
An Acute Problem?

**A report of the
National Confidential Enquiry into
Patient Outcome and Death (2005)**



FOREWORD “An Acute Problem?”


NCEPOD now operates under the umbrella of the National Patient Safety Agency (NPSA) as an independent confidential enquiry whose main aim is to improve the quality and safety of patient care. Evidence is drawn from the specific areas of hospital activity in England and Wales, both NHS and Private, related to the enquiry in question, and we are very grateful to all those who take part, both advisors, local reporters and those who complete the individual case reporting forms. I would also like to express my sincere thanks to our clinical co-ordinators and all the permanent staff of NCEPOD for the enormous amount of work and enthusiasm which they have put into the production of this report and without which we could not hope to create such detailed analysis and comment upon clinically related hospital activity.

“An Acute Problem?” is the second study related to our enlarged responsibility for including medical cases. It has been designed to link together the provision of critical care facilities with the care of severely ill medical patients throughout our hospitals. The pattern of inpatient care is changing rapidly and NCEPOD’s role is to facilitate and inform that change. This study is as much about facilities and resources as about clinical practice and highlights the levels of care appropriate to patient requirements. Although in many cases, overall numbers of hospital inpatient beds are being reduced, the increased complexity of medical care and the expectations of the public mean that there are many more critically ill patients in hospital. In one major teaching hospital in the United States, which now has only 400 inpatient beds, 33% of these are devoted to high dependency and critical care, such are the requirements of patients. However, provision of an appropriate environment for acute care is only part of the story and, as this report highlights, the traditional way in which many consultant physicians work does not involve significant components of acute care. Unlike the surgical on-call team, which often now undertakes no elective work,

the medical on-call team tends to divide itself, so that the consultant physician continues with elective outpatient work and is rarely involved in the acute admission process or indeed when the team’s patients are deteriorating on the wards. Some physicians certainly have a close interest in acute medicine but the existence of the Medical Admissions Unit with dedicated staff, together with specialisation into other areas of medicine, tends to distance many consultant physicians from acute work. Although available out of hours as the consultant on call, many physicians rely heavily on their junior staff and rarely expect to have to return to hospital out of hours.

As a result, doctors in training are both providing and leading the provision of acute care and to an extent this has extended into the ‘Out of Hours Medical Team’ and the ‘Hospital at Night’ projects. This has recently been exacerbated by the changes in working hours following implementation of the European Working Time Directive so that junior doctors, having contributed significantly to out of hours service delivery, are less available for training and, therefore, less experienced and confident than in the past. As a result, in complex cases, there is an inevitable risk that these doctors may provide care which is less than optimal and yet they are unused to seeking advice or supervision, particularly out of hours.

In most hospitals, medical services are severely overstretched and the medical SHOs in particular, have to spread themselves thinly over what is often a significant number of acutely ill patients. Furthermore, the support they receive from their house officers is often small, since, to comply with working hours regulations, the housemen in many hospitals go off duty during the evening, leaving the SHOs to manage on their own for the rest of the night shift. Severely ill patients often exhibit clear signs of clinical deterioration on the wards for some time and although nurses may pick up these simple clinical indicators and call for help, the inevitable delay resulting from



SHOs working largely on their own may further delay the instigation of appropriate treatment.

It might appear that the solution is the provision of comprehensive and adequate critical care facilities to allow rapid admission of all sick and deteriorating medical patients. But here again there are problems with delays in review by the acute care team and subsequent admission to intensive or high dependency care. In many of these cases the delay is related to a lack of critical care beds or staffing shortages, which result in significant numbers of beds actually being closed on a temporary basis. However, even when patients have been admitted, almost 25% are not seen by an intensive care consultant within the first 12 hours of admission, so that the problem of lack of consultant input occurs both in intensive care and in the ward situation.

It has been suggested that one method of addressing many of the above deficiencies would be the comprehensive introduction of intensive care outreach. Many such services are run by intensive care nursing staff and are often not available on a 24 hour basis. Some hospitals do not have an outreach service at all or one that only covers selected patients, particularly postoperative surgical care. Although a Department of Health funded study on outreach is currently occurring, the report is not due until 2007 and even then, if outreach is to provide more immediate care of acutely ill patients, it would need to be fully resourced and staffed and, importantly, have an adequate supply of critical care beds into which the patients could be transferred.

Another proposed solution is the development of acute physicians, and acute medicine is, of course, a recognised medical sub-specialty. Although this may be considered an ideal solution to the above problems, it is undoubtedly a long-term strategy and in the interim we must look for improved

ways of managing the problems of acutely ill patients. It is encouraging that the curriculum for Foundation Year training concentrates specifically on the care of the acutely ill patient and that there are many proposals for generic years at the start of run-through specialist training which would contain acute skills, common to both medicine, critical and intensive care, anaesthesia, emergency medicine and radiology.

It is important to acknowledge that acute patient care in today's NHS depends very largely on the hard work and dedication of all grades of staff and that in areas of this report we should emphasise the 90% of patients who receive good care as much as the 10% who do not. In the past, NCEPOD reports have largely concentrated on identifying the reasons for inadequate care, subjecting these to expert analysis and then making recommendations for improvement. This has proved exceedingly effective, for example in the provision of additional "NCEPOD theatres" to cope with the increasing surgical trauma load and in many other areas of pre and postoperative care. It is our hope that by identifying shortcomings in key areas of acute medical care and offering constructive criticism and pragmatic and affordable solutions, NCEPOD will help to do for acute medicine what it has achieved for acute surgery in the past. To some this report may appear critical and uncompromising in its observations but if we are all concerned, as we must be, with improvements to the quality and safety of patient care, armed with these recommendations and working together in a multiprofessional way with Trust management, the improvements which we all strive for can be achieved.

Dr. Peter Simpson

Chairman - NCEPOD

INTRODUCTION

The management of emergency medical admissions and critically ill medical patients has undergone considerable scrutiny in recent years. There is a body of work that supports the view that the needs of this group of patients are poorly served by the current system ^{1,2,3}.

In a confidential inquiry into quality of care before admission to the Intensive Care Unit (ICU), two external reviewers assessed the quality of care in 100 consecutive admissions to ICU ¹. 20 patients were deemed to have been well managed and 54 to have received suboptimal management, with disagreement about the remainder. Case mix and severity were similar between the groups, but ICU mortality was worse in those who both reviewers agreed received suboptimal care (48% compared with 25% in the well managed group). Admission to the ICU was considered late in 37 patients in the suboptimal group. Overall, a minimum of 4.5% and a maximum of 41% of admissions were considered potentially avoidable. Suboptimal care contributed to morbidity or mortality in most instances. The main causes of suboptimal care were failure of organisation, lack of knowledge, failure to appreciate clinical urgency, lack of supervision and failure to seek advice.


In another UK study of patients either dying unexpectedly on a general ward or requiring admission to the ICU during a six month period, 317 of the 477 hospital deaths occurred on the general wards of which 20 (6%) followed failed attempts at resuscitation ². 13 of these unexpected deaths were considered potentially avoidable: gradual deterioration was observed in physiological and/or biochemical variables, but appropriate action was not taken.

During the same period, 86 hospital inpatients were admitted on 98 occasions to the ICU, 31 of whom received suboptimal care before the ICU admission either because of non-recognition of the severity of the problem or inappropriate treatment. Mortality rates were significantly higher in these patients than in well managed patients in both the ICU (52% v 35%) and hospital (65% v 42%), $p < 0.0001$. The authors concluded that patients with obvious clinical indicators of acute deterioration are not infrequently overlooked or poorly managed on the ward.

Even more disturbingly, studies of events leading to 'unexpected' in-hospital cardiac arrest indicate that many patients have clearly recorded evidence of marked physiological deterioration prior to the event, without appropriate action being taken in many cases ^{4,5}.

The difficulties of providing care to emergency medical admissions and acutely unwell inpatients and the deficiencies that have been highlighted above are recognised by the Royal College of Physicians ^{6,7,8,9}. Over the past few years a number of reports have been produced by the Royal College of Physicians that have made many recommendations in this aspect of acute care. Reports pertinent to this area are: *Interface of accident and emergency and acute medicine* ⁶, *Interface between Acute General Medicine and Critical Care* ⁷, *Acute medicine: making it work for patients. A blueprint for organisation and training* ⁸, and *Good Medical Practice for Physicians* ⁹.

Some time has elapsed since the publication of some papers showing problems in acute care ^{1,2} and subsequent reports suggesting improvements ^{6,7}.



Thus, the situation may or may not have improved³. In addition, there is a widely held belief that the relatively recent changes in junior medical staff working, as a result of the European Working Time Directive and changes in the structure of training, are resulting in fragmentation of the team structure and loss of learning opportunities. These changes have obvious potential

impact on patient care and the need for consultant supervision. As NCEPOD is in a unique position to examine the process of care and identify remediable factors, it was therefore felt that the care of acutely unwell medical patients was a very important topic for further study.

1. McQuillan P, Pilkington S, Allan A et al. *Confidential inquiry into quality of care before admission to intensive care*. BMJ 1998; 316: 1853-1858.
2. McGloin H, Adam SK, Singer M. *Unexpected deaths and referrals to intensive care of patients on general wards. Are some cases potentially avoidable?* J R Coll Physicians Lond 1999; 33(3):255-259.
3. Seward E, Greig E, Preston S, et al. *A confidential study of deaths after emergency medical admission: issues relating to quality of care*. Clin Med 2003; 3(5):425-434.
4. Franklin C, Mathew J. *Developing strategies to prevent in-hospital cardiac arrest: analyzing responses of physicians and nurses in the hours before the event*. Crit Care Med 1994; 22(2):244-247.
5. Schein RM, Hazday N, Pena M, Ruben BH, Sprung CL. *Clinical antecedents to in-hospital cardiopulmonary arrest*. Chest 1990; 98(6):1388-1392.
6. *Interface of accident and emergency and acute medicine. Report of a working party of the Royal College of Physicians*. Royal College of Physicians, 2002.
7. *Interface between Acute General Medicine and Critical Care. Report of a working party of the Royal College of Physicians*. Royal College of Physicians, 2002.
8. *Acute medicine: making it work for patients. A blueprint for organisation and training. Report of a Working Party of the Royal College of Physicians*. Royal College of Physicians, 2004.
9. *Good Medical Practice for Physicians*. Federation of Royal Colleges of Physicians of the UK, 2004.

METHOD

The aim of this study was to review the care of medical patients referred for Level 3 care rather than the intensive care practice itself.

Data collection

- All patients over the age of 16 admitted to a general intensive care unit (ICU) during the month of June 2003.
- Patients not included if they were admitted to a specialty specific unit such as cardiac or neurosurgical.
- Patients not included if they were classified as Level 3¹ but not admitted to an ICU.
- Data were collected retrospectively via a questionnaire to both the referring consultant and the intensive care questionnaire.

Hospital participation

- The study aimed to include general ICUs in all hospitals in England, Wales, Northern Ireland, Guernsey, the Isle of Man, the Defence Secondary Care Agency and those hospitals in the independent sector that participate in the work of NCEPOD.
- An organisational questionnaire relating to the ICU and the provision of outreach services was sent to each hospital.

Advisor groups

- The data were aggregated and anonymised prior to analysis.
- A multidisciplinary group of advisors were recruited to review the questionnaires and associated casenotes of the patients that died in the ICU.
- The groups of advisors comprised of intensive care physicians, general physicians, nurses and pathologists.

1. *Comprehensive Critical Care: a review of adult critical care services.* Department of Health. London, 2000.

DATA OVERVIEW

Hospital participation

- 261 hospitals were identified as having a Level 3 adult, general, intensive care unit.
- 226 hospitals participated; an 88% participation rate.

Clinical questionnaires

- Figure A provides an overview of the number of questionnaires returned.
- More intensive care questionnaires may have been received because single intensive care questionnaires would have been received if the patient had been transferred from another unit (Figure A).

Organisational questionnaire

- 211/261 (81%) returned the organisational questionnaire.
- Of the 50 that did not return it, 18 did return some clinical questionnaires.

Admission method and source of admission

- 93% of cases were emergency admissions.
- 43% were admitted from the accident and emergency department.
- 34% were admitted from a ward in the same hospital.

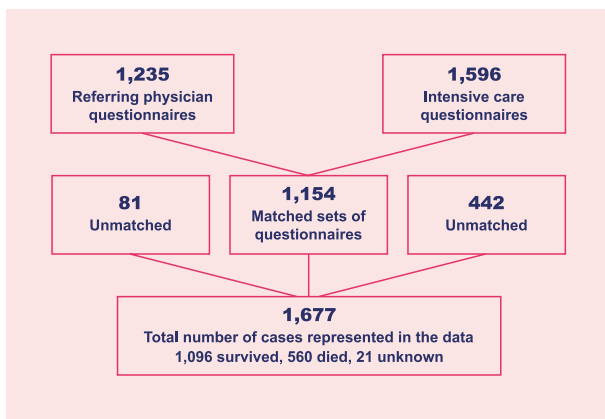


Figure A. Overview of questionnaires returned

PRE-ICU CARE

Key findings

- The quality of the initial hospital admission history and examination was acceptable in 90% of cases. It is worrying that one in 10 patients have an incomplete history and examination.
- Despite an acceptable history and examination, initial treatment was often delayed, inappropriate or both.
- Although the data are difficult to collect from casenotes it seems likely that, despite RCP recommendations, consultant physician involvement in the first 24 hours remains low. Data were available to assess the timing of the patient review by a consultant physician in just 40 of the 439 deaths for which casenotes were available. Amongst these 40 cases, a consultant physician did not review 17 patients within 24 hours of admission to hospital.
- Patients often had prolonged periods of physiological instability prior to admission to ICU. In patients who had been in hospital more than 24 hours prior to ICU admission, 66% exhibited physiological instability for more than 12 hours.

Recommendations

- Trusts should ensure that consultant job plans reflect the pattern of demand of emergency medical admissions and provision should be made for planned consultant presence in the evenings (and perhaps at night in busier units).
- A consultant physician should review all acute medical admissions within 24 hours of hospital admission ². Regular audit should be performed against this standard.
- Trusts should ensure that consultant physicians have no other clinical commitments when on take. This may be through the development of acute physicians ². This will allow for greater involvement in the assessment and treatment planning of new admissions and the review of deteriorating inpatients.
- More attention should be paid to patients exhibiting physiological abnormalities. This is a marker of increased mortality risk.
- Robust track and trigger systems should be in place to cover all inpatients. These should be linked to a response team that is appropriately skilled to assess and manage the clinical problems.

2. *Acute medicine: making it work for patients. A blueprint for organisation and training. Report of a Working Party of the Royal College of Physicians.* Royal College of Physicians, 2004.

PATIENT OBSERVATIONS AND REVIEW CRITERIA

Key findings

- Notes seldom contained written requests regarding the type and frequency of physiological observations.
- Instructions giving parameters that should trigger a patient review were rarely documented.
- Respiratory rate was infrequently recorded.
- 27% of hospitals did not use an early warning system (Table A).

Table A. Hospitals' use of early warning systems		
Early warning system used	Number of hospitals	(%)
Medical emergency team	3	(1)
Patient at risk team	19	(9)
Early warning score	28	(14)
Modified early warning score	89	(42)
Combinations of above	8	(4)
Other	2	(1)
System not specified	4	(2)
Sub-total	153	(73)
No early warning system used	58	(27)
Total	211	

- 44% of hospitals did not provide an outreach service.
- The provision of outreach services was geographically uneven, with a bias toward provision of outreach in English hospitals.

Recommendations

- A clear physiological monitoring plan should be made for each patient. This should detail the parameters to be monitored and the frequency of observations.
- Part of the treatment plan should be an explicit statement of parameters that should prompt a request for review by medical staff or expert multidisciplinary team.
- The importance of respiratory rate monitoring should be highlighted. This parameter should be recorded at any point that other observations are being made.
- Education and training should be provided for staff that use pulse oximeters to allow proper interpretation and understanding of the limitations of this monitor. It should be emphasised that pulse oximetry does not replace respiratory rate monitoring.

REFERRAL PROCESS

Key findings

- A high percentage of patients were referred to critical care by staff in training; 21% of referrals were made by SHOs (Table B).

Table B. Grade of referrer to ICU		
Health professional who referred patient	Total	(%)
Consultant physician	256	(23)
Registered nurse	10	(1)
SHO	238	(21)
SpR year 1 or 2	255	(23)
SpR year 3+	229	(20)
Staff Grade / Associate Specialist	68	(6)
Other	74	(7)
Sub-total	1,130	
Not answered	105	
Total	1,235	

- Consultant physicians had no knowledge or input into 57% of referrals to critical care.
- Delays between referral to critical care and review (5%) and between decision to admit to critical care and admission (16%) were common.
- A significant factor in delay was the lack of appropriate staff and ICU beds.
- 18% of patients were admitted to ICU without prior review by the intensive care service (Table C).

Table C. Patients reviewed by ICU staff prior to admission

Intensive care review	Total	(%)
Yes	858	(82)
No	191	(18)
Sub-total	1,049	
Unknown	126	
Not answered	60	
Total	1,235	

Recommendations

- Consultant physicians should be more involved in the referral of patients under their care to ICU. The referral of an acutely unwell medical patient to ICU without involvement or knowledge of a consultant physician should rarely happen.
- It is inappropriate for referral and acceptance to ICU to happen at junior doctor (SHO) level.
- Any delay in admission to critical care should be recorded as a critical incident through the appropriate hospital incident monitoring and clinical governance system.
- All inpatient referrals to ICU should be assessed prior to ICU admission. Only in exceptional circumstances should a patient be accepted for ICU care without prior review.

ICU ADMISSION PROCESS

Key findings

- Evening was the busiest time for new medical admissions to ICU, followed by night and lastly day (Table D).
- One in four patients were admitted to ICU without consultant intensivist involvement.
- Amongst the 40% of cases, where data were available, approximately one in four patients were not reviewed by a consultant intensivist within 12 hours of admission to ICU (Figure B).

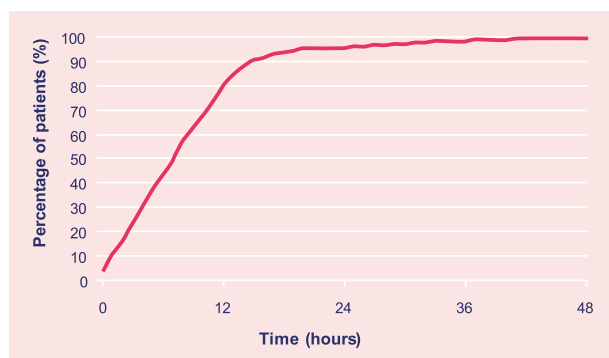


Figure B. Time between ICU admission and first consultant review $n=635$

Recommendations

- Trusts should ensure that consultant job plans reflect the pattern of demand for emergency admission to ICU and provision should be made for planned consultant presence in the evenings (and perhaps at night in busier units).
- Patients should rarely be admitted to ICU without the prior knowledge or involvement of a consultant intensivist.
- A consultant intensivist should review all patients admitted to ICU within 12 hours of admission ³. Regular audit should be performed against this standard.

3. *Good Medical Practice for Physicians*. Federation of Royal Colleges of Physicians of the UK, 2004.

Table D. Frequency distribution of time of ICU admission							
Time of admission	Outcome				Admission/hour	Died (%)	Survived (%)
	Died	Survived	Unknown	Total			
Day	254	457	11	722	72.2	(36)	(64)
Evening	170	312	5	487	81.2	(35)	(65)
Night	126	314	3	443	73.8	(29)	(71)
Sub-total	550	1,083	19	1,652			
Not answered	10	13	2	25			
Total	560	1,096	21	1,677			

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 (Table E).

- 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.

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.

Table E. 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	

OUTREACH

Key findings

- There was geographical inequality in the presence of outreach services, with the majority being provided in English hospitals (Table F).

Table F. Outreach services available in the United Kingdom				
Outreach service				
Country	Yes	No	Not answered	Total
England	108	65	2	175
Independent hospitals	5	7	1	13
Wales	3	9	0	12
Northern Ireland	0	9	0	9
Guernsey	0	1	0	1
Isle of Man	0	1	0	1
Total	116	92	3	211

- One in four hospitals did not use some form of track and trigger system to allow early identification of deteriorating patients.

Recommendations

- Each hospital should have a track and trigger system that allows rapid detection of the signs of early clinical deterioration and an early and appropriate response.

- Although this recommendation does not emerge from the findings in this report, NCEPOD echoes other bodies and recommends that trusts should ensure each hospital provides a formal outreach service that is available 24 hours per day, seven days per week. The composition of this service will vary from hospital to hospital but it should comprise of individuals with the skills and ability to recognise and manage the problems of critical illness ^{4,5,6,7}.

- Outreach services and track and trigger systems should not replace the role of traditional medical teams in the care of inpatients, but should be seen as complementary.

4. *Interface between Acute General Medicine and Critical Care. Report of a working party of the Royal College of Physicians.* Royal College of Physicians, 2002.
5. *Comprehensive Critical Care: a review of adult critical care services.* Department of Health. London, 2000.
6. *Critical care outreach 2003: progress in developing services. The National Outreach Report 2003.* Department of Health and National Health Service Modernisation Agency, 2003.
7. *Guidelines for the introduction of outreach services.* Intensive Care Society. London, 2002.

QUALITY OF MEDICAL RECORDS AND AUDIT

Key findings

- The quality of medical records was poor.
- Documentation of resuscitation decisions rarely happened, even in patients at high risk of deterioration (Table G).

Table G. Statement of resuscitation status in health records		
Resuscitation status documented	Total	(%)
Yes	42	(11)
No	348	(89)
Sub-total	390	
Insufficient data	49	
Total	439	

- Retrospective review (audit) of patients' management was infrequent (Table H).

Table H. Review of patients' management at morbidity and mortality (M&M) meetings (answers from ICU consultants)		
Patient's management to be reviewed at M&M meeting?	Total	(%)
Yes	168	(20)
No	686	(80)
Sub-total	854	
Unknown	178	
Not answered	564	
Total	1,596	

- Where retrospective review did occur, there was a low level of participation by referring physicians.

Recommendations

- All entries in the notes should be dated and timed and should end with a legible name, status and contact number (bleep or telephone).
- Each entry should clearly identify the name and grade of the most senior doctor involved in the patient episode.
- Resuscitation status should be documented in patients who are at risk of deterioration⁸. Each trust should audit compliance with this recommendation by regular review of patients who suffered a cardiac arrest and assessment of whether a 'do not attempt resuscitation' order should have been made prior to this event.

8. *Withholding and Withdrawing Life-prolonging Treatments: Good Practice in Decision-making*. General Medical Council, 2002.

PATHOLOGY

Key findings

- 16% of the patients who died in this study had an autopsy. Of these 77% were authorised by a coroner and only 18% were the result of a clinician request.
- Of the received autopsy reports, 50% were judged to be satisfactory or better.
- 34% of reports had no clinico-pathological summary and in 24%, where it was presented, it was judged to be unsatisfactory.
- The causes of death were erroneously structured according to the ONS pattern of formulation in 26% of cases and in a similar number of cases the causes of death were judged not to reflect the clinico-pathological circumstances.

Recommendations

- More care should be given to the formulation of the cause of death for presentation to the coroner and transfer into the medical certificate of cause of death.
- On this group of patients, consented autopsies should be sought more often to evaluate complex clinical pathology.
- In coronial autopsies on ICU patients, increased histopathological sampling should be undertaken to improve disease identification, with the consent of relatives, once the coroner's requirement is satisfied.
- Pathologists should become more involved in the mortality meetings on ICU patients.

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Epworth House, 25 City Road, London EC1Y 1AA

Tel: 020 7920 0999

Fax: 020 7920 0997

Email: info@ncepod.org.uk

Web site: www.ncepod.org.uk

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