth day after admission. The surgical SpR opinion was that there was peritonitis secondary to perforation of a viscus. The patient was transferred to ICU to allow optimisation of their condition prior to any surgical intervention. However, due to continued deterioration in the face of supportive care a laparotomy was felt inappropriate and the patient was allowed to die "peacefully". The intensive care questionnaire states "not been seen by a consultant physician despite being on medical ward for five days".

Elderly patients with critical illness have a very high mortality. Early recognition and intervention is essential. The lack of consultant input in this case is worrying. In addition there was no outreach service in this hospital, which may have allowed earlier identification and management of the problems.

Assessment of cases

An overall assessment of each case was made using the classification given in Table 7. In 206 cases it was felt that care was of a good standard. However, there were a significant number of cases where the standard of care fell below this level. In the cases where care was classified as less than good practice, the advisors were asked to quantify the impact of the deficiencies. Table 8 shows the potential impact of deficiencies in care on mortality. It was felt that sufficient information was available to assess the potential impact on mortality in 124 cases. Within the group it was felt that there were 41 cases where these deficiencies could have contributed to death.

Table 7. Classification of overall assessment of each case

Advisors overall of assessment of care	Number of cases	(%)
Good practice	206	(53)
Room for improvement – clinical	100	(26)
Room for improvement – organisational	30	(8)
Room for improvement - both clinical and organisational	22	(6)
Less than satisfactory	30	(8)
Sub-total	388	
Insufficient data	51	
Total	439	

Table 8. Potential impact of standard of care being less than good on mortality

Did deficiencies contribute to death?	Total	(%)
Yes	41	(34)
No	83	(68)
Sub-total	124	
Insufficient data	58	
Total	182	

Recommendations

- Training must be provided for junior doctors in the recognition of critical illness and the immediate management of fluid and oxygen therapy in these patients.
- Consultants must supervise junior doctors more closely and should actively support juniors in the management of patients rather than only reacting to requests for help.
- Junior doctors must seek advice more readily. This may be from specialised teams e.g. outreach services or from the supervising consultant.