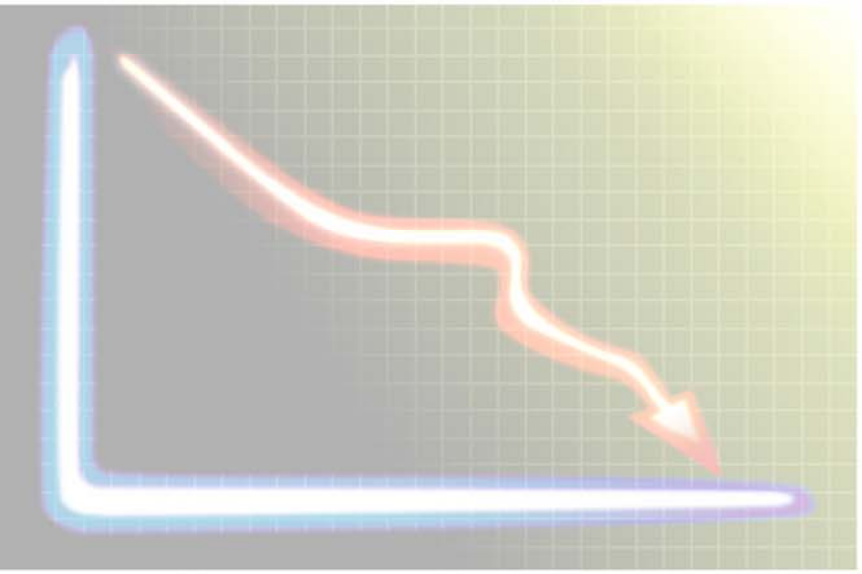
Time to Intervene?

A review of patients who underwent cardiopulmonary resuscitation as a result of an in-hospital cardiorespiratory arrest

NCEPOD



Method

Dr Hannah Shotton

NCEPOD

Introduction

- Rates of survival/recovery following in-hospital CA are poor
  - < 20% survive to discharge
- Variables associated with poorer outcome
  - Age, Sex, Co-morbidities, cause of CA etc.
  - Patients with VF arrest resulting from primary myocardial ischemia
  - Patients with non-cardiac pathology, PEA/asystole

Introduction

- Progressive deterioration leading to CA
  - Indicators of physiological instability
- NICE CG50- recognise and manage the acutely unwell patient
- Study originally planned for 2006/2007
  - Postponed to allow changes in clinical practice time to become embedded
  - 2009 NCEPOD topic selection
- Expert group
  - Role

Study aim

- To describe variability and identify remediable factors in the process of care of adult patients who receive resuscitation in an in-hospital setting, including:
  - Factors which may affect the decision to initiate the resuscitation attempt
  - The outcome and the quality of care following the resuscitation attempt
  - To determine antecedents in the preceding 48 hours, and possible opportunities for intervention

Study objectives

1. Describe the organisational structures and governance in place to provide resuscitation
2. Describe the structures in place to identify patients who might suffer arrest, and so identify opportunities to intervene
3. Review outcome following resuscitation
4. Review the DNACPR policy in patients who have suffered an arrest and describe the appropriateness of resuscitation in regard to the patient on whom the attempt was made

Study objectives

5. Describe the process of resuscitation attempt, and so differentiate between the organisational structures in place to provide resuscitation and what actually happens
6. Determine the quality of care in the 48 hours prior to cardiac arrest
7. Determine the quality of care in the post-resuscitation period

Method

- Hospital participation
  - Organisational questionnaire
- Data collection
  - Prospective
  - Retrospective, peer review

Method

- Prospective study
  - Resuscitation form
  - Time period
  - Population
  - Exclusions

Method

- Peer review study
  - Case identification
  - Clinician questionnaire
  - Case note extracts
  - Cases reviewed by multidisciplinary group of advisors

Data returns

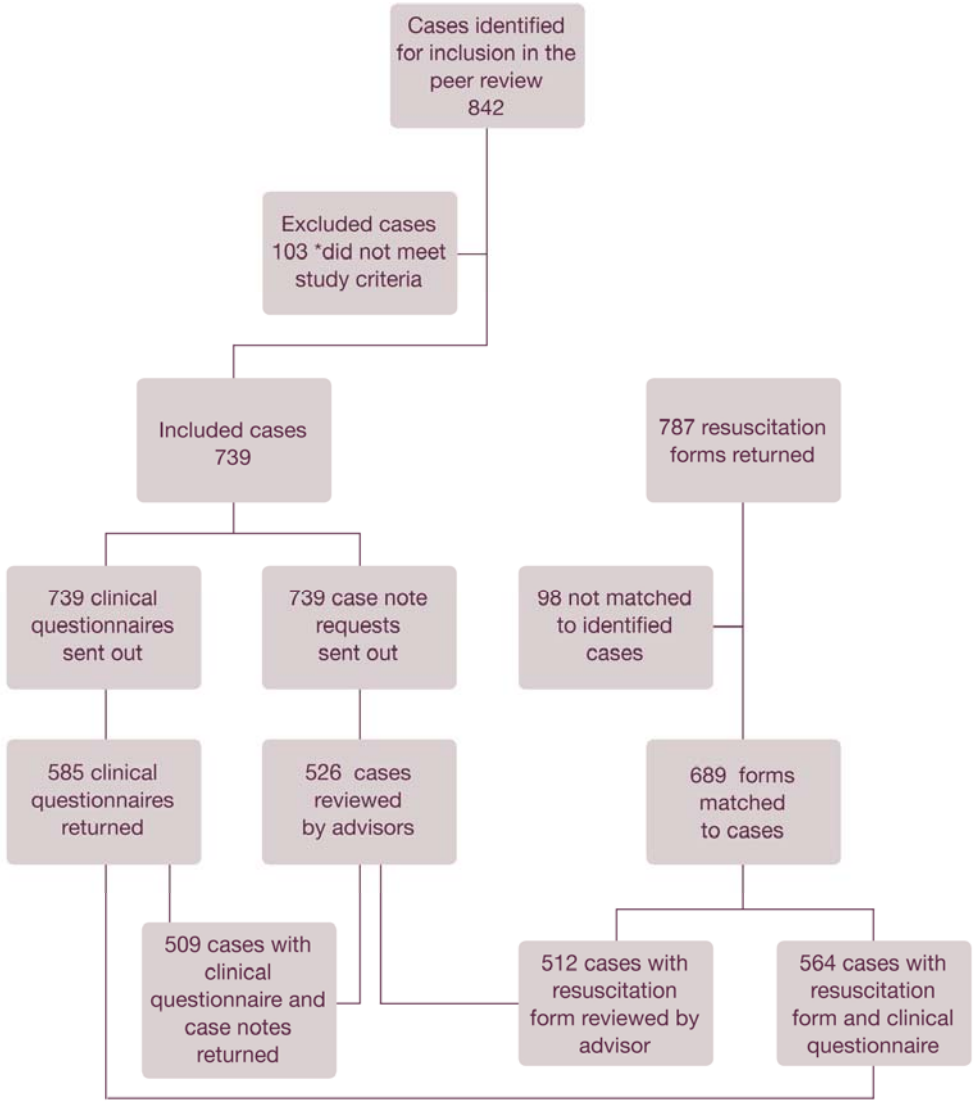


Figure 1.1 Data returned

Overall quality of care

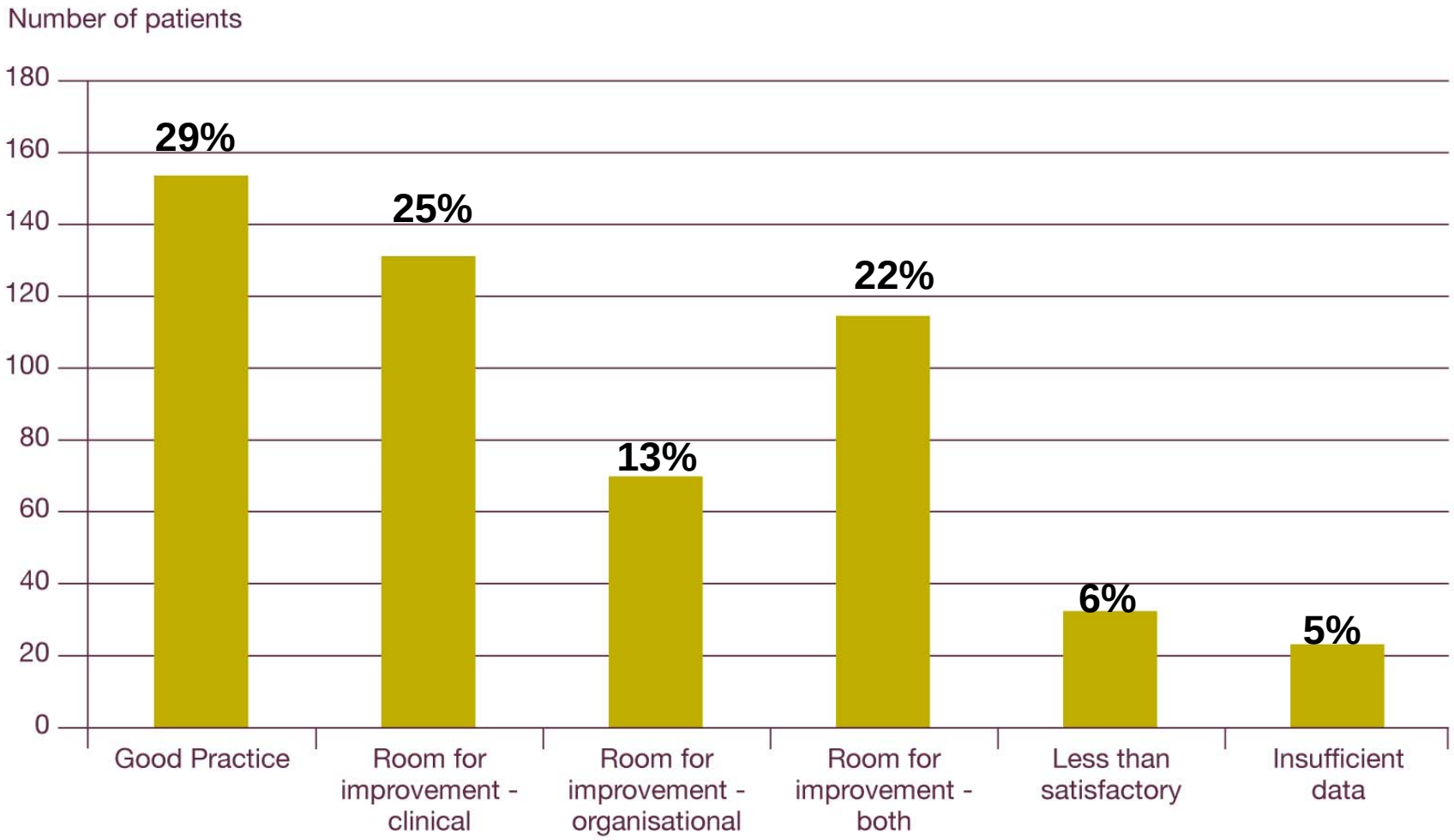
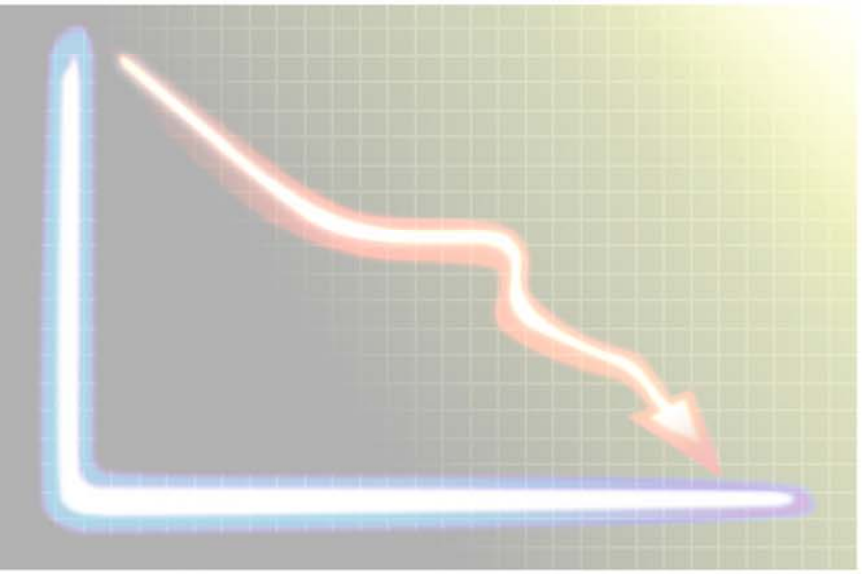


Figure 8.1 Overall quality of care - Advisors' opinion



Study Population

Dr George Findlay

NCEPOD

Age

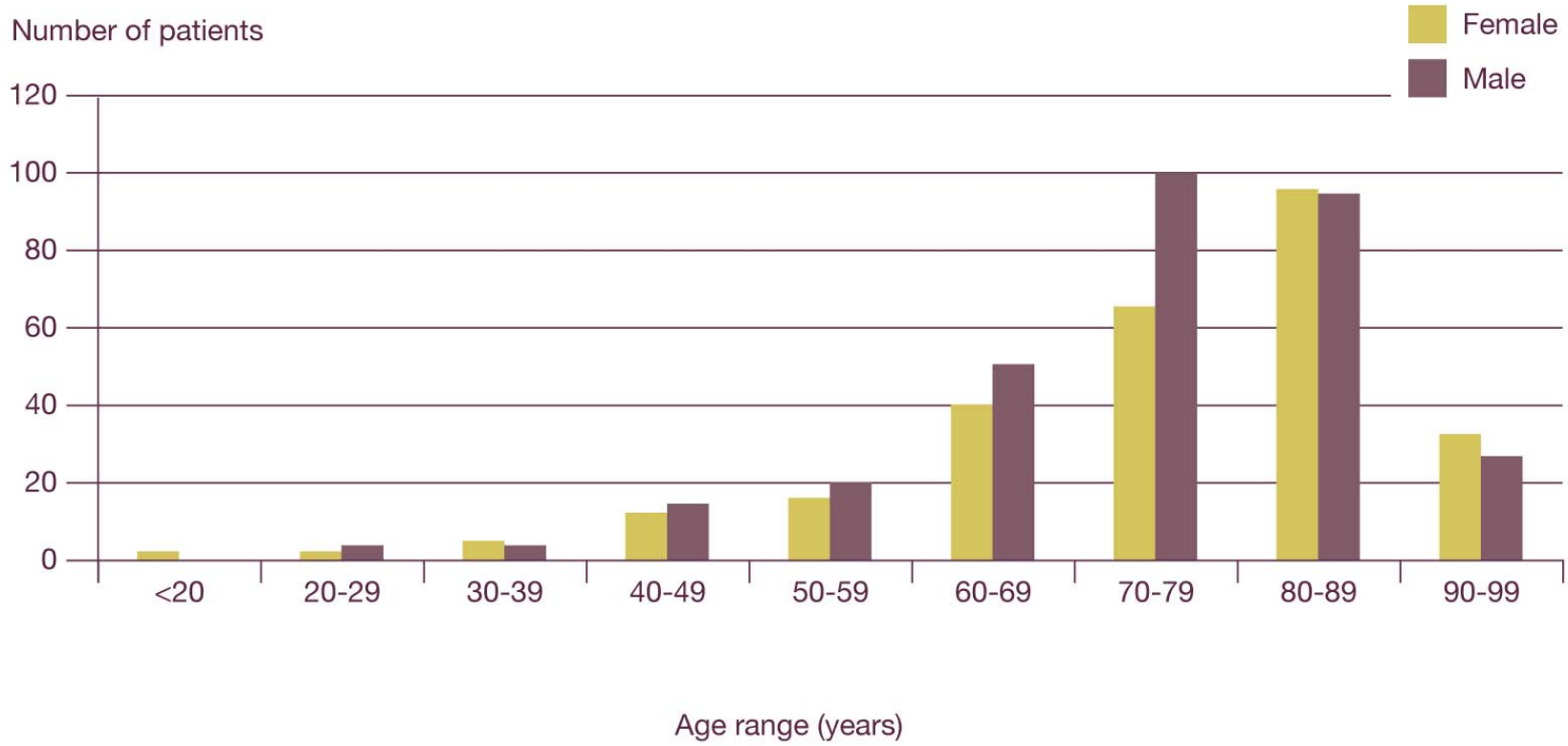


Figure 3.1 Age and gender of the study population *(n=585)*

- Median age – 77 years
- 272/585 patients female (46%)

Comorbid and acute disease

Table 3.1 Chronic disease comorbidities

Comorbidities	n	Subtotal
Cardiovascular	341	524
Respiratory	170	491
Renal	133	483
Immunosuppression	50	456
Liver insufficiency	34	451

Answers may be multiple

Table 3.2 McCabe Classification

Classification	n	%
Rapidly fatal	109	21.2
Ultimately fatal	236	46
Non fatal	168	32.7
Subtotal	**513**	
Not answered	72	
Total	**585**	

- High prevalence of chronic disease
  - Particularly cardiovascular and respiratory
- 1 in 5 patients thought to have rapidly fatal disease

Functional status

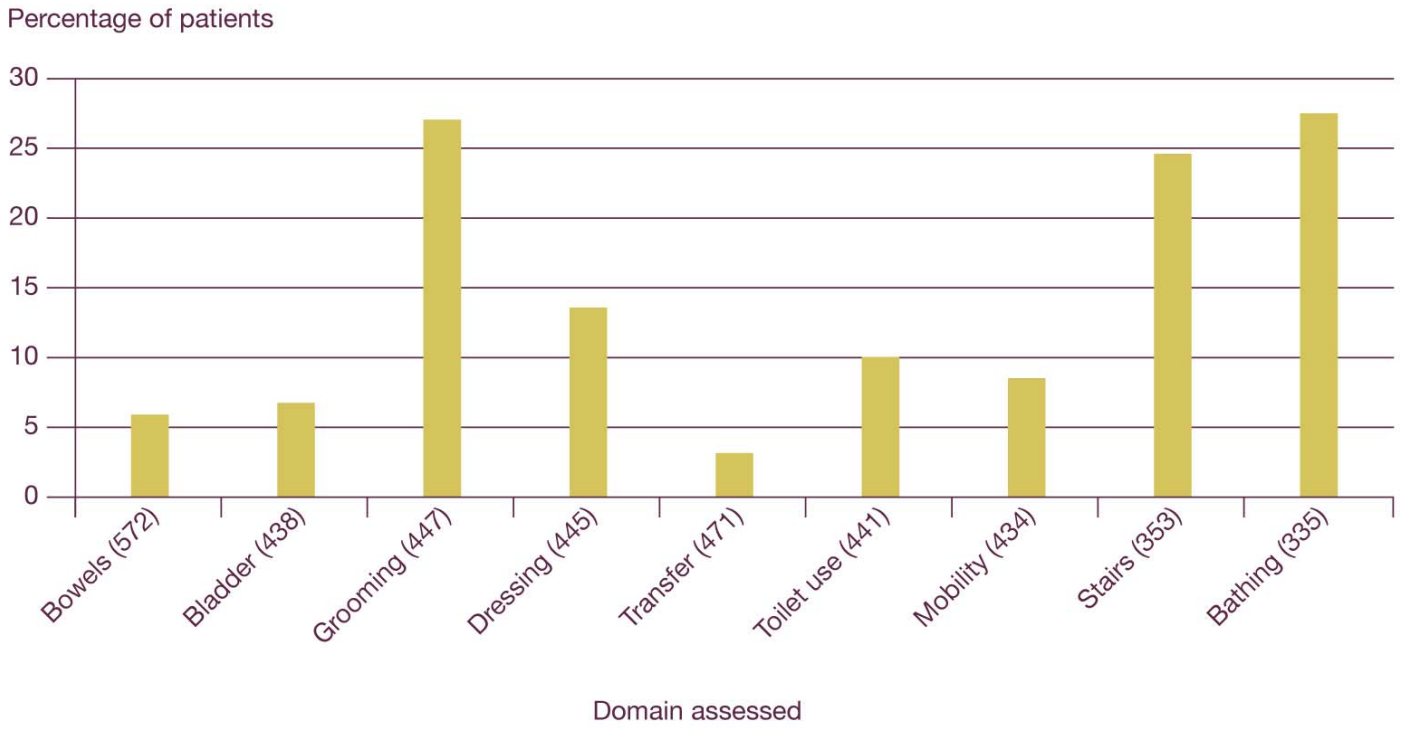


Figure 3.3. Barthel Index of Activities of Daily living: Percentage of patients scoring zero for each domain (i.e. much help required). Denominator for each domain is shown in brackets.

- Substantial functional deficits
- In addition 1 in 5 admitted not from home

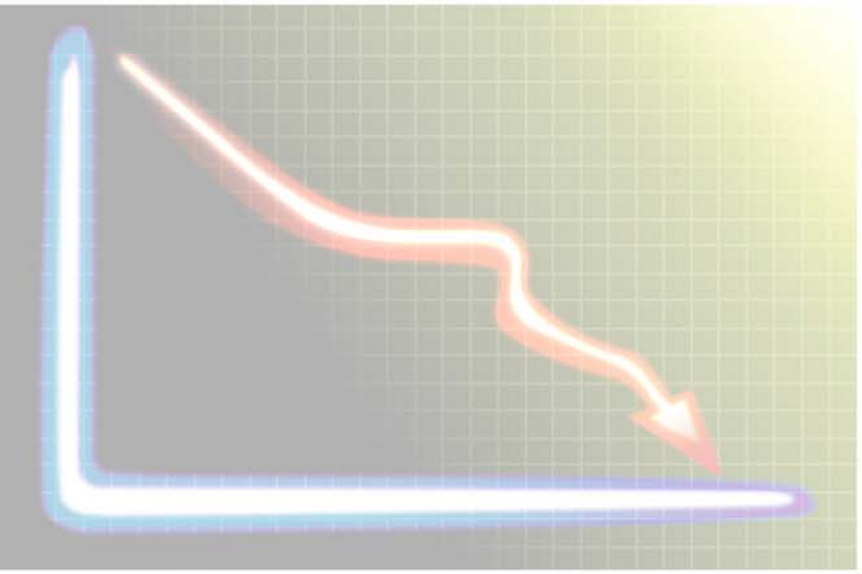
A reminder

INCLUDED

- Patients who deteriorate and have CPR attempt

NOT INCLUDED

- Patients who get better
- Patients who die but DNACPR has been followed



Admission and Assessment

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Day of admission

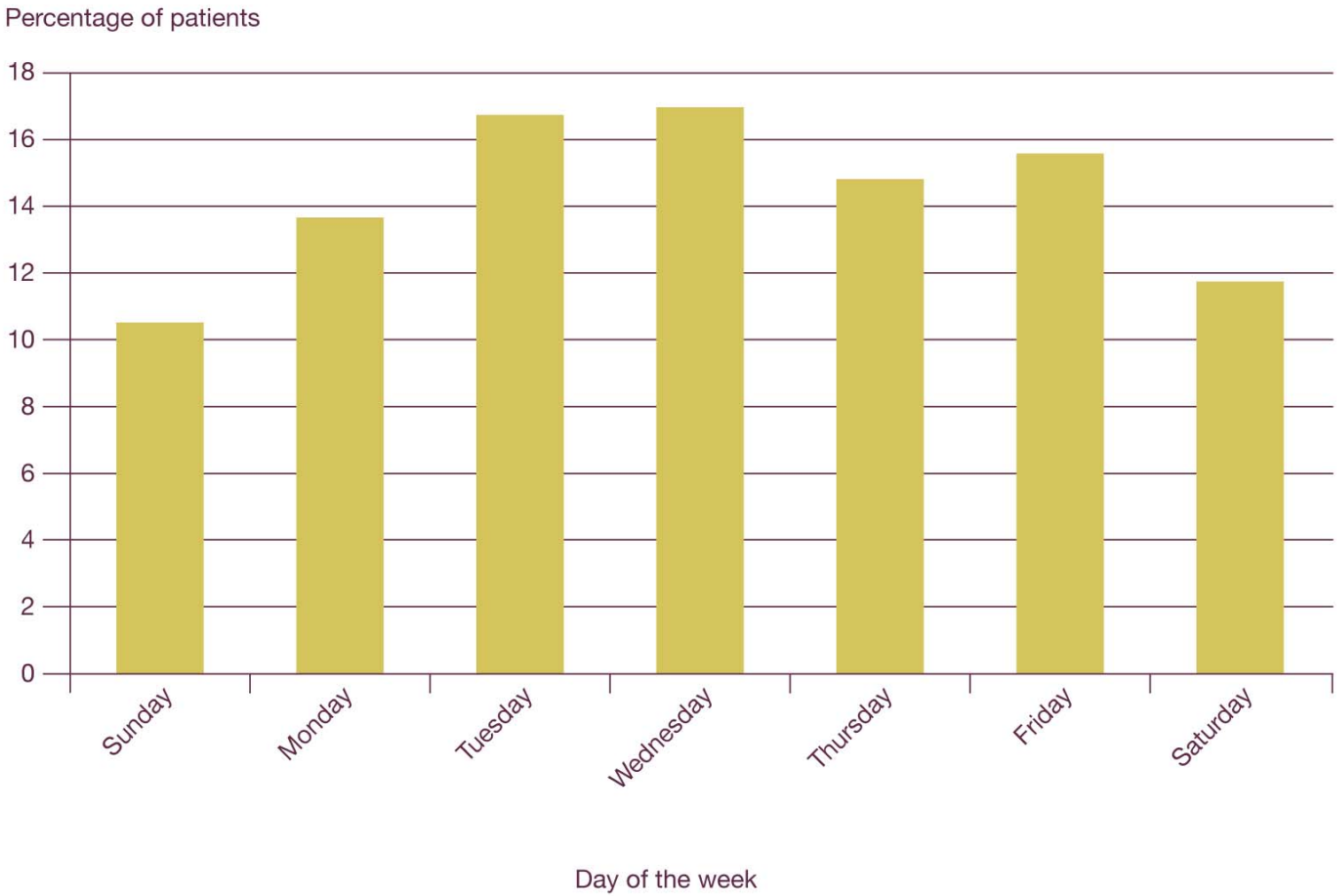


Figure 3.4 Day of the week patients were admitted to hospital *(n= 585)*

Time of admission

Table 3.4 Time of admission to hospital

Time	n	%
00:00-07:59	91	15.6
08:00-17:59	270	46.2
18:00-23:59	145	24.8
Unknown	79	13.5
Total	**585**	

- Almost 4 in 5 admitted Mon – Fri
- Almost half admitted 0800-1800

Initial location

Table 3.5 Location that patients were first admitted to

Type of ward	n	%
Medical ward	221	37.8
Emergency department	114	19.5
Surgical ward	83	14.2
Coronary care unit	54	9.2
Level 3 care	13	2.2
Level 2 care	4	<1
Outpatient department	1	<1
Other	89	15.2
Unknown	6	1.0
Total	**585**	

- Mostly emergency admissions
  - Only 7% planned admissions

Who performs initial assessment?

Table 3.8 Grade of clinician undertaking the initial assessment

Grade of clinician	n	%
Consultant	11	3.0
Staff grade/associate specialist	3	<1
Trainee with CCT	3	<1
Senior specialist trainee	38	10.5
Junior specialist trainee	39	10.8
Basic grade	241	66.6
Specialist nurse practitioner	5	1.4
Other registered nurse	13	3.6
Resuscitation officer	2	<1
Other	7	1.9
Subtotal	**362**	
Unknown	164	
Total	**526**	

History

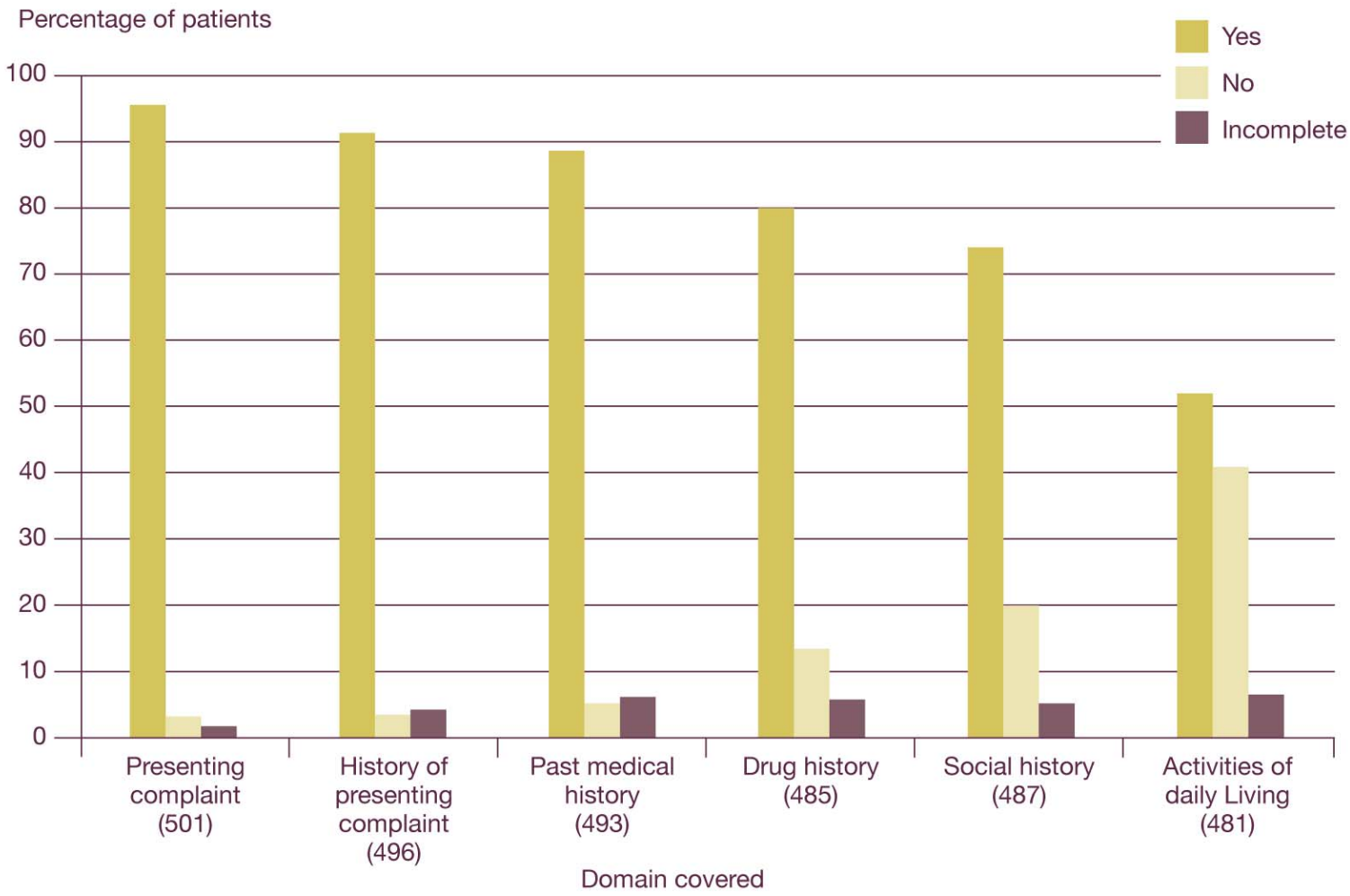


Figure 3.6 Elements of medical history covered by initial assessment ***(the denominator for each domain is shown in brackets).***

History in context

Table 3.10 Adequacy of the past medical history taken - Advisors' opinion

Adequate history was taken	n	%
Yes	419	85.7
No	70	14.3
Subtotal	**489**	
Unknown	37	
Total	**526**	

- Almost 1 in 6 inadequate history

Physical examination

Table 3.11 Assessment of elements of physical examination determined by the Advisors

System assessed	n	%
Cardiovascular system	448	93.5
Respiratory system	432	90.2
Gastrointestinal system	362	75.6
Central nervous system	290	60.5
Genitourinary system	120	25.1
None	17	3.5

Answers may be multiple (n/479; not answered in 13 and insufficient data in 34)

- Peer review from notes
- No value judgment - facts

Physical examination

Table 3.12 Completeness of clinical examination at the first contact - Advisors' opinion

Complete clinical examination	n	%
Yes	362	75.6
No	117	24.4
Subtotal	**479**	
Unknown	47	
Total	**526**	

- Context important
- 1 in 4 incomplete initial clinical exam

Outputs from initial assessment

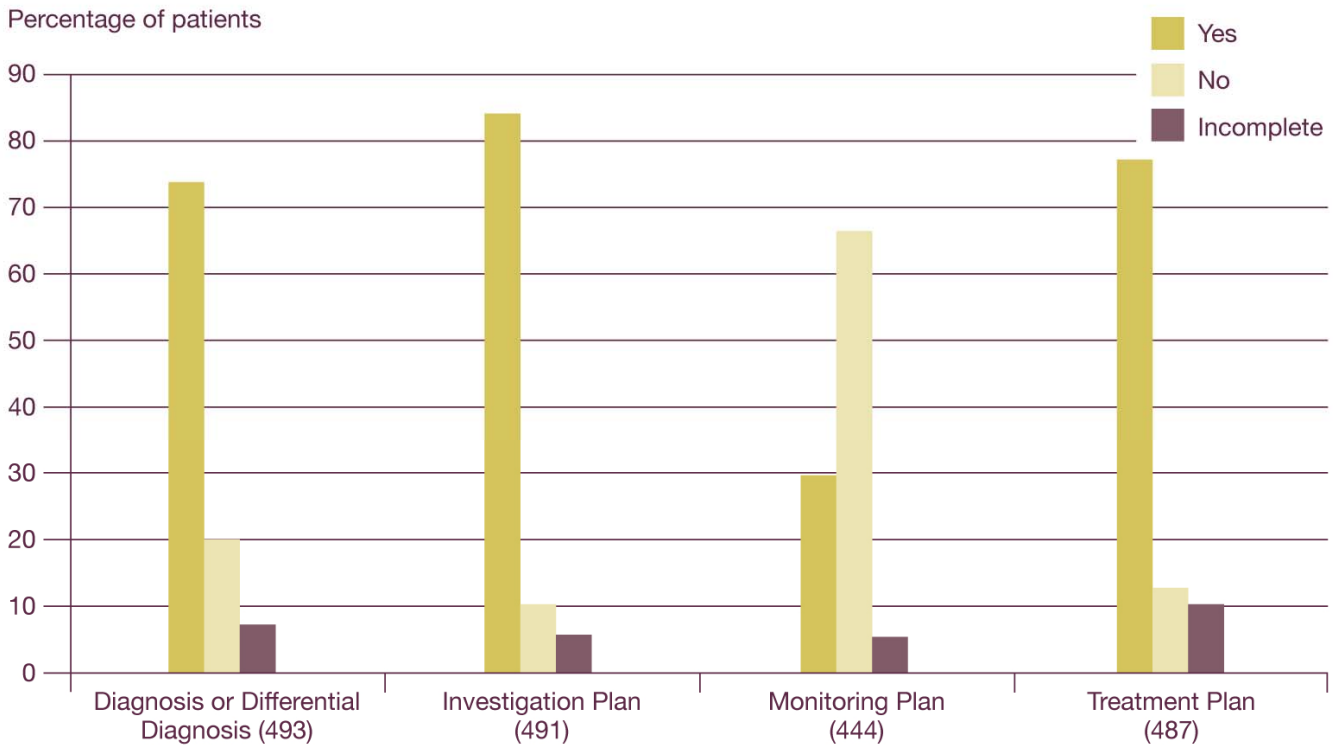


Figure 3.7 Outputs from initial assessment ***(denominator for each question is shown in brackets)***

- Plan – senior review
- Multiple repeat process
- Driven by hierarchical approach?

Appreciation of situation

Table 3.13 Severity of condition recognised by the admitting doctor - Advisors' opinion

Severity of the situation was appreciated	n	%
Yes	342	82.2
No	74	17.8
Subtotal	**416**	
Unknown	110	
Total	**526**	

- Almost 1 in 5 cases were not appreciated
- A safety concern
  - An obstacle to rapid intervention / escalation
- A function of seniority?

Appreciation of situation

Table 3.14 Grade of clinician making the initial assessment where severity of the situation was not recognised - Advisors' opinion

Grade of clinician	Total
Consultant	2
Staff grade	1
Senior specialist trainee	3
Junior specialist trainee	4
Basic grade	34
Specialist nurse practitioner	1
Other registered nurse	3
Other	2
Subtotal	**50**
Not answered	24
Total	**74**

Escalation

Table 3.15 Timely escalation of care - Advisors' opinion

Timely escalation of care	n	%
Yes	286	82.4
No	61	17.6
Subtotal	**347**	
Escalation not required	59	
Unknown	120	
Total	**526**	

- 1 in 5 – same cases as not appreciated?
- Delays and safety concerns

Appreciation and escalation

Table 3.16 Timely escalation against appreciation of the severity of illness by the clerking doctor - Advisors' opinion

	Appreciation of the severity of situation			
Timely escalation of care	**Yes**	**No**	**Unknown**	**Total**
Yes	216	31	39	286
No	31	23	7	61
Subtotal	**247**	**54**	**46**	**347**
Escalation not required	44	4	11	59
Unknown	51	16	53	120
Total	**342**	**74**	**110**	**526**

- 61 lack of timely escalation
- Only 23 of these were there problems with appreciation of severity

Case study

Case study 1

An elderly patient was admitted to a medical assessment unit because of shortness of breath. The patient had a long past medical history including life-long smoking, diabetes, ischaemic heart disease, previous coronary artery surgery, heart failure and chronic kidney disease. The patient was assessed promptly by an FY2 doctor who made a differential diagnosis of heart failure or chest infection and started treatment with antibiotics and increased diuretics. At the time the patient was distressed and unable to speak, oxygen saturations were 84% on high-flow oxygen, respiratory rate was 32 breaths per minute, blood pressure was 85/45 mmHg, pulse rate 140 beats per minute (atrial fibrillation) and arterial blood gasses showed a compensated metabolic acidosis. There was no record of escalation to more senior doctors.

Six hours after admission to the medical assessment unit the patient had a PEA cardiac arrest and despite prompt CPR that continued for 15 minutes the patient could not be resuscitated. The patient had not been reviewed by any senior doctors prior to this.

Advisors raised concerns about recognition of severity of situation and escalation to more senior doctors. They also raised concern that there was no intervention to treat rapid atrial fibrillation. The Advisors considered that more senior involvement may have lead to a referral for higher level of care and also that CPR status may have been considered.

Ongoing management

Table 3.17 Differential diagnosis was made and recorded during the initial review

Diagnosis or differential diagnosis was made	n	%
Yes	442	91.1
No	43	8.9
Subtotal	**485**	
Unknown	41	
Total	**526**	

- Period up to consultant review (or 24hrs)
- 1 in 10 no diagnosis or differential
- Where diagnosis or differential was stated 1 in 10 did not include correct diagnosis

Treatment planning

Table 3.20 Timely treatment against appropriate treatment - Advisors' opinion

Treatment was timely	Treatment was appropriate		
	Yes	No	**Total**
Yes	353	28	**381**
No	44	34	**78**
Total	**397**	**62**	**459**

Not answered in 67 cases

- A reasonable treatment plan – 81/490 (83.5%)
- Timely and appropriate 353/459 (77%)
  - Not timely 78/459 (17%)
  - Not appropriate 62/459 (14%)

CPR status

Table 3.21 Resuscitation status recorded

Decision about CPR status was recorded	n	%
Yes	44	10.1
No	391	89.9
Subtotal	**435**	
Insufficient data	91	
Total	**526**	

- CPR status recorded in 44 patients only (10%)
- Remember population
  - Age, comorbidity, functional status, acute disease

Advisor opinion of CPR status

Table 3.22 Actions regarding DNACPR status were appropriate - Advisors' opinion

Appropriate DNACPR status	n	%
Yes	237	63.2
No	138	36.8
Subtotal	**375**	
Insufficient data	151	
Total	**526**	

- Difficult to assess
- However – 1 in 3 cases felt to be inappropriate actions
- Mainly DNACPR

Advisor opinion – global assessment

Table 3.23 Deficiencies in initial assessment - Advisors' opinion

Deficiencies in the initial assessment	n	%
Yes	230	47.6
No	253	52.4
Subtotal	**483**	
Insufficient data	43	
Total	**526**	

- 1 in 2 cases judged to have deficiencies in initial assessment and treatment phase
- Not a good start for optimal care

Where were the deficiencies?

Table 3.24 Areas of deficiencies in care - Advisors' opinion

Deficiencies	n	%
Decision making with regards to CPR status	107	48.0
Examination	85	38.1
Treatment plan	79	35.4
Diagnosis	76	34.1
Recognition of severity of illness	69	30.9
Seniority of doctor	68	30.5
History taking	60	26.9
Monitoring	66	29.6
Investigation	66	29.6

Answers may be multiple (n/223; not answered in 7)

Care location

Table 3.25 Initial location where care was provided

Level of care	n	%
Level 1 care	402	83.2
Level 2 care	62	12.8
Level 3 care	19	3.9
Subtotal	**483**	
Unknown	43	
Total	**526**	

- Mainly ward care
- 1 in 10 level 2 (HDU)

Advisor opinion

Table 3.26 Actual level of care provided assessed by Advisors' opinion of where the patient should have gone

	Level of care				
Advisors' opinion of required level of care	Level 1 care	Level 2 care	Level 3 care	Unable to answer	Total
Level 1 care	355	0	1	9	**365**
Level 2 care	35	61	0	13	**109**
Level 3 care	2	0	18	1	**21**
Subtotal	**392**	**61**	**19**	**23**	**495**
Unknown	10	1	0	20	**31**
Total	**402**	**62**	**19**	**43**	**526**

- Those admitted to Level 2 or 3 are in right place
- 1 in 10 ward patients should be in higher care setting

First consultant review

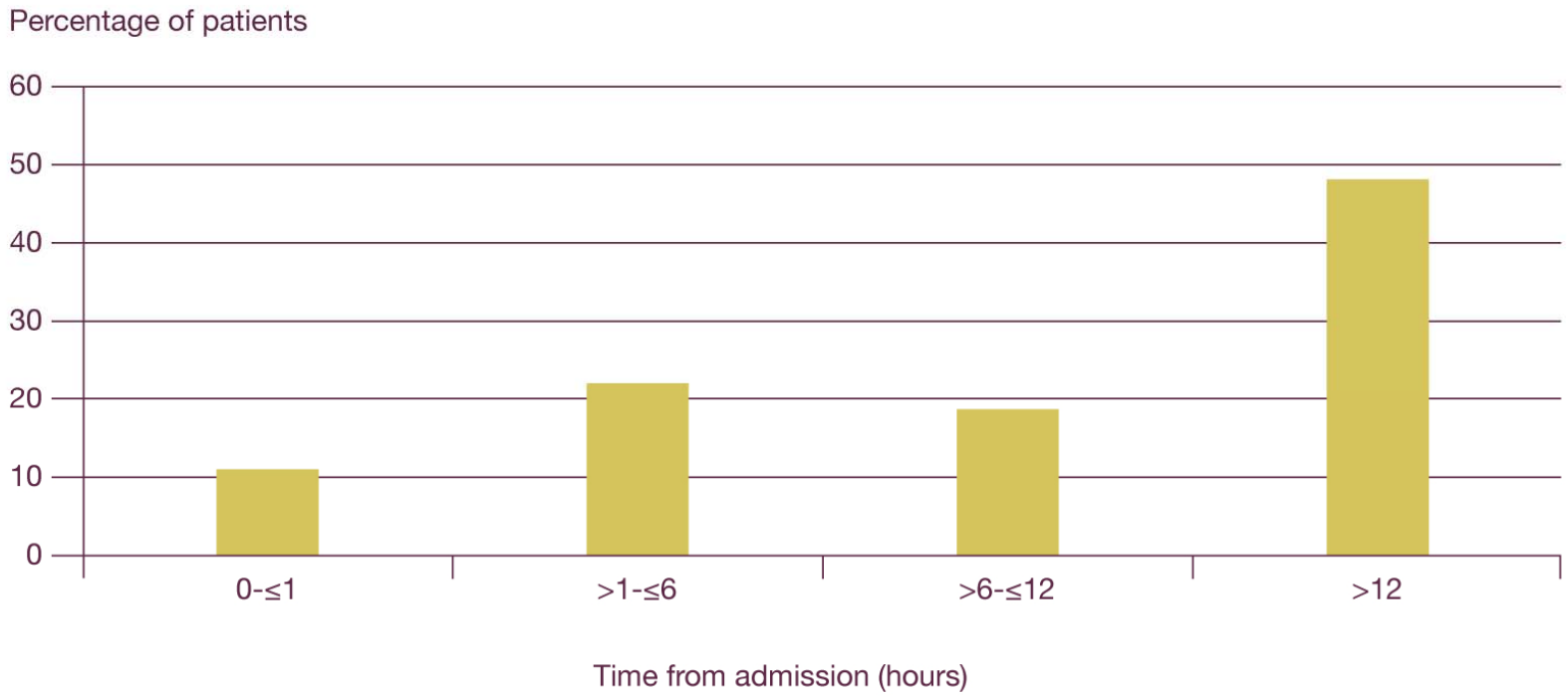


Figure 3.8 Timing of first consultant review *(n=198, data missing in 79)*

- First consultant review recorded in 277/521 cases (53%)
- 1 in 2 greater than 12 hours

Advisor opinion

Table 3.28 Timely consultant review - Advisors' opinion

Timely consultant review	n	%
Yes	212	82.5
No	45	17.5
Subtotal	**257**	
Unknown	20	
Total	**277**	

- Maximum 12 hours?
- Earlier if required
- Safety net and supervision
- Doves not hawks

When is time an issue?

Table 3.29 Consultant review was within an appropriate timeframe for the patients' condition by time of admission

	Consultant review within appropriate timeframe			
Time of admission	**Yes**	**No**	**Unknown**	**Total**
00:00-07:59	33	4	5	42
08:00-17:59	105	27	9	141
18:00-23:59	54	6	3	63
Subtotal	**192**	**37**	**17**	**246**
Not answered	20	8	3	31
Total	**212**	**45**	**20**	**277**

- Consultant working 24/7
- Conflict of scheduled / unscheduled work
- Priority for unscheduled care

Impact of consultant review

Table 3.30 Changes in management of care following consultant review

Changes made in:	n	%
Investigations	100	39.1
Monitoring	29	11.3
Diagnosis	34	13.3
Other	82	32.0
No evidence of change	83	32.4

Answers may be multiple (n/256; not answered in 21)

- Changes in 6/10 cases

Consultant review and CPR

Table 3.31 CPR status was considered

CPR status was considered	n	%
Yes	31	13.2
No	203	86.8
Subtotal	**234**	
Unknown	43	
Total	**277**	

- Lack of evidence of CPR consideration
  - ? Done but not recorded v Not done
- Remember population
  - Age, comorbidity, functional status, acute disease

Case study

Case study 6

A middle-aged patient was admitted to hospital with an infective exacerbation of chronic lung disease. This was the fourth admission within the previous 12 months. At home, the patient was housebound and unable to walk more than 10-15 metres due to breathlessness. The admission process and initial treatment were excellent and confirmed at consultant review which occurred within 12 hours of admission to hospital. At this review, after discussion with the patient, it was agreed that care would not be escalated to tracheal intubation and ventilation should the patient fail to respond to treatment. CPR status was not discussed or documented. The patient had a cardiac arrest 48 hours after hospital admission and underwent a 25 minute period of unsuccessful CPR.

CPR was unlikely to work in this case and, in the opinion of the Advisors, a DNACPR decision should have been made and documented. Whilst DNACPR in the event of a cardiac arrest does not stop the provision of other active treatment measures to prevent deterioration, it appeared that there may have been a concern that making a DNACPR decision would result in less than full treatment and contribute to poor outcome.

Key findings

- An adequate history was not recorded in 70/489 cases (14%) and clinical examination was incomplete at first contact in 117/479 cases (24%)
- Appreciation of the severity of the situation was lacking in 74/416 (18%)
- Timely escalation to more senior doctors was lacking in 61/347 (18%)
- Initial assessment (up to first consultant review or first 24 hours if consultant review could not be identified) was considered to be deficient in 230/483 (48%) cases

Key findings

- Deficiencies were present in many domains but by far the greatest number of concerns was raised about decisions regarding CPR status (107 cases)
- Decisions about CPR status were documented in the admission notes in 44/435 cases (10%). This is despite the high incidence of chronic disease and almost one in four cases being expected to be rapidly fatal on admission
- Advisors were of the opinion that a further 89 patients should have had a DNACPR decision made in this initial phase of their treatment

Key findings

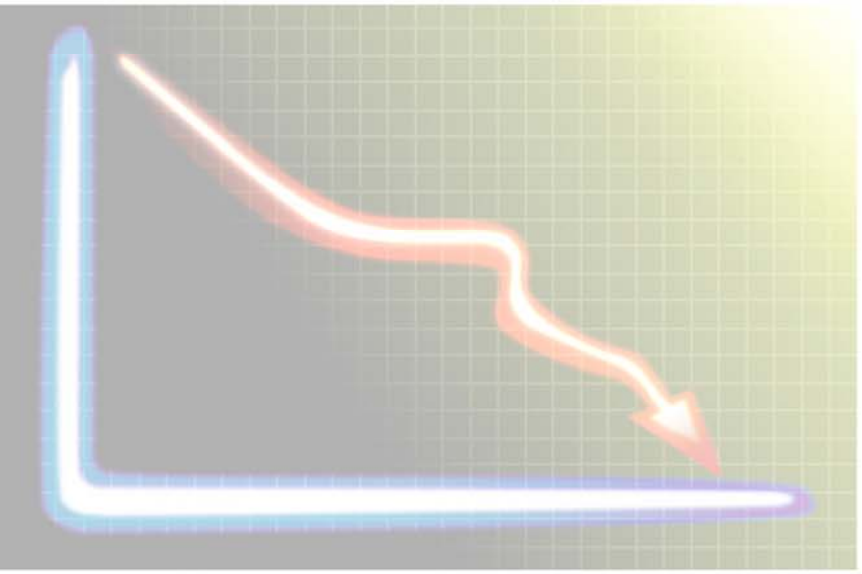
- First consultant review could be identified only in 277/521 cases (53%) and time to first consultant review could be determined only in 198/521 cases (38%)
- Where time to first consultant review could be identified it was more than 12 hours in 95/198 cases (48%)
- CPR status was considered in only 31/234 cases at first consultant review (13%)

Recommendations

- Clerking and examination
- Supervision, recognition and escalation
- Case notes
- Consultant review within 12 hours

Recommendations

- CPR status must be considered and recorded for all acute admissions, ideally during the initial admission process and definitely at the initial consultant review when an explicit decision should be made, and clearly documented (for CPR or DNACPR). When, during the initial admission, CPR is considered as inappropriate, consultant involvement must occur at that time.



Care in 48 hours prior to cardiac arrest

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Location at time of arrest

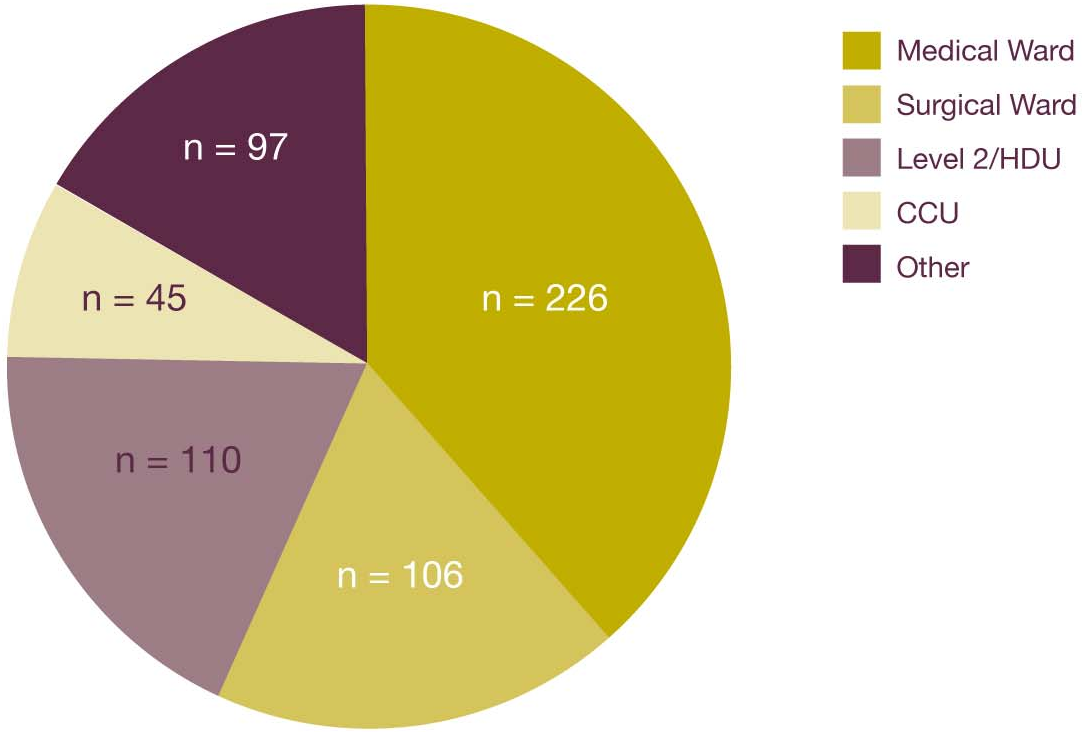


Figure 4.1. Type of ward the patient was on at the time of cardiac arrest
(n=584, not answered in one)

Was this correct location?

Table 4.1 Appropriate ward for the care needed by the patient

Appropriate ward	n	%
Yes	521	92.2
No	44	7.8
Subtotal	**565**	
Unknown	20	
Total	**585**	

- Treating clinician opinion
- Mainly correct location

Where location was thought be wrong

Table 4.2 Location where the patients should have been cared for - Responsible clinicians' opinion

Location	Total
Level 3 care	3
Level 2 care	13
Coronary care unit	8
Surgical ward	2
Medical ward	7
Other	10
Subtotal	**43**
Not answered	1
Total	**44**

- 1 in 2 – Level 2 / 3 / CCU

Duration of hospital stay

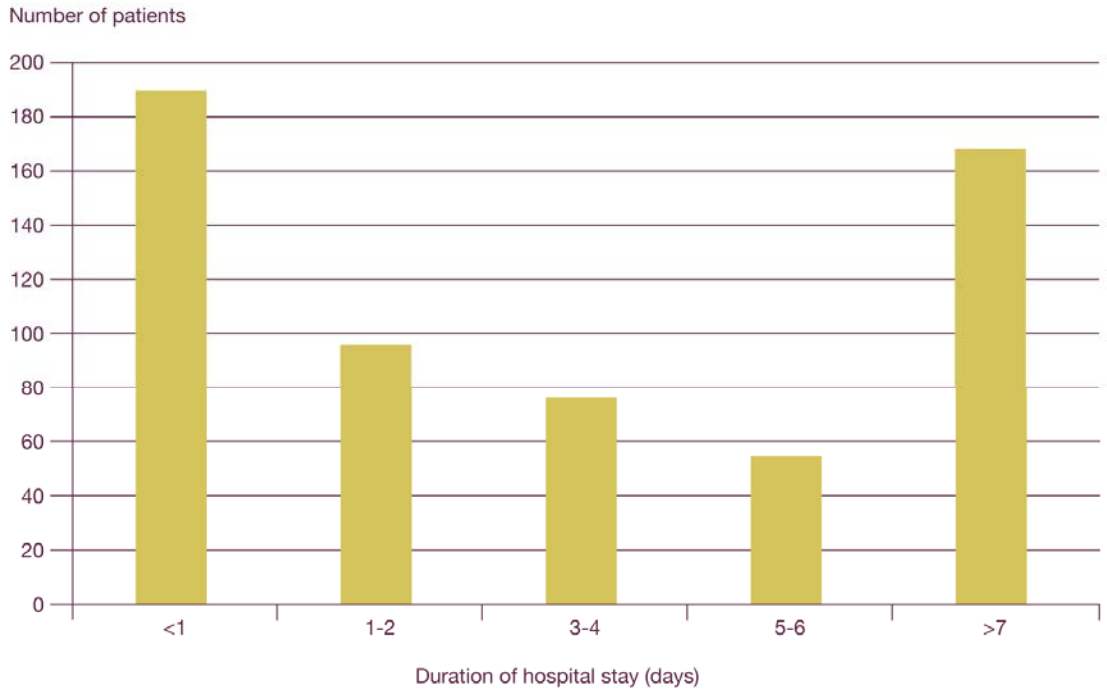


Figure 4.2 Duration of hospital stay prior to cardiac arrest
(n=583, not answered in 2 cases)

- One third in hospital for less than one day prior to cardiac arrest
- Almost one third in hospital for greater than one week

Less than 24 hour stays

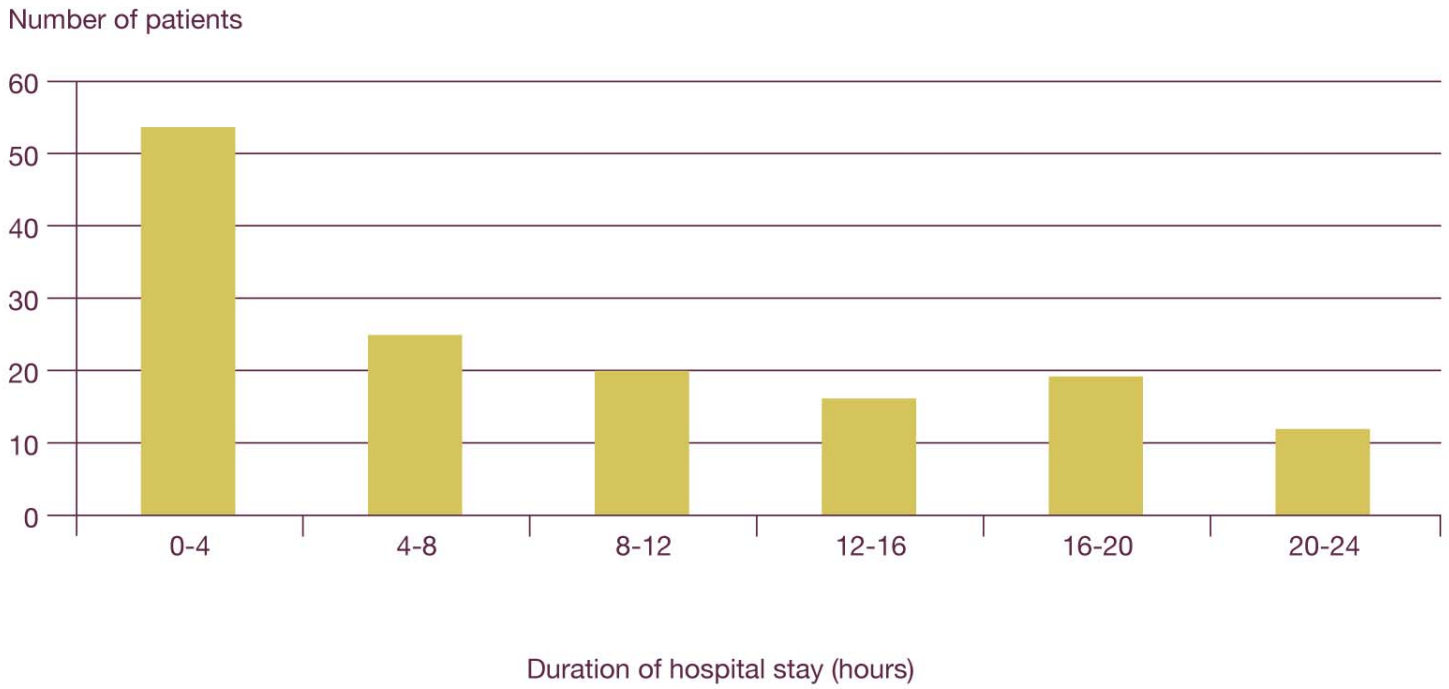


Figure 4.3 Duration of hospital stay in those that stayed less than 24 hours
(n=146, not answered in 43)

- Challenge
- Systems designed around this?

End of life pathway and CPR

Table 4.3 Patients were on an end of life care pathway

End of life care pathway	n	%
Yes	7	1.2
No	566	97.9
Unknown	5	<1
Subtotal	**578**	
Not answered	7	
Total	**585**	

- 6 out of 7 ROSC
- All died in hospital
- A systems problem?

Case study

Case study 7

An elderly patient was admitted to hospital due to pain from abdominal distension secondary to ascites. The cause of ascites was known to be metastatic colonic carcinoma and all therapeutic options had been explored. The patient was on an end of life care pathway and understood that they were nearing the end of life. Paracentesis was performed to ease the symptoms of pain and breathlessness. Forty-eight hours after hospital admission the patient had a PEA cardiac arrest. The cardiac arrest team was summoned and CPR started promptly. After 10 minutes of CPR there was a return of circulation and spontaneous respiratory effort, however the patient remained obtunded and unresponsive. After discussion with the consultant in charge it was decided that further investigation or escalation of care was not appropriate. The patient survived for a further 36 hours but never regained consciousness.

It is not clear why CPR was performed in a patient who was on an end of life care pathway and was nearing the end of life. The Advisors considered this very poor practice.

Physiological observations

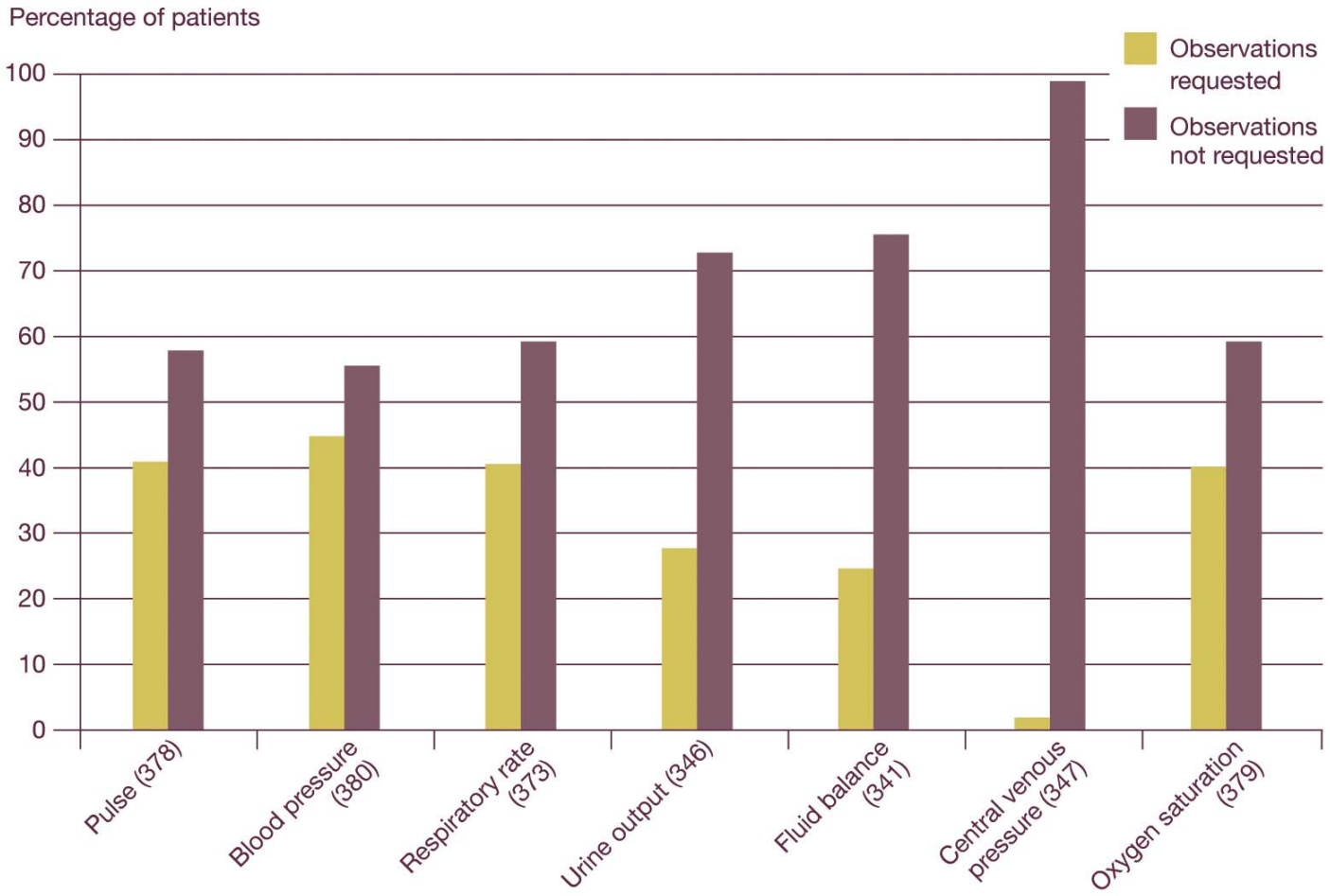


Figure 4.4. Observations that were requested/not requested during the 48 hours prior to cardiac arrest *(the denominator for each domain is shown in brackets)*

Frequency of observations

Table 4.4 Number of patients by requested frequency of observations

Parameter measured	Hourly	Four hourly	Other	Not specified	Number of patients for whom observations requested
Pulse	33	36	50	39	**158**
Blood pressure	34	36	52	47	**169**
Respiratory rate	34	36	46	36	**152**
Urine	30	16	22	27	**95**
Fluid balance	15	6	30	32	**83**
Central venous pressure	2	0	0	3	**5**
Blood oxygen saturation level (SpO_2)	29	35	47	43	**154**
Other	10	6	16	12	**44**

Escalation

Table 4.5 Instructions to nurses about when to alert medical staff that a patient was deteriorating was recorded in the case notes

Instructions recorded	n	%
Yes	85	21.0
No	320	79.0
Subtotal	**405**	
Insufficient data to assess	121	
Total	**526**	

Track and trigger systems

- Organisational data
- 376/380 hospitals used early warning scoring systems
- 365/373 systems were linked to escalation protocols

Evidence of track and trigger systems

Table 4.6 Track and trigger monitoring system used

Track and trigger used	n	%
Yes	282	78.8
No	76	21.2
Subtotal	**358**	
Insufficient data	168	
Total	**526**	

- Standard chart mainly
- Tracking v triggering
- No evidence in 1 in 5 cases
  - At odds with organisational data

Presence of physiological instability

Table 4.7 Patient assessments

Criteria reached in 48 hours prior to cardiac arrest	Yes	%	No	%	Subtotal	Insufficient data	Not answered
Respiratory rate <8 /min	**13**	3.7	**343**	96.3	**356**	131	39
Respiratory rate >30/min	**86**	23.6	**279**	76.4	**365**	124	37
Oxygen saturation <90% on oxygen	**159**	42.0	**220**	58.0	**379**	115	32
Difficulty speaking	**49**	16.2	**253**	83.8	**302**	183	41
Pulse <40 beats/min	**23**	6.3	**344**	93.7	**367**	118	41
Pulse >130 beats/min	**69**	18.6	**301**	81.4	**370**	119	37
Systolic BP <90 mm Hg	**141**	37.3	**237**	62.7	**378**	115	33
Repeated seizures	**2**	<1	**386**	99.5	**388**	96	42
Unexplained decreased consciousness	**59**	15.9	**313**	84.1	**372**	114	40
Agitation/delirium	**43**	12.0	**314**	88.0	**357**	121	48
Other concern	**66**	19.0	**282**	81.0	**348**	115	63

Answers may be multiple

Duration of physiological instability (1)

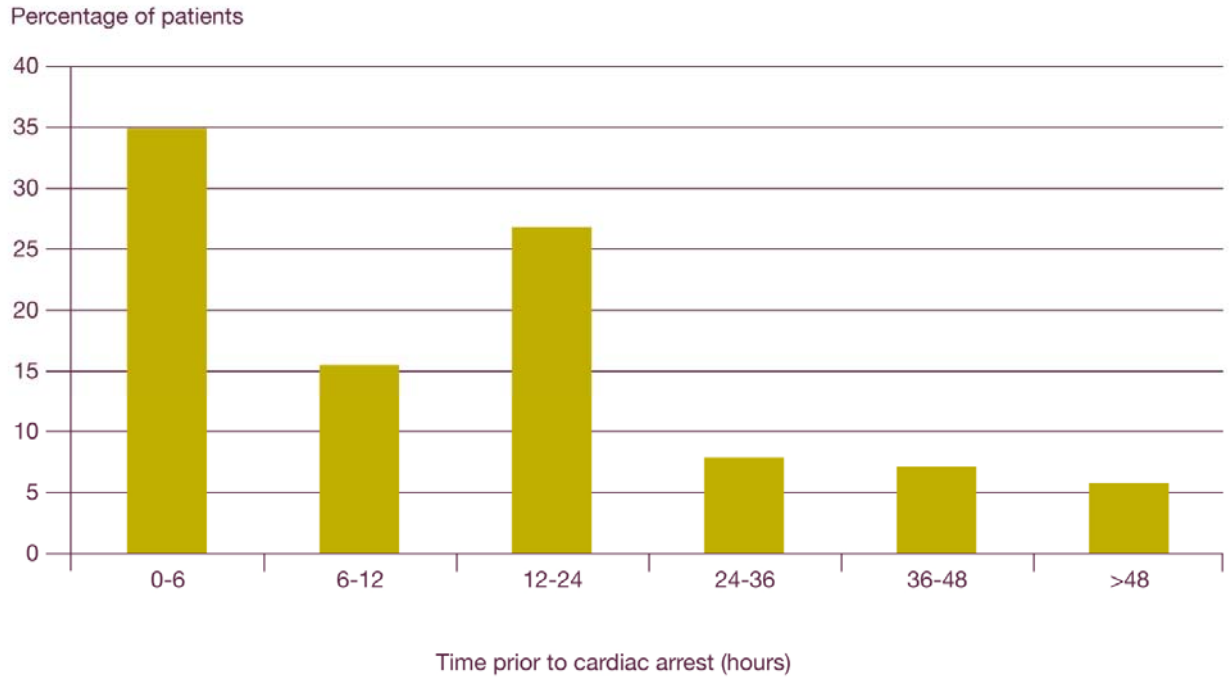


Figure 4.5 First appearance of markers of physiological instability prior to cardiac arrest
(n=190, not answered in 132)

- 62% > 6 hours
- 47% > 12 hours
- ? time to recognise and intervene

Duration of physiological instability (2)

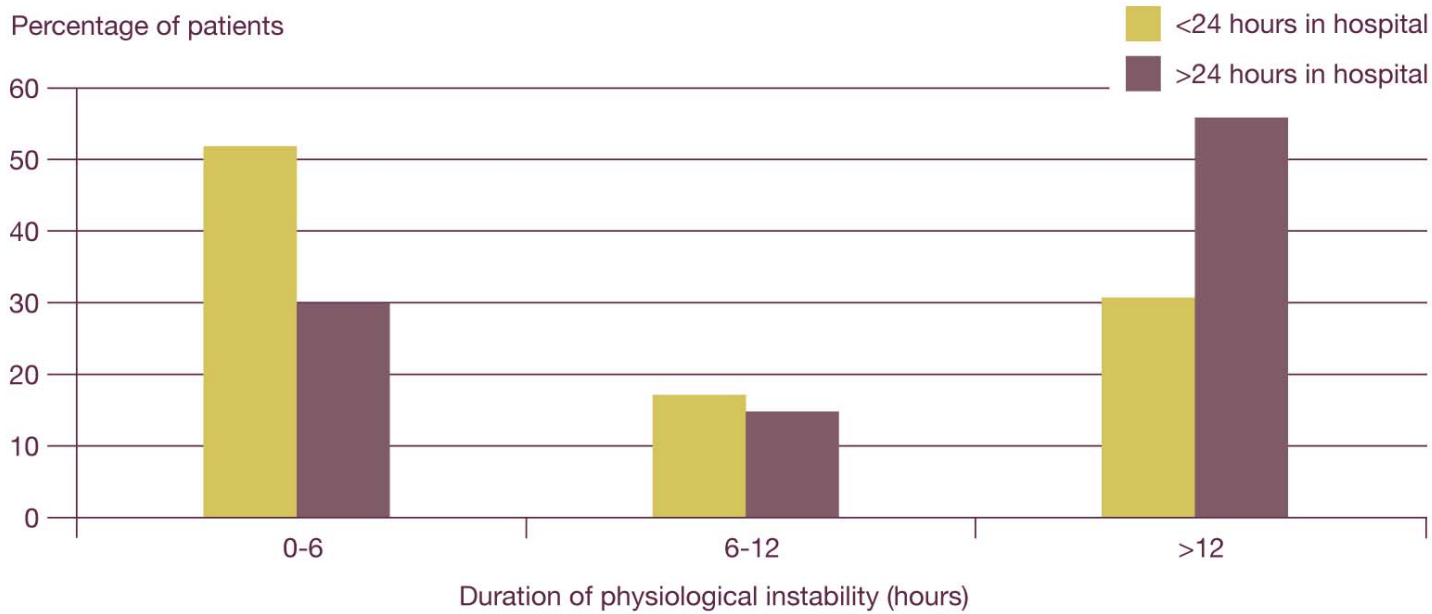


Figure 4.6 Duration of physiological instability for those patients in hospital either less than or longer than 24 hours *(n= 179, not answered in 101)*

- 2/3rds of study population in hospital for >24hrs prior to arrest

Patient reviews (1)

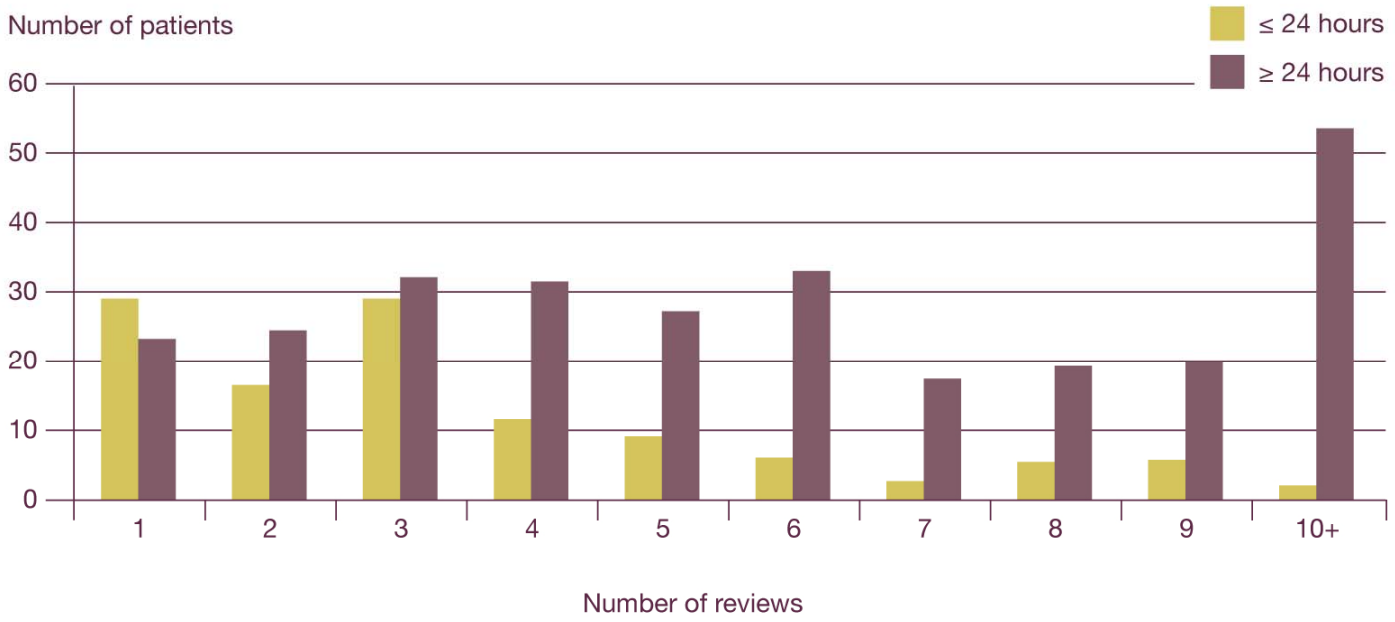


Figure 4.7. Number of reviews in patients in hospital for less than or longer than 24 hours *(n=391, not answered in 135)*

- Many reviews in 48 hour period prior to cardiac arrest
- 60 patients had 10 or greater reviews
- Track and trigger?

Patient reviews (2)

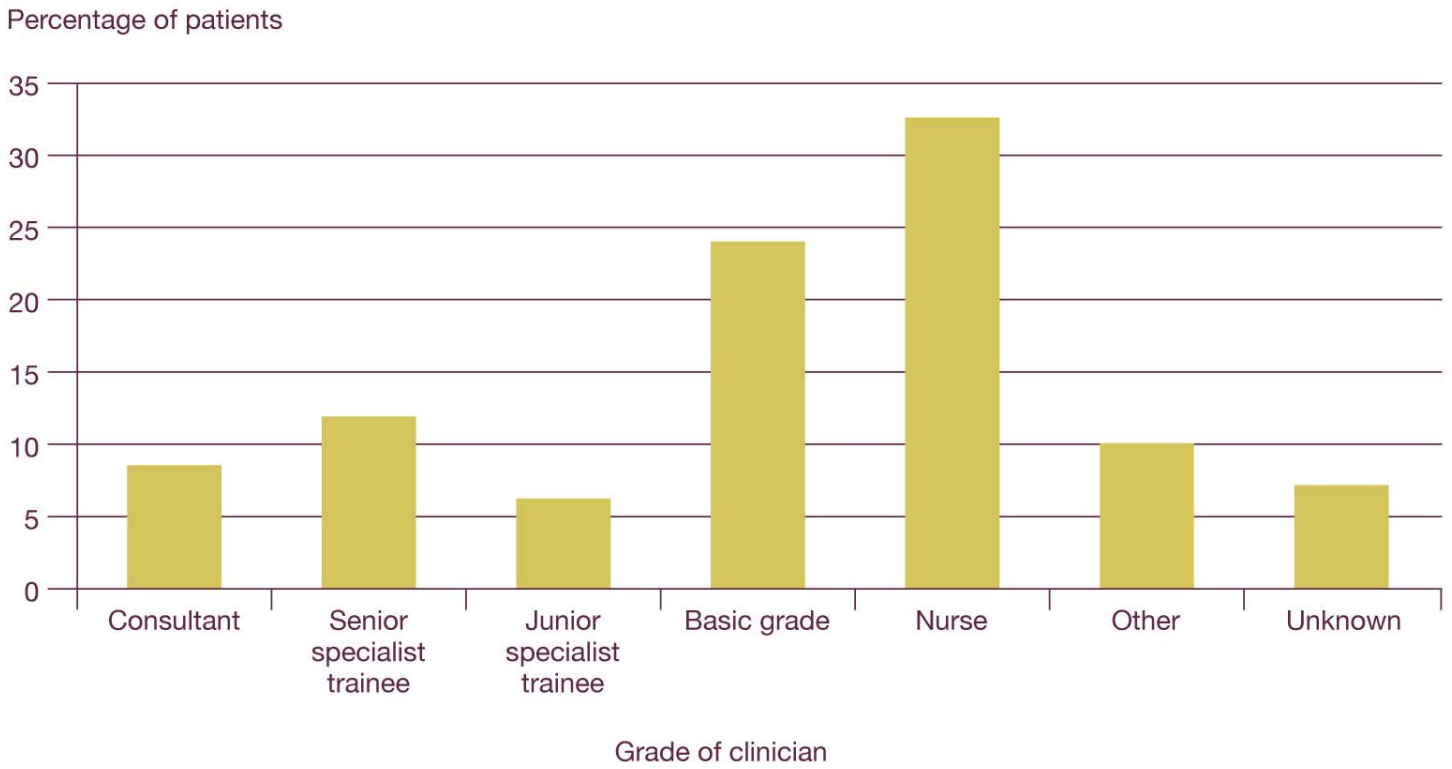


Figure 4.8 Summary of the grade of clinician reviewing patients during the 48 hours prior to cardiac arrest *(n=2368)*

- 2368 reviews with grade
- 24% by nursing staff
- 33% by basic grade doctors

Patient reviews (3)

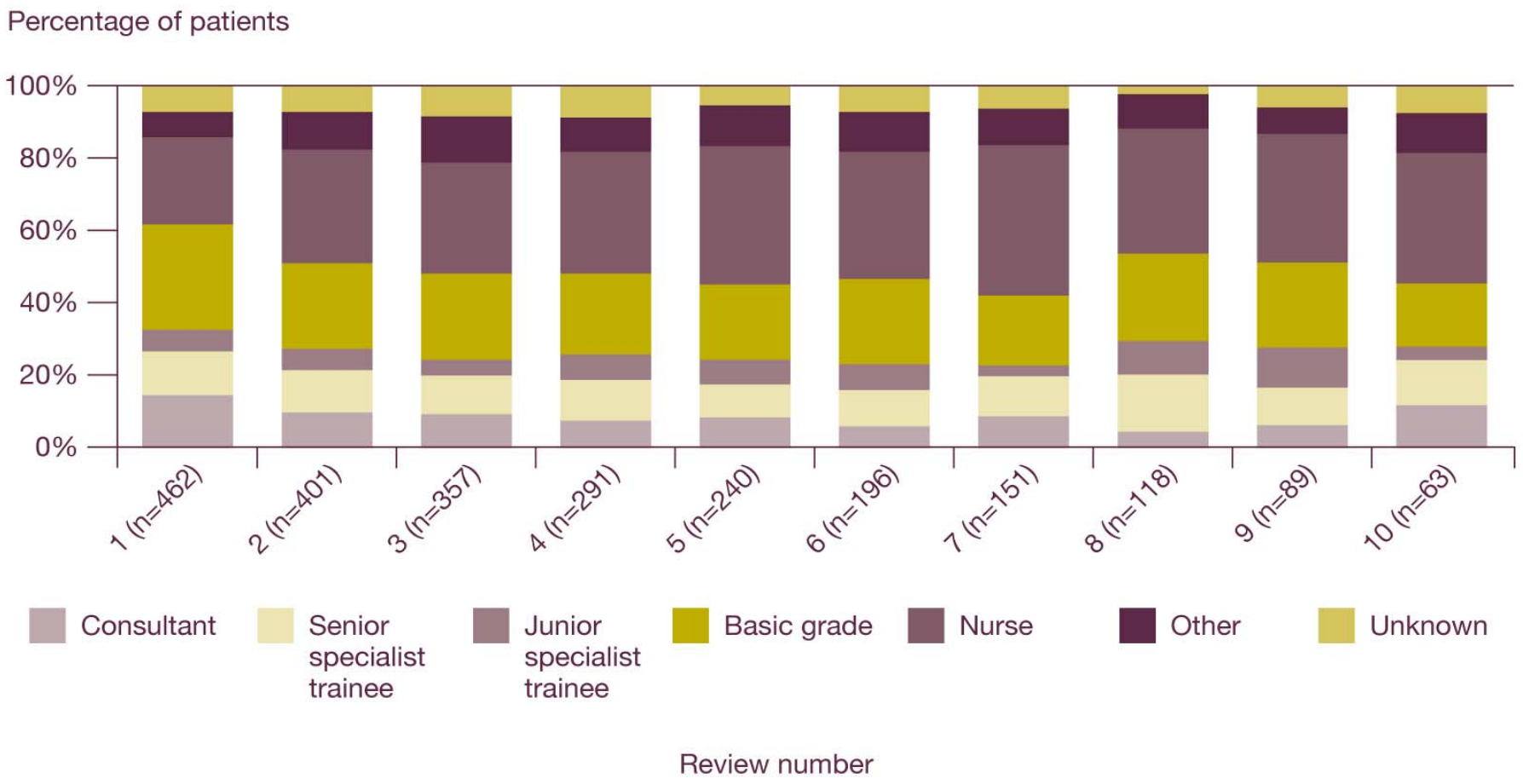


Figure 4.9 Grades of clinician that reviewed patients during 10 reviews in the 48 hours prior to cardiac arrest *(the denominator for each review number is shown in brackets)*

Advisor opinion

Table 4.9 Warning signs were apparent that the patient was deteriorating - Advisors' opinion

Warning signs were apparent	n	%
Yes	344	74.5
No	118	25.5
Subtotal	**462**	
Insufficient data	64	
Total	**526**	

- Warning signs present in 3 out of 4 cases
- Consistent with literature
- Opportunities to intervene

How were warning signs responded to?

Table 4.10 Action taken if warning signs were present - Advisors' opinion

The signs were:	Yes	%	No	%
Recognised	152	64.1	85	35.9
Acted on adequately	104	43.9	133	56.1
Communicated to appropriate senior doctors	106	44.7	131	55.3

Answers may be multiple (n/237; not answered in 107)

- Recognition
  - Despite clear signs over many hours
- Action
  - Despite multiple review
- Escalation
  - Despite track and trigger systems

Predictability and avoidability

Table 4.12 Cardiac arrest was avoidable - Advisors' opinion

Avoidable cardiac arrest	n	%
Yes	156	37.8
No	257	62.2
Subtotal	**413**	
Insufficient data to assess	113	
Total	**526**	

- 165/289 cardiac arrest judged to be predictable (63.7%)
- Almost 4 in 10 judged to be avoidable
  - 74 DNACPR
  - 99 care to prevent deterioration

Domains of care (1)

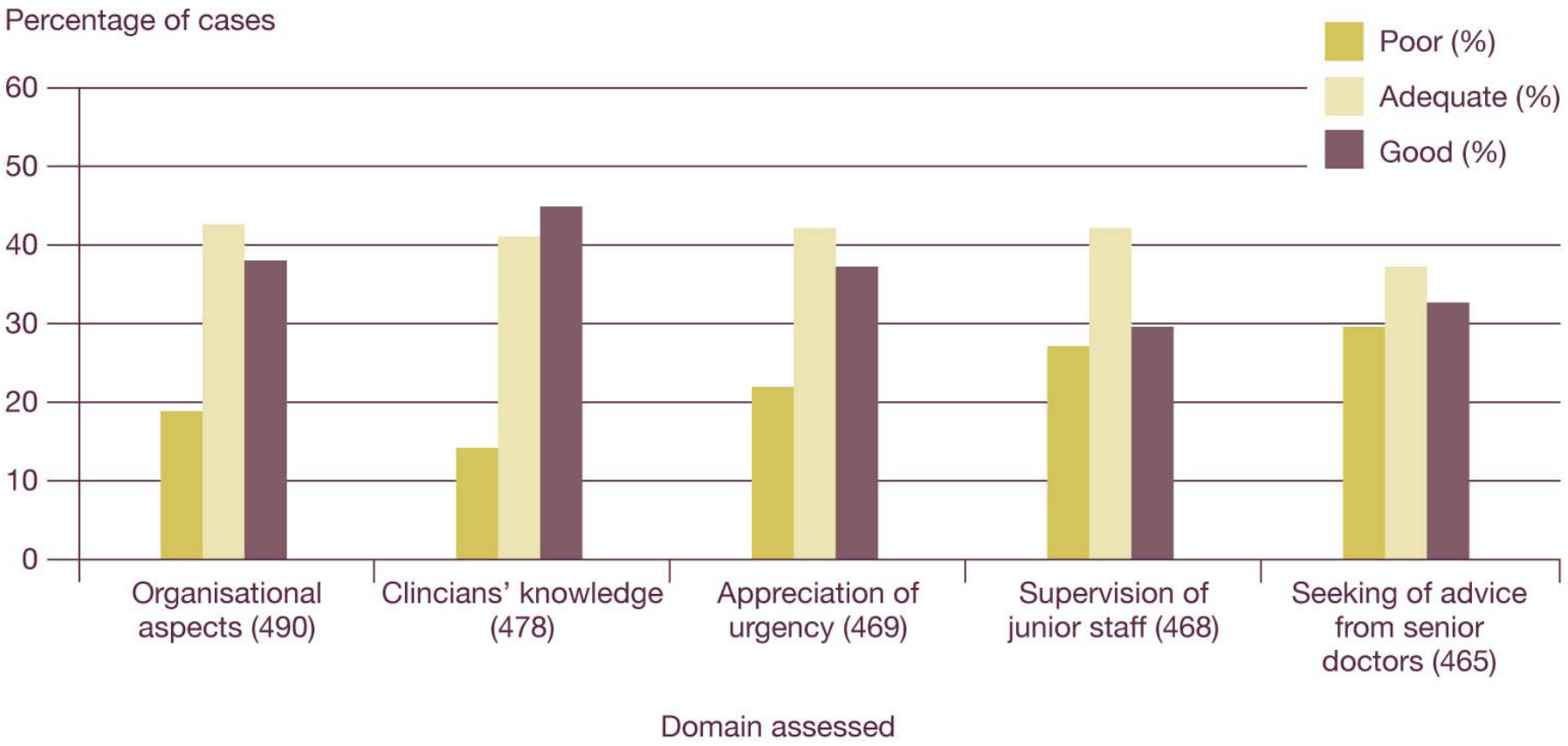


Figure 4.10 Advisor grading of clinical aspects of care in 48 hours prior to cardiac arrest *(the denominator for each domain are shown in brackets)*

Domains of care (2)

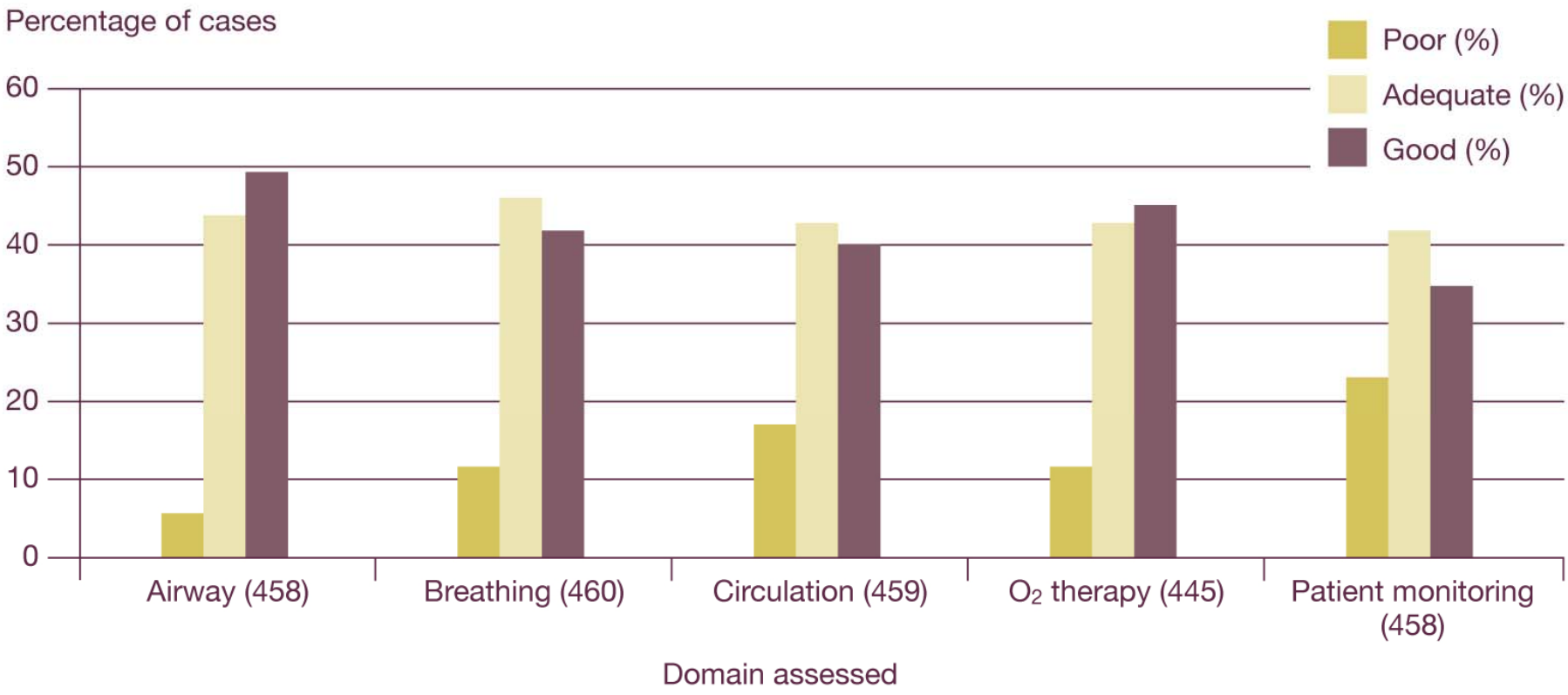


Figure 4.11 Advisors grading of aspects of patient management in the 48 hours prior to cardiac arrest *(the denominator for each domain is shown in brackets).*

Case study

Case study 8

A elderly patient was admitted to hospital as an emergency because of breathlessness. After initial assessment it was suspected that this was due to community acquired pneumonia. Appropriate treatment was commenced, and confirmed at consultant review, which took place within six hours of admission. At that time the patient was tachypnoeic (respiratory rate 20 breaths per minute), tachycardic (pulse 110 beats per minute, sinus rhythm) and febrile (temperature 38.2°C). After a further two hours in the medical assessment unit the patient was transferred to an acute medical ward for ongoing inpatient treatment with IV antibiotics, oxygen and IV fluids. Physiological observations were carried out initially on a four hourly basis. Over the next twelve hours these documented a rising respiratory rate (to 32 breaths per minute), rising pulse rate (to 120 beats per minute) and hypotension (systolic blood pressure 80 mmHg). In that time the patient was reviewed twice by an FY2 doctor. Additional IV fluids were prescribed but no further action was taken. The frequency of observations was increased to hourly, due to nursing concerns. Eight hours later an ST1 doctor reviewed the patient at the request of the nursing staff on the ward. Blood pressure was lower (systolic 75 mmHg) and the patient was less rouseable. Further fluid was prescribed and IV antibiotics were changed. There was no request for more senior review or referral to other teams, such as critical care. Four hours later the patient had a PEA cardiac arrest and CPR was unsuccessful. The last recorded observations were: BP 70/35, Pulse 130/min, Respiratory rate 32/min, Saturation – 85% (on 40% oxygen).

This case illustrates the antecedent factors to cardiac arrest and lack of appropriate action in the face of significant abnormalities. The Advisors considered that this cardiac arrest may have been avoided if escalation to more senior doctors and earlier intervention (haemodynamic and respiratory support) had occurred.

Key findings

- 68% of patients (394/583) had been in hospital for longer than 24 hours prior to cardiac arrest
- Advisors considered that warning signs for cardiac arrest were present in 344/462 (75%) of cases. These warning signs were recognised poorly, acted on infrequently, and escalated to more senior doctors infrequently

Key findings

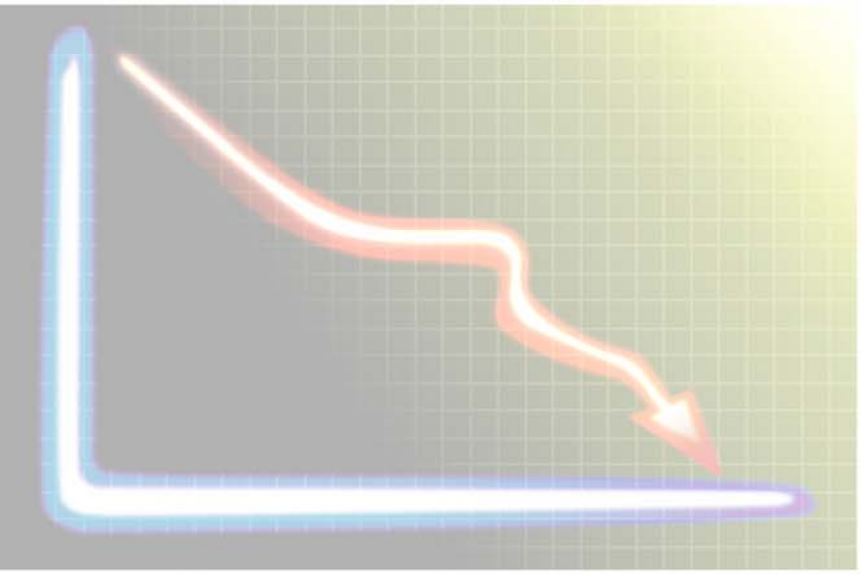
- Many patients had multiple reviews in the 48 hour period prior to cardiac arrest, 160/391 had more than 5 reviews
- There was no evidence of escalation to more senior staff in patients who had multiple reviews
- Advisors considered that the cardiac arrest was predictable in 289/454 (64%) and potentially avoidable in 156/413 (38%) of cases

Recommendations

- NICE Clinical Guideline 50 is not applied universally. Each hospital must ensure that they comply with this NICE guidance.
- Where patients continue to deteriorate after non consultant review there should be escalation of patient care to a more senior doctor. If this is not done, the reasons for non-escalation must be documented clearly in the case notes.

Recommendations

- Hospitals should undertake a detailed audit of the period prior to cardiac arrest to examine whether antecedent factors were present that warned of potential cardiac arrest and what the clinical response to those factors was.



Resuscitation Status

NCEPOD

CPR status from treating clinician

Table 5.1 CPR status was recorded in the notes

CPR status was recorded	n	%
Yes	122	22.1
No	430	77.9
Subtotal	**552**	
Not answered	33	
Total	**585**	

Table 5.2 Explicit CPR decision had been made

CPR status	n	%
For CPR	70	57.4
DNACPR	52	42.6
Total	**122**	

- Is it helpful not to document CPR status in 430 patients?
- Why did 52 patients with DNACPR decision undergo CPR?

Reasons for DNACPR

Table 5.3 Reason for the DNACPR decision

Reason	n
Patient was unlikely to survive	48
Patient would have a poor quality of life	11
It was at the patient's request	5
Unknown	1

Answers may be multiple (n/52)

- Mainly lack of effectiveness
- Rarely quality of life per se

Engagement

- Patient involvement
  - Yes 8 cases
  - No 22 cases
  - Unknown 22 cases
- Next of kin involvement
  - Yes 25 cases
  - No 7 cases
  - Unknown 20 cases

Why no DNACPR decision

Table 5.4 Reason for no DNACPR decision

Reason	n	%
Patient was for full and active management	326	76.9
No opportunity/time to discuss with relatives	27	6.4
No opportunity/time to document the decision	17	4.0
No opportunity or time to discuss with the patient	16	3.8
The perceived need to discuss resuscitation status with the patient/relatives inhibited the decision being made	8	1.9
Other	31	7.3
Unknown	5	1.3

Answers may be multiple (n/424; not answered in 76)

- Full and active management can coexist with DNACPR
- Concerns that DNACPR leads to poor care*
- Use of ceilings of treatment documentation may help

*Resuscitation 2010;81:1138-41 (Ref 34)

Cohort where time was a constraint

Table 5.5 Duration of hospital stay prior to cardiac arrest

Duration	n
<1 hour	5
1-2 hours	2
1-6 hours	1
6-12 hours	2
12-24 hours	10
1-2 days	7
2-3 days	3
3-4 days	2
4-5 days	1
7-8 days	1
10-11days	1
>14 days	3
Subotal	**38**
Not answered/data missing	22
Total	**60**

- Time between admission and arrest
  - Working patterns
- Time in working day
  - Priorities

Advisor opinion of CPR status

Table 5.6 CPR status recorded at any point from admission to cardiac arrest - Advisors' opinion

Record made	n	%
Yes	62	12.3
No	443	87.7
Subtotal	**505**	
Insufficient data to assess	21	
Total	**526**	

Table 5.7 Recorded decision stated that the patient was for resuscitation - Advisors' opinion

Recorded decision	n
Yes	38
No	24
Total	**62**

- Treating clinicians stated 122 patients had CPR status recorded
  - 52 DNACPR, 70 for CPR

Who was making CPR decisions?

Table 5.8 Grade of clinician who made the CPR status decision - Advisors' opinion

Grade of clinician	n
Consultant	23
Staff grade	2
Trainee with CCT	0
Senior specialist trainee	5
Junior specialist trainee	6
Basic grade	5
Specialist nurse practitioner	0
Other registered nurse	0
Resuscitation officer	0
Other	2
Subtotal	**43**
Insufficient data	19
Total	**62**

- 1 in 2 consultants
- 1 in 4 basic grade or junior specialists

Advisor opinion

Table 5.12 Advisors' opinion whether the patient should have had a DNACPR and whether they did or not

Advisors' opinion: Patient should have had a DNACPR decision	Patient had DNACPR		
	Yes	No	**Subtotal**
Yes	22	174	**196**
No	30	4	**34**
Subtotal	**52**	**178**	**230**

Insufficient data/not answered in 296

- Advisors judged that 196/230 should have had a DNACPR decision
- Lack of agreement in 30/52 cases

Case study

Case study 11

An elderly patient with severe dementia was transferred from a nursing home to an acute hospital bed due to an acute confusional state. Over the previous few months the patient had experienced significant weight loss. It was noted that food intake was very poor even with help and encouragement.

It was felt that the reason for the patient's confusional state may be infection, either chest or urinary tract, and antibiotics were started to cover both possibilities. Over the next few days the patient remained very confused. Due to concerns over poor oral intake a nasogastric tube was inserted. However this was pulled out several times and no effective nutrition was delivered. Six days after admission the patient was noted to be more obtunded, had a high respiratory rate (30 breaths per minute) and urine output was very poor. The patient was reviewed by a CT1 doctor who prescribed further fluids and changed the antibiotics. Concern was expressed in the notes by nursing staff that the patient was dying and that there should be clarity about what to do in the event of a cardiac arrest. The patient was reviewed a further two times by junior medical staff over the next 24 hours. CPR status was not considered during those reviews. Shortly after the last review the patient had a cardiac arrest. When the cardiac arrest team arrived they found the patient to be in asystole. CPR continued for 10 minutes before a decision was taken by a Specialist Registrar in medicine that this was futile and the CPR attempt stopped. There was no return of circulation.

The Advisors considered that this was an undignified procedure at the end of life. Furthermore they thought that it should have been recognised that the patient was deteriorating despite active therapy and that death was a likely outcome. CPR in the context of this case was felt to be inappropriate.

Key findings

- CPR status was recorded in only 122/552 (22%) of patients. Of these 122 patients, 70 were for CPR and 52 had a DNACPR decision
- Reasons stated for patients remaining for CPR included: Patient remained for full and active treatment (326/424; 77%) and lack of time to discuss or document decision (60/424; 14%)
- In 196/230 cases where there was sufficient data Advisors felt that a DNACPR decision should have been made

Recommendations

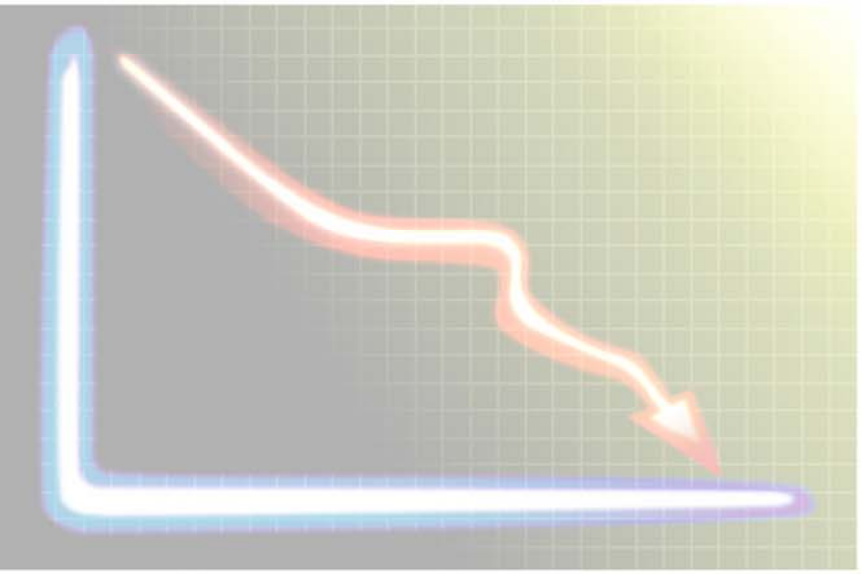
- An effective system for recording all decisions and discussions relating to CPR/DNACPR must be established, allowing all people who may care for the patient to be aware of this information.

Recommendations

- Health care professionals as a whole must understand that patients can remain for active treatment but that in the event of a cardiac arrest CPR attempts may be futile. Providing active treatment is not a reason not to consider and document what should happen in the event of a cardiac arrest.

Recommendations

- The use of ‘ceilings of care’ documentation would facilitate decision making and clarity of intent. There is need for a national project to lead this work.



Resuscitation Attempt

NCEPOD

Location of cardiac arrest

Table 6.1 Location of cardiac arrest

Location	n	%
Surgical ward	217	27.8
Medical ward	212	27.1
Coronary care unit	94	12.0
Emergency department	63	8.1
Procedure/intervention area	54	6.9
Operating room/post-operative anaesthetic care unit	13	1.7
Outpatient area	10	1.3
Level 2 care	9	1.2
Other	109	14.0
Subtotal	**781**	
Not answered	6	
Total	**787**	

- 55% wards
- 1 in 3 high care areas

Time of cardiac arrest

Table 6.2 Time of cardiac arrest

Time	n	%
00:00-07:59	285	36.7
08:00-17:59	318	41.0
18:00-23:59	173	22.3
Subtotal	**776**	
Not answered	11	
Total	**787**	

- 60% out of hours
- Availability of staff
- Structures to respond

Team leader

Table 6.3 Team leader at the resuscitation attempt

Team leader	n	%
Consultant	67	8.9
Staff grade/associate specialist	74	9.8
Trainee with CCT	2	<1
Senior specialist trainee	431	57.2
Junior specialist trainee	102	13.5
Basic grade	46	6.1
Specialist nurse practitioner	10	1.3
Other registered nurse	13	1.7
Resuscitation officer	4	<1
Other	5	<1
Subtotal	**754**	
Not answered	33	
Total	**787**	

- 1 in 5 basic grade or junior specialist
- 1 in 10 consultant

ALS training

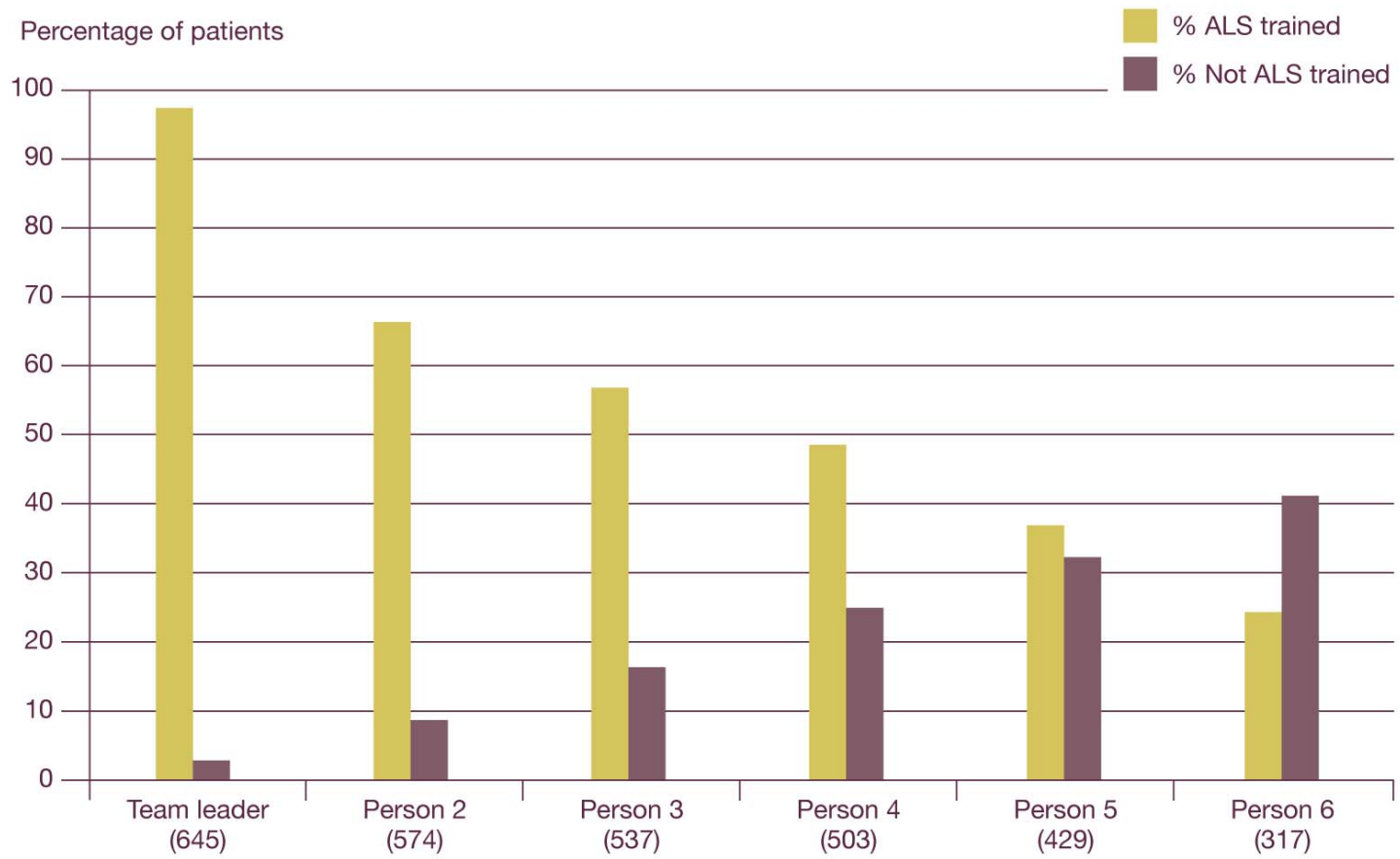


Figure 6.1 ALS training of the resuscitation team *(the denominator for each team member is shown in brackets)*

Cause of cardiac arrest

Table 6.4 Cause of cardiac arrest

Cause	n	%
Primary cardiac disease	235	39.8
Non-cardiac disease	356	60.2
Subtotal	**591**	
Unknown	196	
Total	**787**	

Table 6.5 Primary rhythm at cardiac arrest

Primary rhythm	n	%
Ventricular fibrillation	79	11.1
Ventricular tachycardia	31	4.4
Asystole	227	31.9
Pulseless electrical activity	375	52.7
Subtotal	**712**	
Not monitored/unknown/not answered	75	
Total	**787**	

- Majority secondary to non-cardiac disease
- Only 15% VF/VT

Primary rhythm and cause

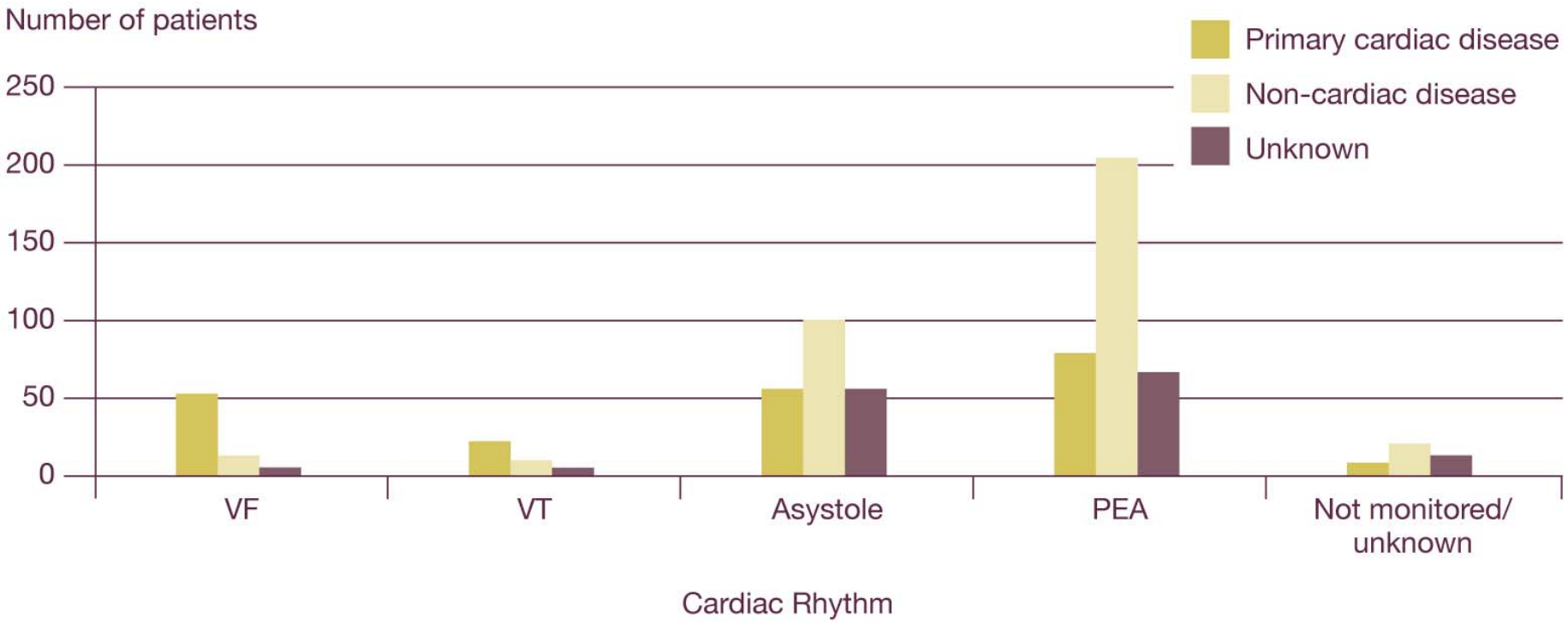


Figure 6.2 Underlying cause and initial primary rhythm of cardiac arrest
(n=730; not answered in 57)

Immediacy of CPR

Table 6.11 Time from cardiac arrest to the resuscitation attempt

Time	n	%
Immediately	287	59.1
1-3 minutes	178	36.6
4-6 minutes	12	2.5
7-8 minutes	1	<1
9-10 minutes	2	<1
11-15 minutes	2	<1
16-25 minutes	3	<1
>25 minutes	1	
Subtotal	**486**	
Not answered	301	
Total	**787**	

Immediacy of defibrillation

Table 6.10 Time to defibrillate and whether the arrest was witnessed

Time	Witnessed				
	Yes	No	Subtotal	Not answered	Total
Immediately	6	0	**6**	0	**6**
1-3 minutes	44	7	**51**	5	**56**
4-6 minutes	4	2	**6**	1	**7**
7-8 minutes	1	0	**1**	0	**1**
9-10 minutes	1	1	**2**	0	**2**
11-15 minutes	2	0	**2**	0	**2**
16-25 minutes	2	0	**2**	0	**2**
Subtotal	**60**	**10**	**70**	**6**	**76**
Not answered	24	6	**30**	4	**34**
Total	**84**	**16**	**100**	**10**	**110**

- Not answered in 1 in 3 cases
- Delay greater than 3 minutes in 1 in 5

Duration of CPR

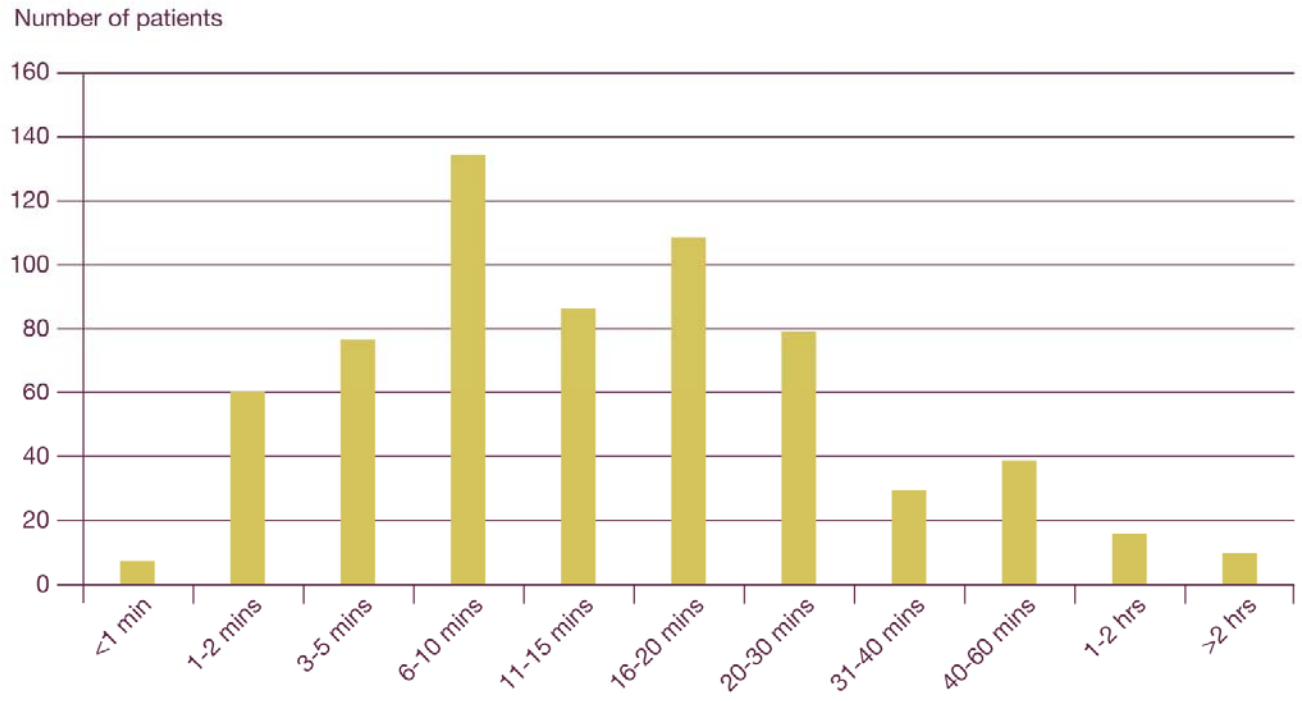


Figure 6.3 Duration of CPR attempt *(n=638; not answered in 149)*

- 1 in 5 less than 5 minutes
- 4 in 10 less than 10 minutes

Duration of CPR – by cause

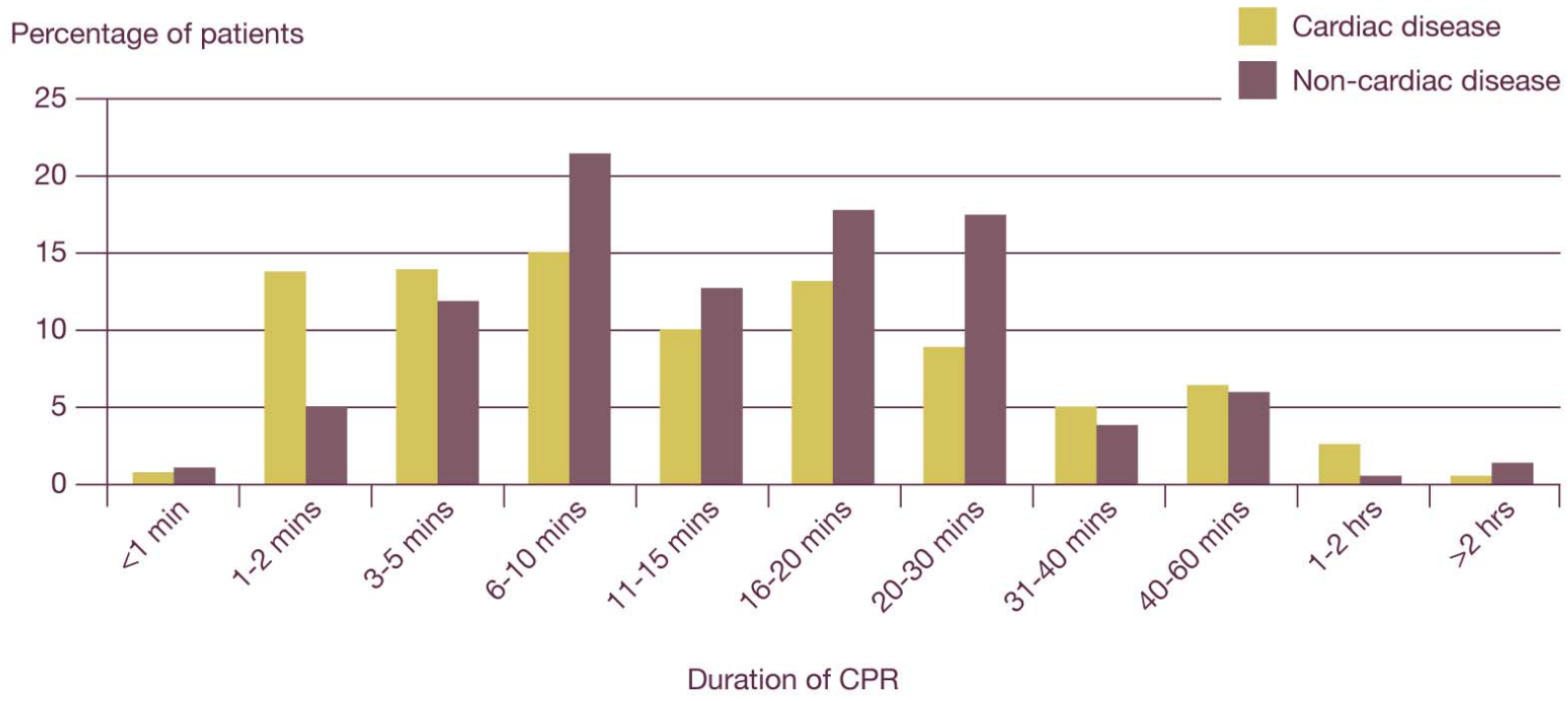


Figure 6.4 Duration of CPR by cardiac and non-cardiac disease *(n=481; not answered in 206)*

- Duration shorter in cardiac causes
  - Reversibility
  - Initial concept for CPR

Interventions

Table 6.12 Interventions applied during CPR

Interventions	n	%
Chest compressions	726	94.3
Assisted ventilation	586	76.1
Adrenaline	579	75.2
Tracheal intubation	310	40.3
Defibrillation	179	23.2
Supraglottic airway device	99	12.9

Answers may be multiple (n/770; not answered in 17)

- Airway management?

Airway management

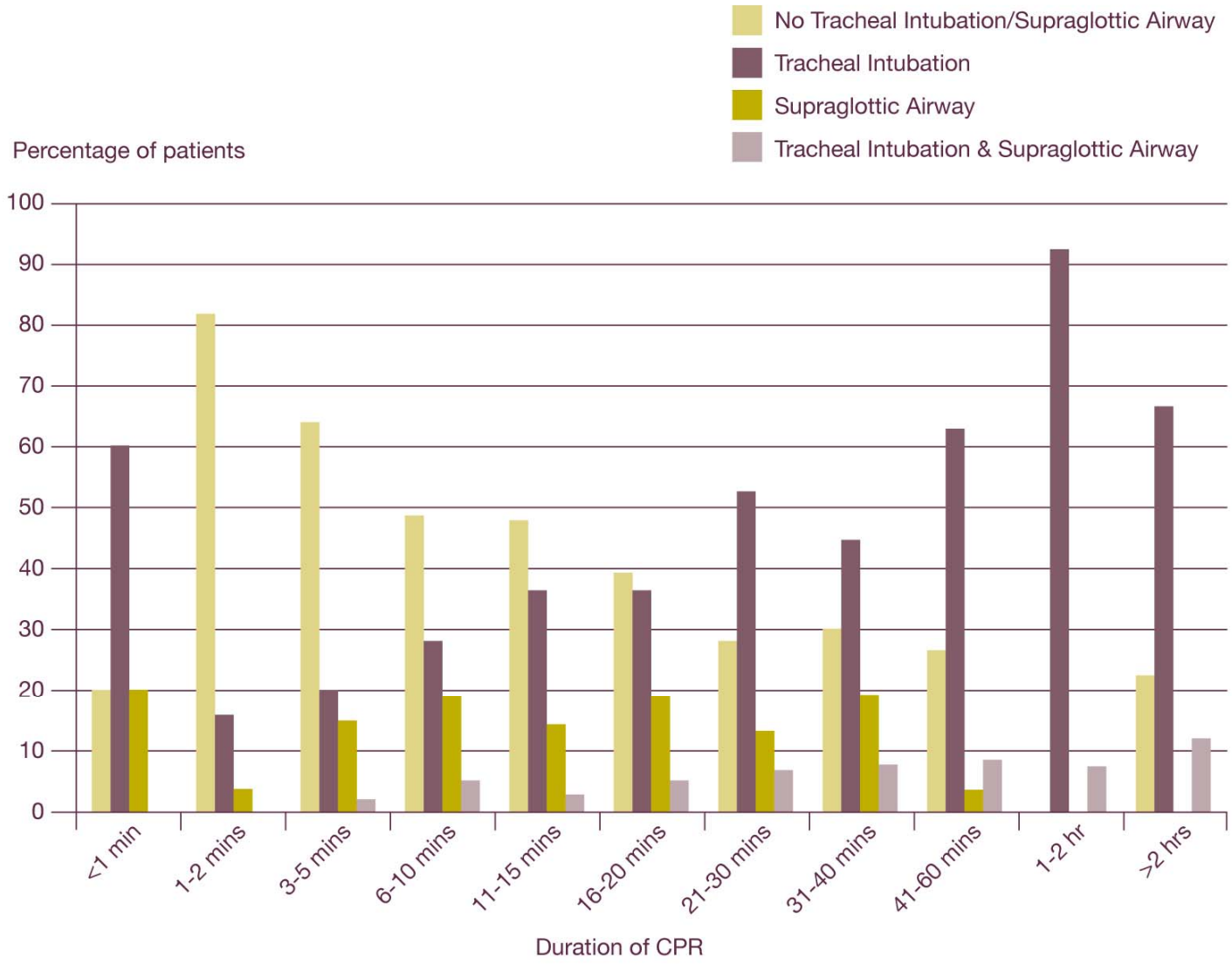


Figure 6.5 Duration of CPR and treatment received *(n=634; not answered in 153)*

Airway management

Table 6.13 Presence of and anaesthetist/ intenstivist on the resuscitation team

Anaesthetist/Intensivist on team	Total	%
Yes	486	76.7
No	148	23.3
Subtotal	**634**	
Not answered	153	
Total	**787**	

- 1 in 4 cardiac arrest teams no anaesthetist/intensivist
- Competence for advanced airway management?

Arrest with no anaesthetist/intensivist

Table 6.14 Location of arrest

Location	Total	%
Medical ward	48	32.7
Surgical ward	33	22.4
Coronary care unit	25	17.0
Procedure/intervention area	12	8.2
Emergency department	9	6.1
Outpatient area	1	<1
Other	19	12.9
Subtotal	**147**	
Not answered	1	
Total	**148**	

- Majority general ward areas

Problems during CPR attempt

Table 6.15 Problems reported by the team leader

Problems reported	n	Subtotal	%
Equipment	51	**750**	6.8
Airway management	40	**728**	5.5
Communication/teamwork	29	**728**	4.0
Staff availability	23	**741**	3.1
Drugs	22	**747**	2.9
Defibrillation	6	**698**	<1
Other	63	**65**	
All of the above	1		

Answers may be multiple

Table 6.16 Problems evident during the CPR attempt - Advisors' opinion

Problems with:	n
Airway management	36
Appropriate staff	27
Equipment	21
Drugs	18
Other	16
Defibrillation	5
Speed of response of team	4
Communication & teamwork	2

Answers may be multiple (n/91)

Key findings

- More than half of the cardiac arrests in this study occurred on medical/surgical wards (429/781; 55%)
- 458/776 cardiac arrests (59%) occurred ‘out of hours’
- Most cardiac arrests where the cause was known were secondary to non-cardiac disease (356/591; 60%)
- The initial rhythm was pulseless electrical activity in 53%, asystole in 227/712 (32%) and VF/VT in 110/712 (15%)

Key findings

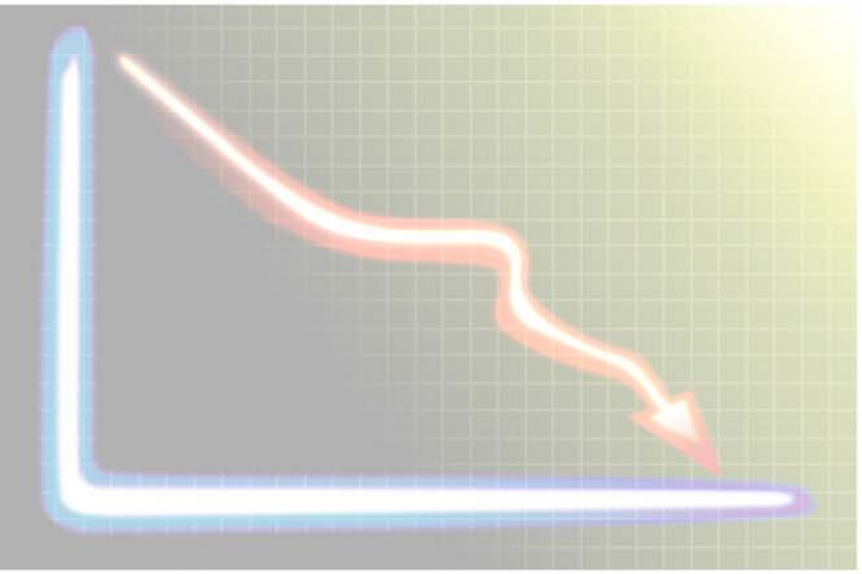
- 1 in 5 patients in whom defibrillation was indicated did not receive a shock within 3 minutes of recognition of cardiac arrest
- In only 486/634 cases (77%) an anaesthetist or intensivist was part of the resuscitation team
- There were 234 problems identified by the treating clinicians during the 787 resuscitation attempts. The most common problems were equipment (7%), airway management (6%) and team work (4%)
- The Advisors reported problems during the resuscitation attempt in 91/526 cases (17%). Of these, 36/91 were associated with airway management

Recommendations

- Hospitals must arrange services and equipment to ensure that defibrillation is delivered within three minutes of cardiac arrest (for shockable rhythms).

Recommendations

- Each hospital should ensure there is an agreed plan for airway management during cardiac arrest. This may involve bag and mask ventilation for cardiac arrests of short duration, tracheal intubation if this is within the competence of members of the team responding to the cardiac arrest or greater use of supraglottic airway devices as an alternative.



Period After Cardiac Arrest - Outcome

NCEPOD

Outcome

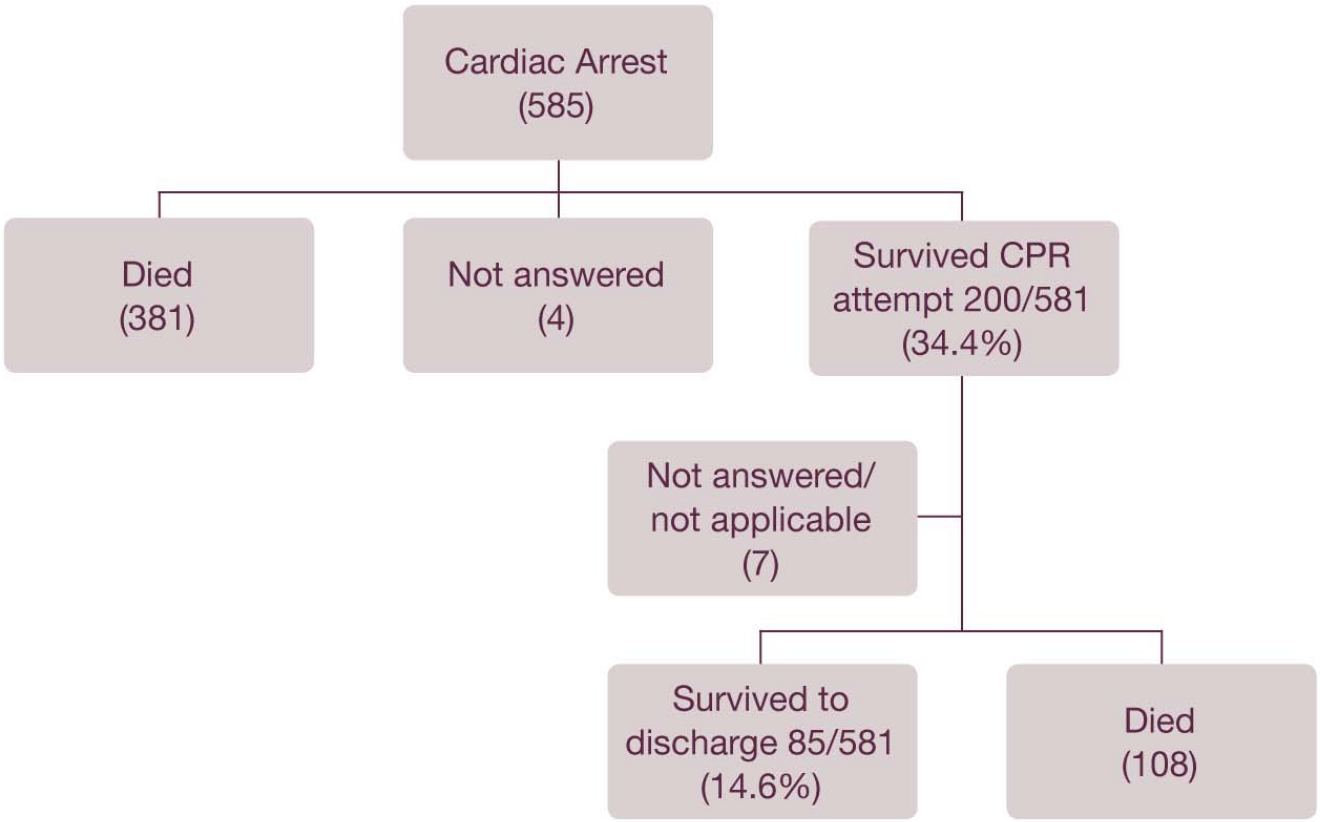


Figure 7.1 Survived to discharge after CPR

Functional status

Table 7.2 Cerebral performance category (CPC)

CPC	Total
1. Conscious, alert-normal function	71
2. Conscious, alert-moderate disability	5
3. Conscious, severe disability	1
4. Comatose	1
Subtotal	**78**
Not answered	7
Total	**85**

- Retrospective
- Difficulty identifying true deficits
- Literature suggests many CPC 1 are actually 2

Functional outcome

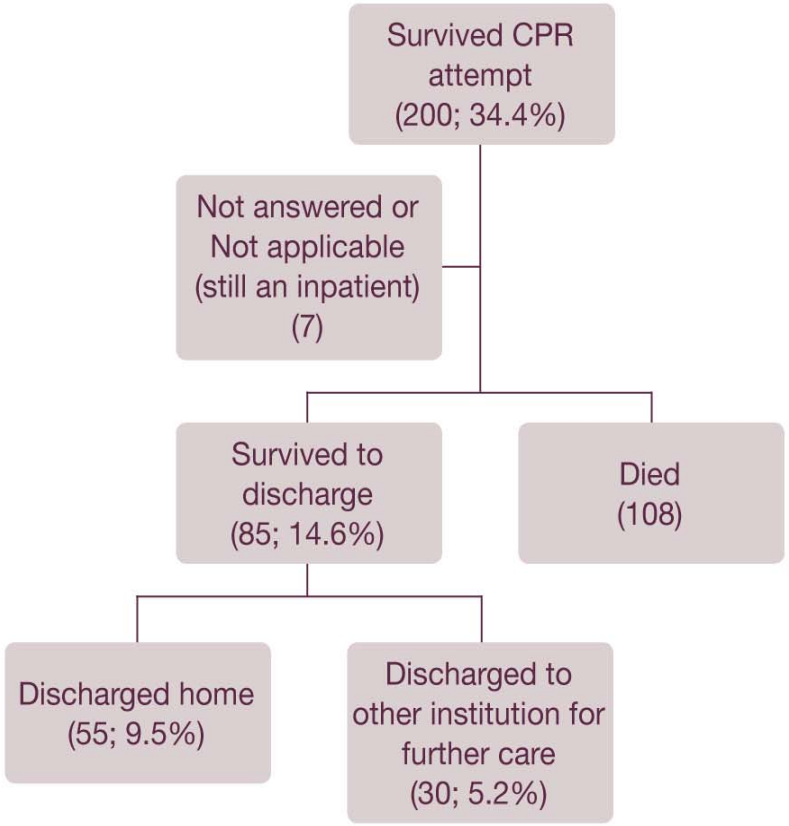


Figure 7.2 Discharge location

- 55/85 discharged home
- 30/85 other care facility (35% of survivors)

Aetiology and outcome

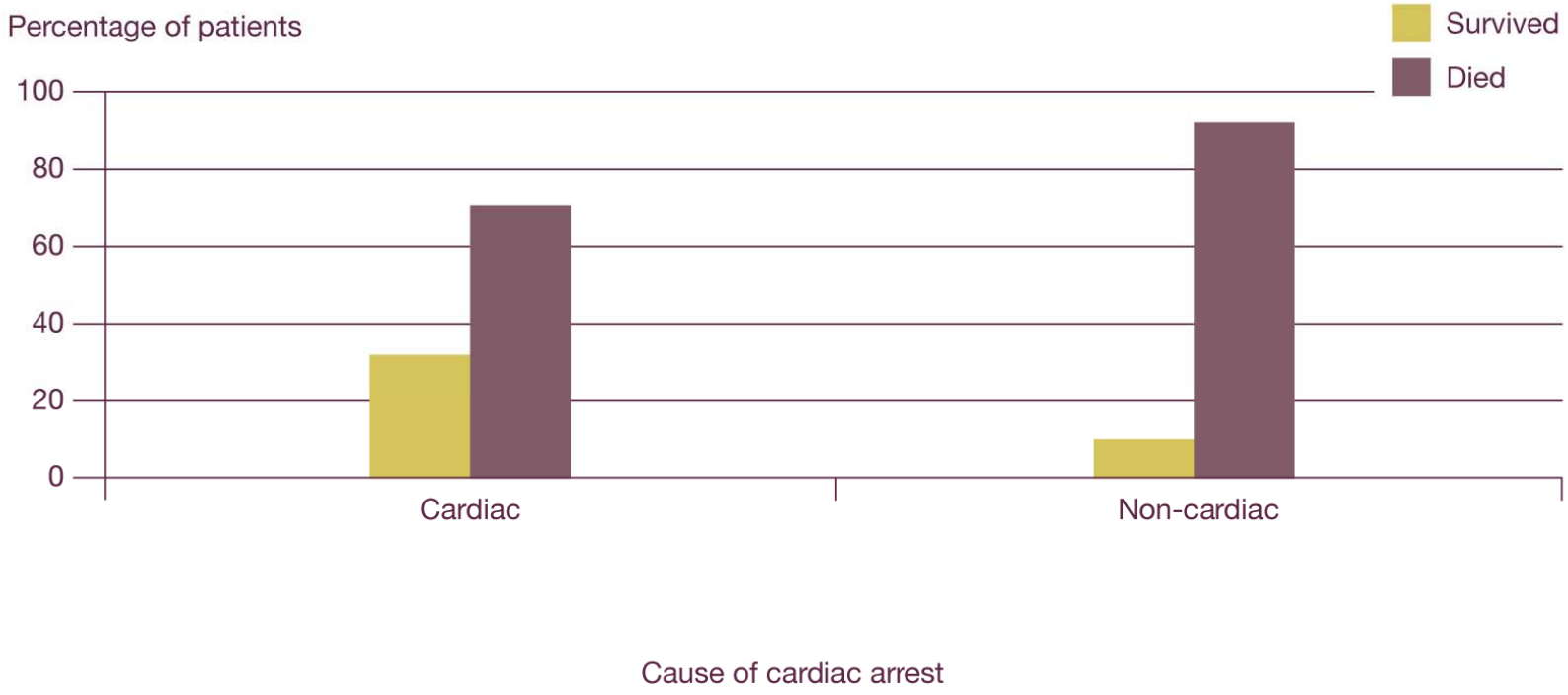


Figure 7.3 Cause of cardiac arrest and survival to discharge *(n=424)*

- Cardiac 51/170 cases(30%)
- Non-cardiac 22/262 cases (8%)

Rhythm and outcome

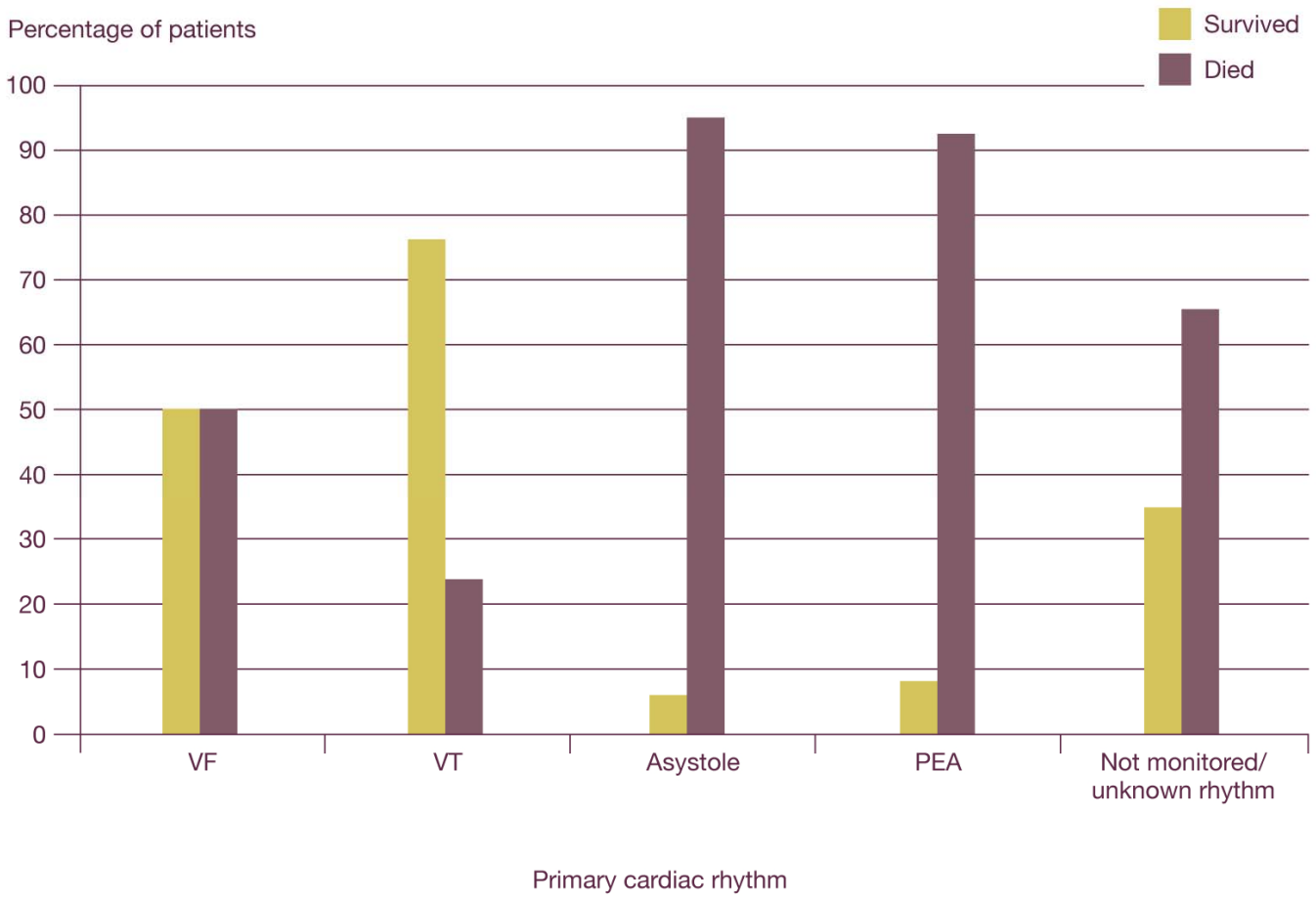


Figure 7.4 Primary cardiac rhythm and survival to discharge *(n=537)*

- Remember function and discharge location

Aetiology, rhythm and outcome

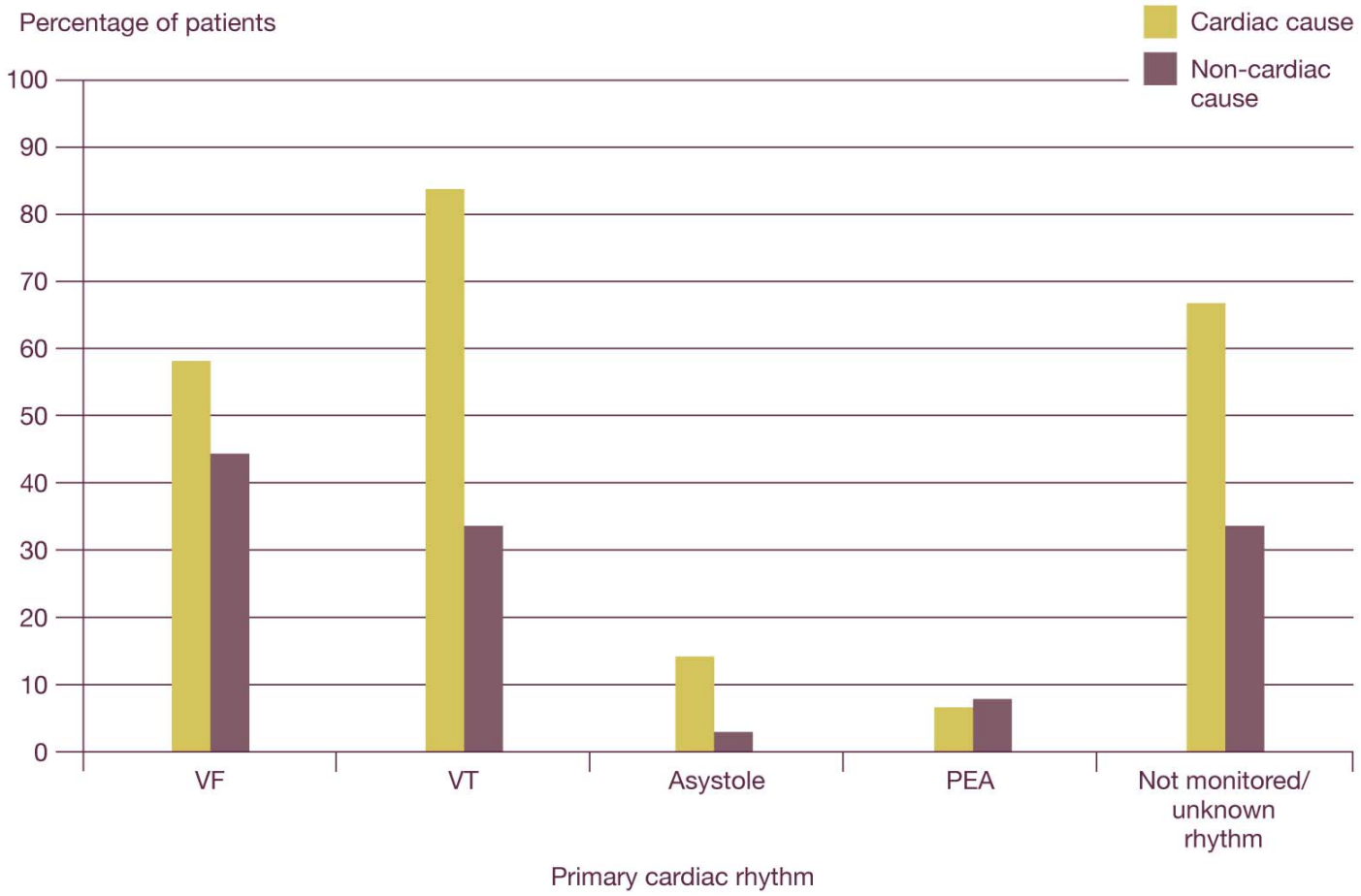


Figure 7.5 Percentage of patients that survived to discharge and type of primary rhythm and cause of cardiac arrest *(n=424)*

Length of stay

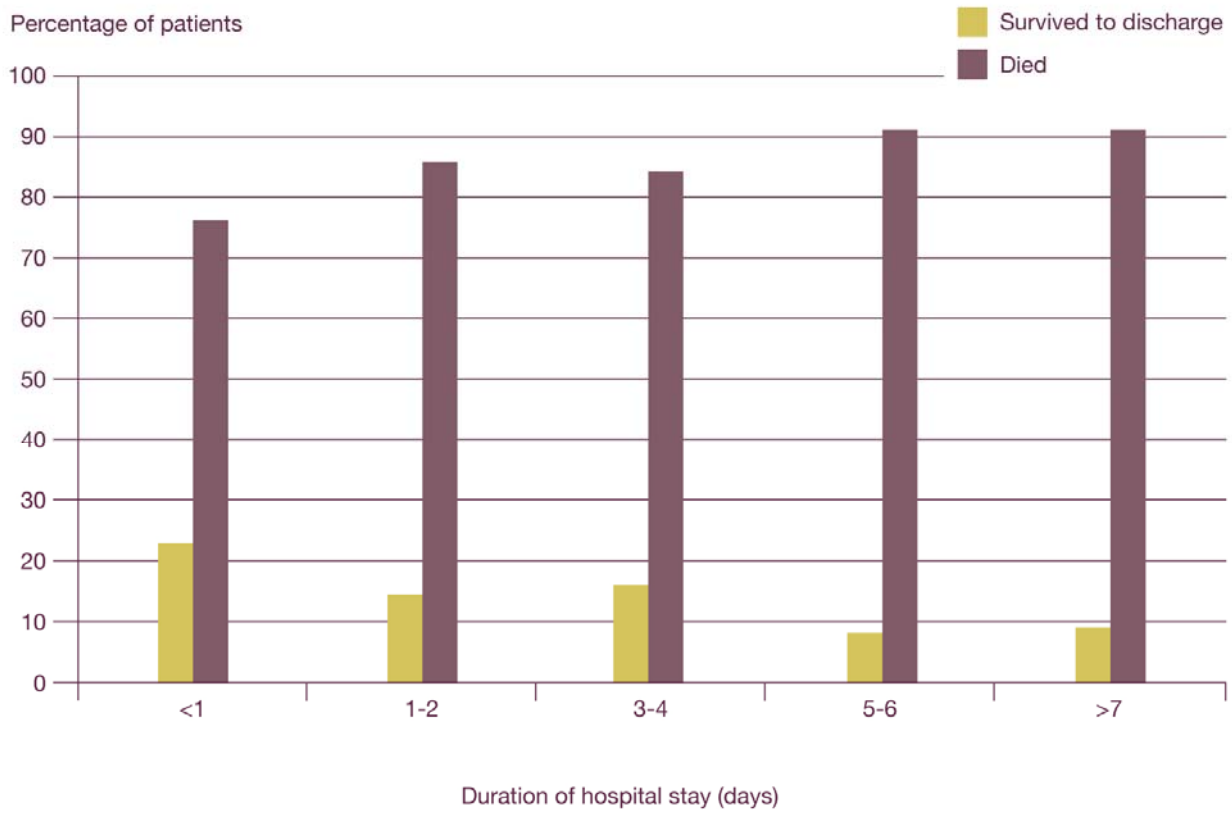


Figure 7.6 Duration of hospital stay and survival to discharge *(n=551)*

- Longer stay – worse outcome
- Intuitive
- Opportunities to address direction and action

Time of arrest

Table 7.3 Outcome by time of arrest

	Patient survived to discharge						
Time	**Yes**	**%**	**No**	**%**	**Subtotal**	**Insufficient data to assess**	**Total**
00:00-07:59	13	7.4	163	92.6	**176**	5	**181**
08:00-17:59	44	20.1	174	79.8	**218**	6	**224**
18:00-23:59	15	12.5	105	87.5	**120**	1	**121**
Total	**72**	**14.0**	**442**	**86.0**	**514**	**12**	**526**

Day of arrest

Table 7.4 Outcome by day of the week

	Patient survived to discharge						
Day	**Yes**	**%**	**No**	**%**	**Subtotal**	**Insufficient data to assess**	**Total**
Monday to Friday	57	15.4	314	84.6	**371**	7	**378**
Saturday and Sunday	15	10.5	128	89.5	**143**	5	**148**
Total	**72**	**14.0**	**442**	**86.0**	**514**	**12**	**526**

Time and day of arrest

Table 7.5 Outcome by arrests occurring out of hours

	Patient survived to discharge						
Day	**Yes**	**%**	**No**	**%**	**Subtotal**	**Insufficient data to assess**	**Total**
Monday to Friday in hours	52	19.8	210	80.2	**262**	2	**264**
Saturday and Sunday/out of hours	20	7.9	232	92.1	**252**	10	**262**
Total	**72**	**14.0**	**442**	**86.0**	**514**	**12**	**526**

- Recognition and intervention
- DNACPR decisions
- Response
- Combination of all

Location

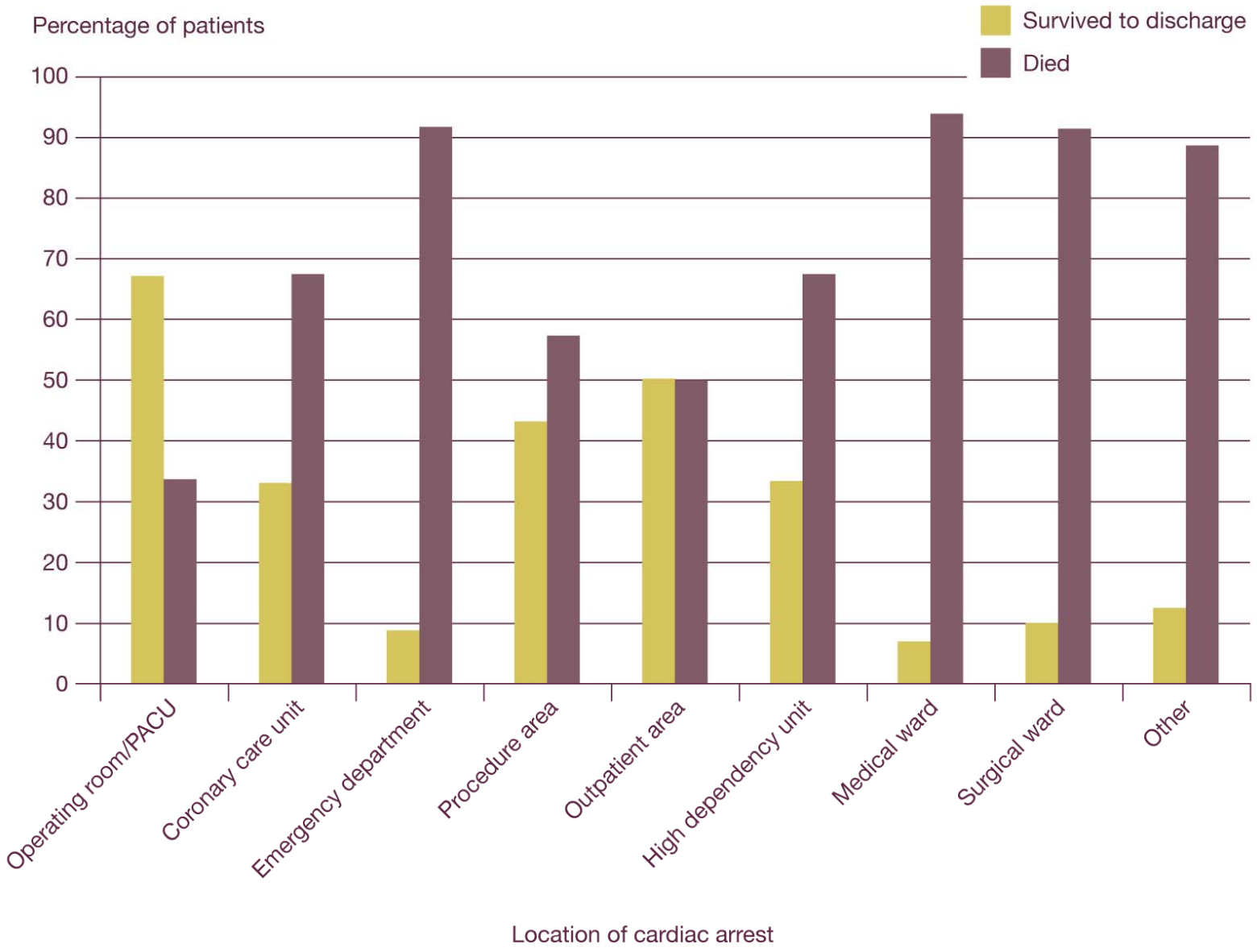


Figure 7.7 Location of cardiac arrest and survival to discharge *(n=547)*

- 521/565 cases (92%) thought to be on correct ward (clinician returning form)

What about the 52 DNACPR patients?

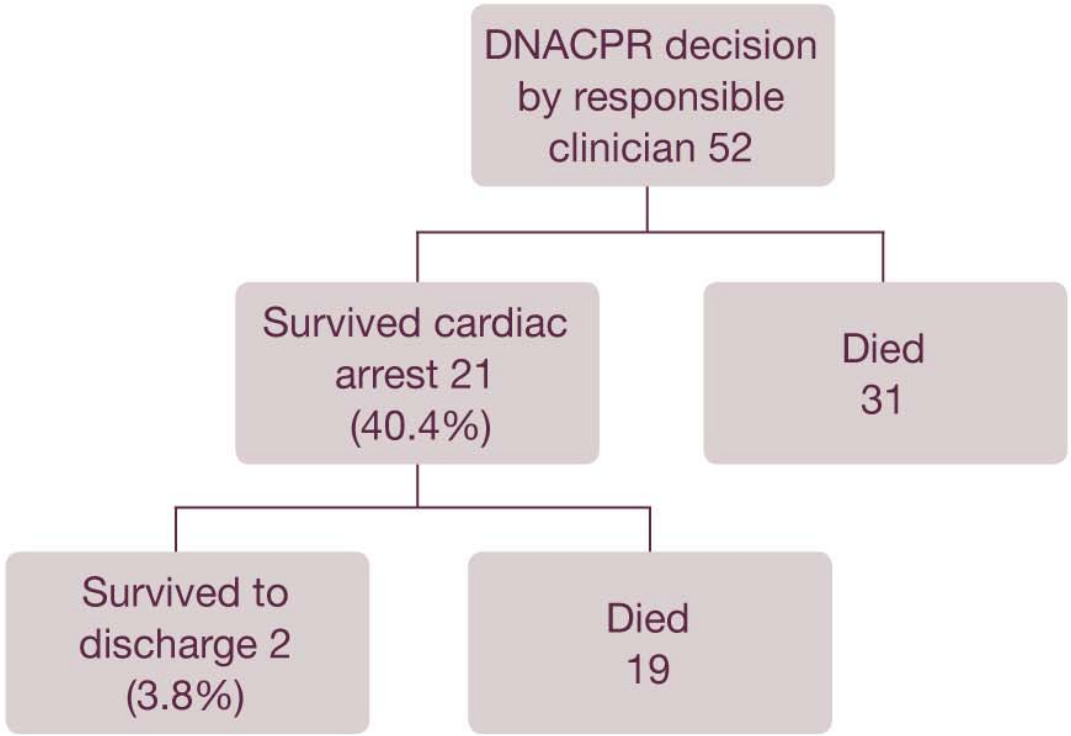
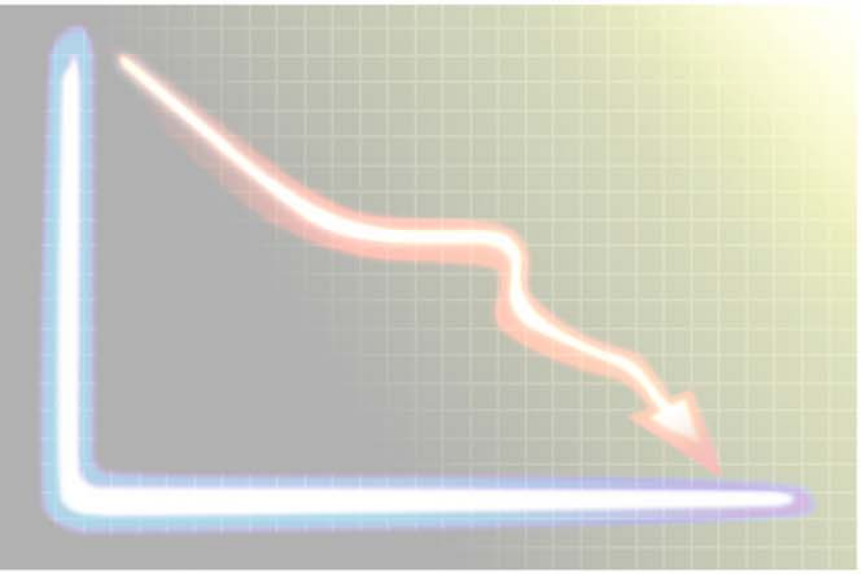


Figure 7.8 Patients who had a DNACPR decision but still underwent CPR



Period After Cardiac Arrest - Care

NCEPOD

Simple investigations

Table 7.7 Investigations performed in the immediate post arrest period

Investigations performed	n	%
12 lead ECG	122	79.7
Full blood count	111	72.5
Urea and electolytes	110	71.9
Chest x-ray	89	58.2
Arterial blood gasses	103	67.3

Answers may be multiple (n/153; not answered in 55)

- Deficits
- Decisions not to investigate

DNACPR after CPR

Table 7.8 Outcome when a DNACPR order was made after CPR

	Patient survived to discharge					
Following CPR, DNACPR order was made	**Yes**	**No**	**Subtotal**	**Not applicable**	**Not answered**	**Total**
Yes	11	72	**83**	0	1	**84**
No	70	33	**103**	1	3	**107**
Subtotal	**81**	**105**	**186**	**1**	**4**	**191**
Unknown	4	3	**7**	0	2	**9**
Total	**85**	**108**	**193**	**1**	**6**	**200**

- 83/191 had DNACPR decision (44%)
  - ? CPR in first instance

Cardiology

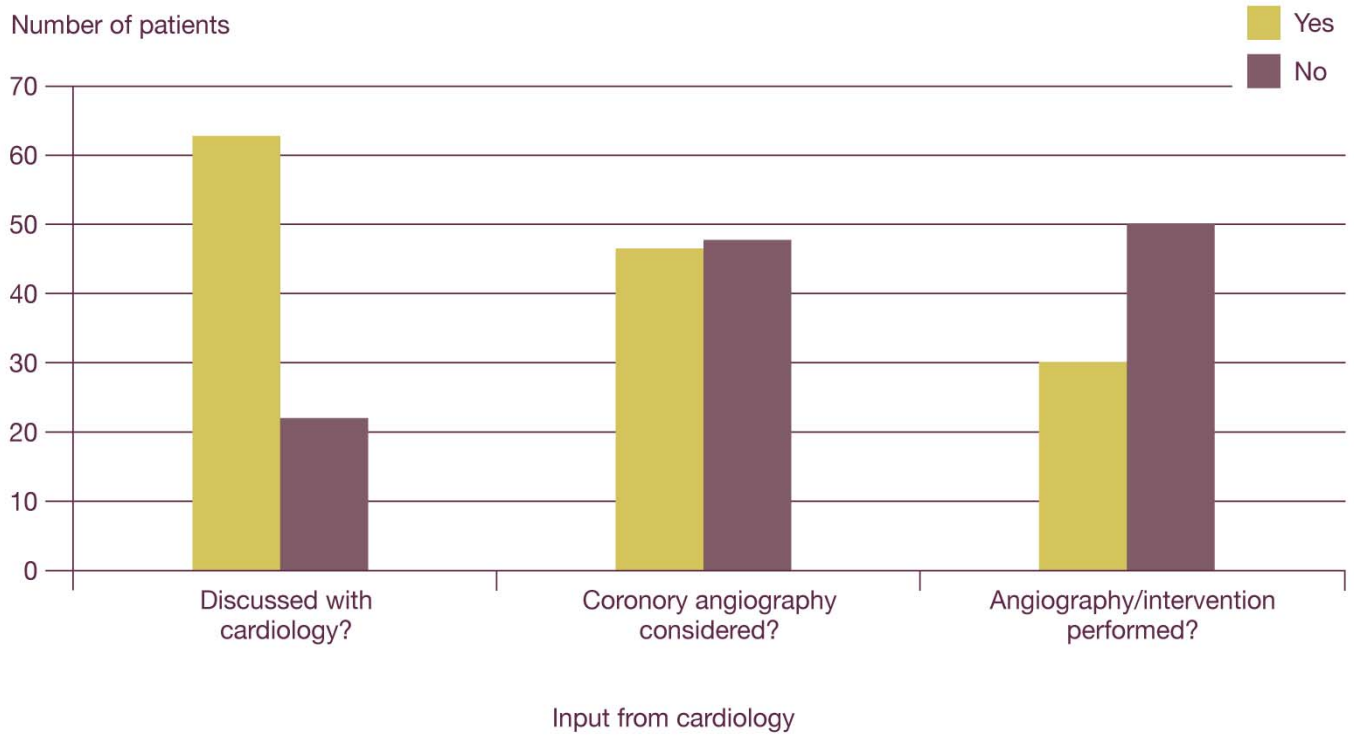


Figure 7.9 Cardiology input in patients with CVS aetiology *(n=100)*

- 100 patients with ROSC after arrest due to cardiac cause
- 1 in 3 angiography

Critical care

Table 7.16 Patient was admitted to critical care (all surviving patients)

Admitted to critical care	n	%
Yes	84	41.6
No	118	58.4
Subtotal	**202**	
Insufficient data to assess	6	
Total	**208**	

- 4 in 10 admitted to critical care

Reason for not admitting to critical care

Table 7.17 Reason patient was not admitted to critical care

Reason	n	%
No need for admission, patient would recover with lower level care	32	28.3
No need for admission, patient expected to die	66	58.4
No critical care beds, patient would have been admitted but no facility	2	1.8
Other	13	11.5
Subtotal	**113**	
Not answered	5	
Total	**118**	

- Could the 66 have been identified prior to CPR

Post arrest location

Table 7.10 Appropriate location after the arrest - Advisors' opinion

Appropriate location after the cardiac arrest	n	%
Yes	194	95.1
No	10	4.9
Subtotal	**204**	
Insufficient data to assess	4	
Total	**208**	

- Advisors judged 1 in 20 patients did not receive care in the correct location

Case study

Case study 13

A middle-aged patient collapsed while shopping. Bystander CPR was started and an ambulance was called. When the ambulance arrived the patient was found to be in VF and was defibrillated with an immediate return of spontaneous circulation. By the time the patient arrived in the emergency department they were awake and mildly confused but otherwise physiologically stable. ECG showed evidence of acute myocardial infarction. The patient was referred for an urgent cardiology opinion. Whilst with the cardiology SpR the patient had another VF cardiac arrest. Resuscitation continued for 25 minutes before return of spontaneous circulation. As the patient was unconscious, intubated and making no respiratory effort a referral was made to the critical care unit.

The patient was seen by an SpR in critical care who stated the patient was not suitable to be admitted to intensive care. The patient was extubated and died shortly after.

The decision not to admit this patient to critical care was questioned by the Advisors. The patient was previously in reasonable health and had received prompt and appropriate CPR. In the opinion of the Advisors the patient should have received treatment for the myocardial infarction and supportive care in a critical care unit. The Advisors also questioned the apparent lack of consultant input into the decision making in the peri-arrest period.

Key findings

- Survival to discharge after in-hospital cardiac arrest was 14.6% (85/581)
- Only 9/165 (5.5%) patients who had an arrest in asystole survived to hospital discharge
- Survival to discharge after a cardiac arrest at night was much lower than after a cardiac arrest during the day time (13/176; 7.4% v 44/218; 20.1%)
- In the post arrest period 84/191 (44.0%) patients had a DNACPR decision made

Key findings

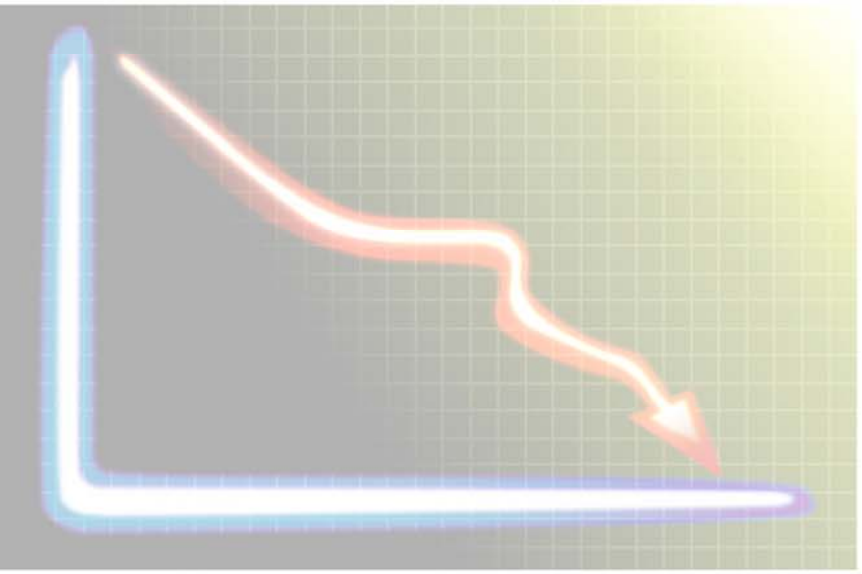
- Location of post arrest care was judged to be appropriate in 95% of cases
- It was considered that in 100 patients who had return of circulation, the cause of the cardiac arrest primary myocardial. Only 30 of these 100 patients had coronary angiography, and PCI where appropriate, in the post cardiac arrest phase
- Life sustaining therapies were withdrawn in 38 cases
- Organ donation was considered in six of those cases

Recommendations

- Each hospital should audit all CPR attempts and assess what proportion of patients should have had a DNACPR decision in place prior to the arrest and should not have undergone CPR, rather than have the decision made after the first arrest.

Recommendations

- Coronary angiography and PCI should be considered in all cardiac arrest survivors where the cause of cardiac arrest is likely to be primary myocardial ischaemia.
- Organ donation should be considered in every case where life sustaining therapies are being withdrawn.



Overall Quality of Care

NCEPOD

Overall quality of care

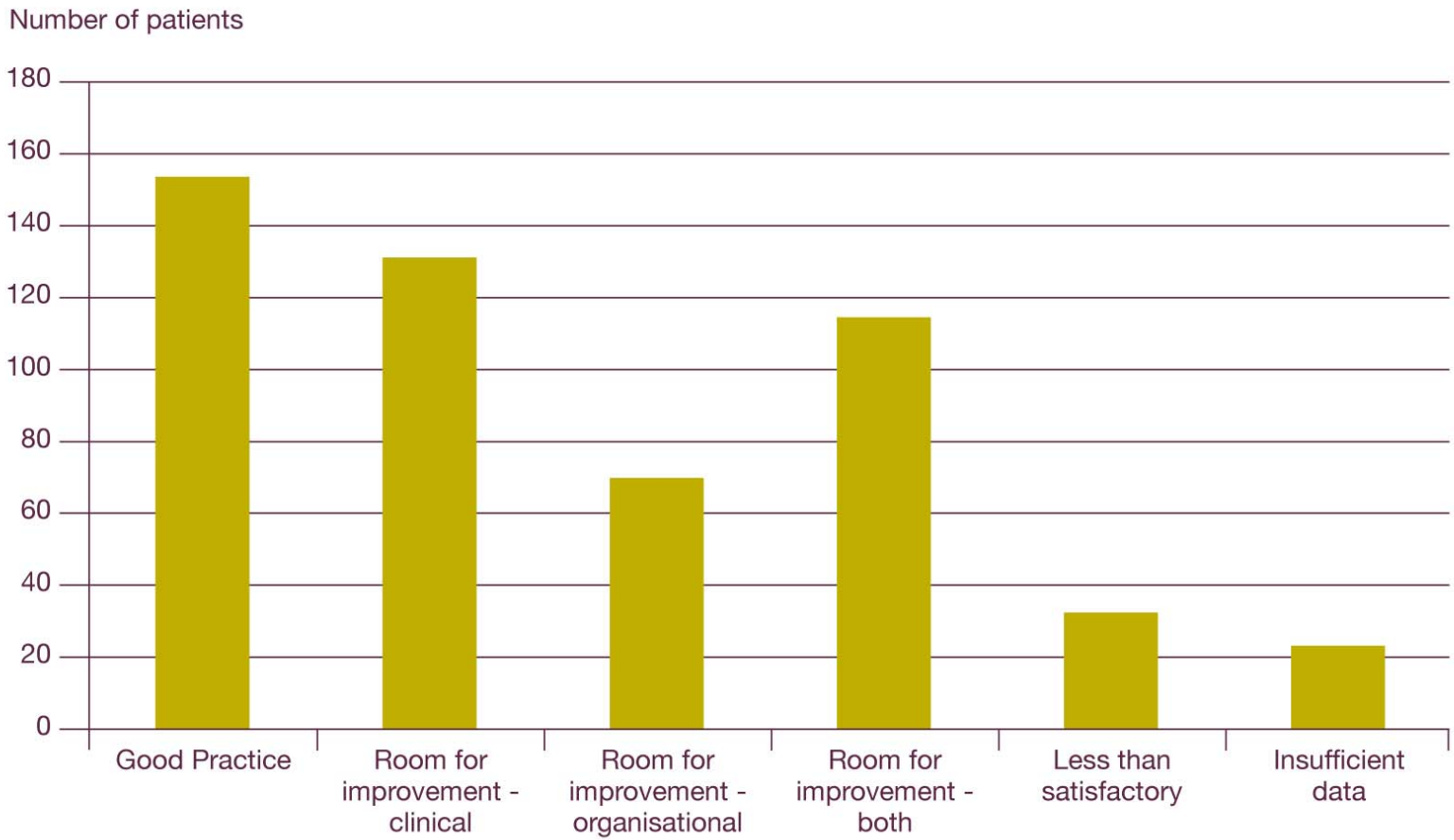


Figure 8.1 Overall quality of care - Advisors' opinion

Responsible clinicians' views

Table 8.2 Action that may have improved outcome if something had been done differently - Clinician caring for the patients' opinion

Action	n
Earlier treatment of problem	14
DNACPR decision	13
Better monitoring	12
Escalation to higher level of care	5
Early warning score acted on	4
Correction of wrong diagnosis made	3
Escalation to consultant	2
Administration of treatment as stated by the consultant	1
Correction of wrong treatment	1
Other	16
Total	**71**

- Not just Advisor views

Less than good care

Table 8.3 Less than good care contributed to death - Advisors' opinion

Less than good care contributed to the patients' death	Total	%
Yes	81	31.9
No	173	68.1
Subtotal	**254**	
Insufficient data to assess	75	
Total	**316**	

Summary

- Care less than good in 7 out of 10 cases
- Deficiencies in period prior to cardiac arrest
  - Admission process, consultant involvement, recognition of illness, appreciation of severity, escalation
- Decision making – ceilings of treatment/DNACPR
- Some problems in resuscitation and post resuscitation phase

‘The Challenge’

- Accurate and appropriate initial assessment and management.
- Consistent recognition of, response to, and management of acute illness.
- Consistent explicit decision making about CPR status to ensure that it is performed only on patients likely to benefit.

Time to Intervene?

A review of patients who underwent cardiopulmonary resuscitation as a result of an in-hospital cardiorespiratory arrest

NCEPOD