NATIONAL CEPOD

The Report of the National Confidential Enquiry into Perioperative Deaths 1992/1993

• E A CAMPLING • H B DEVLIN •
• R W HOILE • J N LUNN •

THE REPORT OF THE

NATIONAL CONFIDENTIAL

ENQUIRY

INTO

PERIOPERATIVE DEATHS

1992/1993

(1 April 1992 to 31 March 1993)

E A Campling	**BA MHSM DipHSM**
H B Devlin	**CBE MD FRCS**
R W Hoile	**MS FRCS**
J N Lunn	**MD FRCA**

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35-43 Lincoln's Inn Fields
London
WC2A 3PN

Tel: 0171 831 6430

Requests for further information should be addressed to the Chief Executive.

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ROYAL COLLEGE OF ANAESTHETISTS

ROYAL COLLEGE OF OBSTETRICIANS
AND GYNAECOLOGISTS

ROYAL COLLEGE OF OPHTHALMOLOGISTS

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ASSOCIATION OF ANAESTHETISTS OF GREAT BRITAIN & IRELAND

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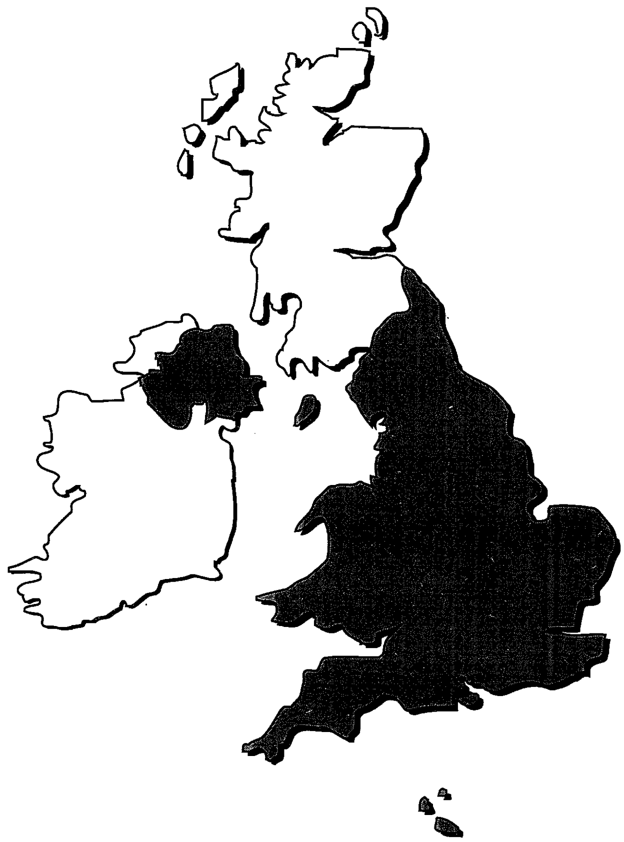

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Foreword

Surgery and anaesthesia today are very safe, and postoperative deaths are rare. By studying closely the circumstances of perioperative deaths, the National Confidential Enquiry into Perioperative Deaths (NCEPOD) seeks to identify areas where the quality of care might be further improved and the process made even more safe. There is evidence that points noted in previous reports have already led to improvements in the standard of care: fewer operations are now being done by unsupervised trainees and there is a greater use of audit. Certain deficiencies remained uncorrected in the period covered by the present report (1992/1993), notably the lack of high dependency or intensive care units and daytime emergency operating facilities.

It is neither possible nor desirable for NCEPOD to provide any kind of league-table: without the detailed denominators - the numbers of operations of each type and in each hospital - NCEPOD could not draw any kind of comparison between one surgeon and another or one hospital and another. Our aim is to identify deficiencies so that they may be identified and corrected, and an already excellent surgical service made even better.

The study has involved an immense amount of work by the surgeons, anaesthetists and pathologists in each of the specialist advisory groups who have reviewed many questionnaires: they deserve our thanks.

J P Blandy CBE FRCS
Chairman, Steering Group
The National Confidential Enquiry into Perioperative Deaths
November 1995

Acknowledgements

The National Confidential Enquiry into Perioperative Deaths would not be possible without the enormous voluntary effort of local reporters and administrative and clinical audit staff who provide the basic data on deaths. We are grateful for their continued support and enthusiasm.

The information presented in this report represents many hours of work by consultant and junior medical staff who have completed questionnaires. We thank them for their participation and valuable contribution to the Enquiry. We are also grateful to the secretarial and medical records staff who have searched for patients' notes.

The advisory groups for anaesthesia, gynaecology, pathology and surgery have carefully reviewed questionnaires and data and have assisted the authors in the production of this Report. We are pleased to acknowledge their valuable contribution and thank them for their hard work.

The organization of the Enquiry would be impossible without the hard work and good humour of the NCEPOD staff; Peter Allison, Mark Bell, Fatima Chowdhury, Jennifer Drummond, Sean Gallimore, Dolores Jarman, Sheila Keay, Monica Stubbings and Donna Wallace.

Background

The National Confidential Enquiry into Perioperative Deaths (NCEPOD) was launched in 1988 and commenced data collection on 1 January 1989. It is concerned with the quality of the delivery of anaesthesia and surgery and the perioperative care of the patients: it does not study the causation of death. The protocol is derived from that of the Confidential Enquiry into Perioperative Deaths (CEPOD) for which the report was published in December 1987.[1] NCEPOD is independent of the Departments of Health and of the other governmental and non-governmental organizations which support it.

The first national report, on the 1989 data, was published in June 1990[2] and concentrated on the care of children up to the age of 10 years. The 1990 Report[3] reviewed a random selection of one in five of all deaths reported to the Enquiry. The 1991/92 Report[4] was based on specific procedures across all the surgical specialties.

Key CEPOD and NCEPOD recommendations 1987 to 1992

Supervision and skills

No trainee should undertake any anaesthetic or surgical operation on a child of any age without consultation with their consultant. (NCEPOD 1989)

The supervision of locum appointments at all grades in anaesthesia and surgery needs an urgent review. (NCEPOD 1990)

It is no longer acceptable for basic specialist trainees (senior house officers) in some specialties to work alone without suitable supervision and direction by their consultant. Managers and consultants must locally achieve these arrangements. (NCEPOD 1991/92)

There needs to be a collaborative approach to the matching of surgical and anaesthetic skills to the condition of the patient. (NCEPOD 1991/92)

Decision-making

Resuscitation, assessment and management of medical disease take time and may determine the outcome; their importance needs to be re-stated. Arrangements which permit this in every case are important. (CEPOD)

The decision not to operate is difficult. Humanity suggests that patients who are terminally ill or moribund should not have non-life-saving operations, but should be allowed to die in peace with dignity. (CEPOD)

Decisions for or against operations should be made jointly by surgeons and anaesthetists; this is a consultant responsibility. (NCEPOD 1990)

Clinical issues

Surgeons, gynaecologists and anaesthetists need to address the continuing problem of thromboembolism which causes death after surgery. Hospitals and clinical directorates should be required to address the issue and develop agreed local protocols. (NCEPOD 1991/92)

All grades of surgeon, gynaecologist and anaesthetist must realise the critical importance of fluid balance in elderly patients. (NCEPOD 1991/92)

Essential services and facilities

Providers should review their facilities for out-of-hours work and concentrate anaesthetic, surgical and nursing resources at a single location. (CEPOD)

Essential services (including staffed emergency operating rooms, recovery rooms, high dependency units and intensive care units) must be provided on a single site wherever emergency/acute surgical care is delivered. (NCEPOD 1990)

Surgeons, gynaecologists and anaesthetists must have immediate access to essential services (recovery rooms, high dependency and intensive care units) if their patients are to survive. (NCEPOD 1991/92)

Clinical experience and education

Operations should only be performed by surgeons who have adequate training in the specialty relevant to the operation. (CEPOD)

Surgeons and anaesthetists should not undertake occasional paediatric practice. The outcome of surgery and anaesthesia in children is related to the experience of the clinicians involved. (NCEPOD 1989)

Consultants who take the responsibility for the care of children must keep up to date and competent in the management of children. (NCEPOD 1989)

All grades of surgeon and anaesthetist should be involved in medical audit and continuing education. (NCEPOD 1990)

Medical records and education

The provision of clinical and management information about patients, including postmortem records, needs to be improved significantly. (NCEPOD 1989 and 1990)

There is a need for an improved method for collection and validation of information on perioperative deaths locally and nationally. (NCEPOD 1991/92)

Postmortem examinations

Efforts should be made to increase the number of postmortem examinations. (NCEPOD 1990)

The postmortem rate is too low. At least 49% of postmortems demonstrate, despite clinicians' scepticism, significant, new and unexpected findings which are relevant. Postmortems are an important form of quality control. (NCEPOD 1991/92)

The NCEPOD report 1992/93

The sample for 1992/93 was deaths of patients aged 6 years to 70 years. This is the largest sample reviewed to date by NCEPOD. It is important for the casual reader to remember that the annual report of the National Confidential Enquiry into Perioperative Deaths deals only with data about patients who have died, usually in hospital, within 30 days of operation. The amount of information submitted to NCEPOD is limited. It is confined to that given in answers to questions in a questionnaire sent to consultants (anaesthetists and surgeons, including gynaecologists). Furthermore, it is limited because of the inevitable interval of time between the death and the receipt of the questionnaire by the consultant. There are many occasions on which further limitations arise because the consultants cannot obtain the hospital notes and (or) cannot remember the salient details of the patient, the contemporary circumstances or the death.

Advisors

Groups of advisors in each surgical specialty and in anaesthesia and pathology looked through the questionnaires and operation and anaesthetic records and provided comments to the clinical coordinators on the management of the patients. These comments were then amalgamated by the clinical coordinators along with the aggregated tables and turned into the text of the report for which the authors are responsible. This is a time-consuming process, but it is one in which the profession, through the NCEPOD Steering Group and advisory groups, participates. It must be stressed that the coordinators are the authors of the report, with the support of the Steering Group.

Data

The return rate of questionnaires by anaesthetists has increased by 16% since 1991/92. One particular specialty, orthopaedic surgery, has notably improved its rate of return. The fact that NCEPOD received no reply about 860 surgical and also 494 anaesthetic questionnaires in response to three letters about each individual patient is disquieting and it is obvious that these figures could be reduced with considerable benefit to NCEPOD. However, the high rate of questionnaire returns leads us to believe that we have the support of the medical profession and we need this to continue.

	Number of deaths reported	Surgical questionnaires returned %	Anaesthetic questionnaires returned %
1989	20247	*73.2*	*65.0*
1990	18817	*73.6*	*65.8*
1991/92	18132	*68.9*	*61.2*
1992/93	19816	*72.4*	*77.4*

Definitions

NCEPOD has a number of definitions and classifications which are not yet always used in hospital practice. The important differentiation, for instance, between operations as elective, scheduled, urgent or emergency is not made by all clinicians consistently. Appropriate comparisons would be facilitated if it were. Attention is drawn elsewhere in the report to the different perceptions of surgeons and anaesthetists about the state of patients according to the American Society of Anesthesiologists' classification of physical status.

Essential services

The division of the various special care areas is sometimes apparently arbitrary and this results in confusion: it is difficult, for instance, to accept that 10% patients who died were apparently in hospitals without **recovery rooms**. The distinctive nature of **high dependency units** and **intensive care units** (ICU) is not always clear in hospitals with specialist or otherwise limited functions and this also causes confusion. Overall there is an inadequate provision of high dependency units across the country and this is something that should be addressed very urgently both by clinicians and by managers. It is pointless to perform major surgery on patients who are physiologically compromised unless there are facilities for these patients to recover postoperatively. Other bodies have pointed out the importance of properly staffed high dependency units and intensive care units and that there is a need for a rational provision of staffed and equipped ICU beds whenever major surgery is carried out and this should be appreciated by all. For out-of-hours operations which are inherent in the practice of surgery, patients must be properly prepared by suitable resuscitation and their operations undertaken by suitably supervised staff. Trainees with less than three years' experience in the specialty should not anaesthetise or operate without appropriate supervision.

Surgery may not always be curative and there are operations which are done to alleviate pain and discomfort in patients who have incurable conditions. These patients should not be denied the best arrangements (staff, equipment, essential services) for their care. Selection of such patients for operation is crucial and is best done as a result of widespread discussion at consultant level. Physicians and nurses may need to be involved and these decisions must not be delegated to junior staff. The complex problem of the place of surgery in mentally ill patients needs more discussion both within the medical profession and, probably more importantly, outside it.

Guidance

It is obvious that there is a need for some central guidance, guidelines or standards about the management of the most common problems, which could be endorsed by the entire medical profession. The next task for the profession might be to endorse standards for anaesthetic and surgical interventions from which protocols could be written. These protocols should be "owned" locally and capable of routine initiation.

Vignettes

Most sections of the report have some vignettes to illuminate events which have been reported to NCEPOD. These stories may not have all the detail with which the actual participants in the event would wish to justify their actions but there is sufficient material contained within each to illustrate the point(s) at issue. Many demonstrate more than one point of importance and all serve to make the otherwise turgid collection of figures slightly more interesting for clinicians. No-one, apart from the actual doctors, can know the precise identity of the patient, the hospital or the doctors involved and thus the confidentiality of all is preserved. The authors, on this occasion, have reluctantly agreed to the omission of vignettes from two sections of the surgical report. Vignettes have been widely and successfully used in other Confidential Enquiries, but the clinical information available to NCEPOD is limited, and this can lead to its interpretation by the advisors' groups being at apparent variance with the view held by others who have access to more information. But does this not fail to appreciate the purpose that is intended? We trust that the press and media will not distort the vignettes out of context in a manner which could alarm the wider public. NCEPOD is not concerned with outcome or clinical decision-making in relation to individual cases. It is concerned with the overall organization and process of surgical and anaesthetic practice. It is financed largely by government, draws on information from surgeons and anaesthetists to present to the profession, to those responsible for health care management and to the general public a considered view on how improvements can be made.

General Recommendations 1992/93

- NCEPOD has again identified the substantial shortfall in critical care services. Any hospital admitting emergency patients, and hospitals admitting complex elective patients must have adequate facilities for intensive and/or high dependency care at all times.

- Trainees with less than three years' training in the specialty should not anaesthetise or operate without appropriate supervision.

- Practitioners must recognise their own limitations and not hesitate to consult a more appropriate colleague when managing conditions outside their immediate expertise.

- The skills of the surgeon and anaesthetist should always be appropriate for the physiological and pathological status of the patient.

- Surgeons operating laparoscopically should not hesitate to convert to an open approach when necessary.

- Appropriately trained staff must accompany all patients with life-threatening conditions during transfer between and within hospitals.

- The medical profession needs to develop and enforce standards of practice for the management of many common acute conditions (e.g. head injuries, aortic aneurysm, colorectal cancer, gastrointestinal bleeding).

- There is an urgent need to improve the quality of medical notes.

- Managers need to improve the services provided by medical records departments so that notes are available when required.

NCEPOD 1993 to 1996

1993/94

The distribution of questionnaires for deaths which occurred between 1 April 1993 and 31 March 1994 has been restricted to one per consultant surgeon or gynaecologist.

1994/95

Deaths on the day of the surgical procedure or within three days of it are selected for review from the data for 1994/95. One questionnaire only will be sent to each consultant surgeon or gynaecologist.

1995/96

Between 1 April 1995 and 31 March 1996 NCEPOD is carrying out a widespread audit of the starting times of surgical procedures. NHS and independent hospitals have been invited to participate. The method of the audit is briefly described below.

1 From 1 April 1995, the initial questionnaire should be completed by the hospital's local contact for all surgical procedures performed during a 24-hour period specified by NCEPOD. Each hospital will provide data on seven different days of the week during the year. These days will fall in different months. NCEPOD will inform the contact of the relevant day two weeks in advance of each date.

2 Data from the completed questionnaires will be entered to the NCEPOD database.

3 For all "out-of-hours" surgery (18.01 to 07.59 on weekdays plus weekends and bank holidays) a letter will be sent to the consultant surgeon to ask for further information on why the operation was performed at this time.

4 The local contact will be asked to inform NCEPOD of any patients included in (1) who die within 30 days of <u>this</u> procedure.

5 Detailed questionnaires will be sent to the consultant surgeon and consultant anaesthetist about patients identified under (4).

Management of the Enquiry

Corporate structure

The National Confidential Enquiry into Perioperative Deaths (NCEPOD) is an independent body to which a corporate commitment has been made by the Associations, Colleges and Faculties related to its areas of activity. Each of these bodies nominates members of the Steering Group.

Steering Group

Chairman
Professor J P Blandy CBE

Vice-Chairman
Professor V R Tindall CBE
(Royal College of Obstetricians and Gynaecologists)

Secretary
Mr H B Devlin CBE
(Royal College of Surgeons of England)

Treasurer
Dr J N Lunn
(Royal College of Anaesthetists)

Professor D Cumberland
(Royal College of Radiologists)

Dr M Goldacre
(Faculty of Public Health Medicine)

Mr R W Hoile
(NCEPOD Clinical Coordinator)

Dr J Lumley
(Royal College of Anaesthetists)

Professor V Lund
(Royal College of Surgeons of England)

Dr M Morgan
(Association of Anaesthetists of Great Britain and Ireland)

Dr A Morley
(Royal College of Pathologists)

Mr C G Munton
(Royal College of Ophthalmologists)

Mr M L Obeid
(Association of Surgeons of Great Britain and Ireland)

Mr M F Sullivan
(Royal College of Surgeons of England)

Mr J Ll Williams
(Faculty of Dental Surgery, Royal College of Surgeons of England)

Co-opted members;

Mr M J C Burgess
(Coroners' Society of England and Wales)

Mr T Matthews
(Institute of Health Services Management)

Department of Health (England) representative

Coordinators

Management	Ms E A Campling
Anaesthesia	Dr J N Lunn
Surgery	Mr H B Devlin
	Mr R W Hoile

Assistant Coordinators

Anaesthesia	Dr M C Derrington
	Dr G S Ingram
Surgery	Mr M A C Leonard

Funding

The total annual cost of NCEPOD is approximately £450,000 (1994/95). We are pleased to acknowledge the continued support of;

Department of Health (England)
Welsh Office
Department of Health and Social Services (Northern Ireland)
States of Guernsey Board of Health
Jersey Group of Hospitals
Department of Health and Social Security, Isle of Man Government
Benenden Hospital
Compass Healthcare Limited
General Healthcare Group PLC
Nuffield Hospitals
St Martins Hospitals Limited
The Wellington Hospital

This funding covers the *total* cost of the Enquiry, including administrative salaries and payments for clinical coordinators (nine sessions per week), assistant clinical coordinators (six sessions per week), office accommodation charges, computer and other equipment as well as travelling and other expenses for the coordinators, Steering Group and advisory groups.

The NCEPOD protocol

The Enquiry reviews clinical practice and identifies remediable factors in the practice of anaesthesia and surgery. We consider the *quality* of the delivery of care and do not study specifically causation of death. The commentary in this report is based on peer review of the data, questionnaires and notes submitted to us: it is not a research study based on differences within a control population.

NCEPOD does not provide data to any person or organization outside the NCEPOD staff, coordinators and Steering Group. All questionnaires, reporting forms and other paper records relating to 1992/93 have been shredded, and the data have been removed from the computer database.

The protocol for the Enquiry was agreed in December 1988 (see Appendix A).

Coverage

All National Health Service and Defence Medical Services hospitals in England, Wales and Northern Ireland, and public hospitals in Guernsey, Jersey and the Isle of Man are included in the Enquiry, as well as hospitals managed by BUPA Hospitals Limited, Compass Healthcare Limited, General Healthcare Group PLC, Nuffield Hospitals, St Martins Hospitals Limited, the Wellington Hospital and Benenden Hospital. Funding is provided by the Department of Health (England), the Welsh Office, the Department of Health and Social Services (Northern Ireland), the relevant authorities in Guernsey, Jersey and the Isle of Man, and by the independent healthcare companies. Consultant Anaesthetists, Gynaecologists and Surgeons in all specialties are asked to participate.

Reporting of deaths

The Enquiry depends on local reporters (see Appendix J) to provide data on deaths in their hospital(s). Most of the reporters in the public sector are consultant clinicians who have devised their own methods of obtaining the information; many have delegated the data collection to administrative staff. In the independent sector, hospital or nursing managers provide the data. When incomplete information is received, the NCEPOD staff contact the appropriate medical records or information officer or secretarial or clinical audit staff.

Deaths of patients *in hospital* within 30 days of a surgical procedure (excluding maternal deaths) are included in the Enquiry. If local reporters are aware of postoperative deaths at home, they report them to us. A surgical procedure is defined by NCEPOD as;

> "any procedure carried out by a surgeon or gynaecologist, with or without an anaesthetist, involving local, regional or general anaesthesia or sedation".

Reporters provide the following information, which is entered on to the computer database;

Name of authority/trust
Name/sex/hospital number of patient
Name of hospital in which the death occurred (and hospital where surgery took place, if different)
Date of birth, final operation and death
Surgical procedure performed
Name of consultant surgeon
Name of anaesthetist

The data collection year runs from 1 April to 31 March.

Data collection and review for 1992/93

Sample for detailed review

A sample of the reported deaths was reviewed in more detail. The sample selection varies for each data collection year, and is determined by the Steering Group. The detailed sample for 1992/93 was patients aged 6 years to 70 years at the time of death.

For each sample case, questionnaires (see Appendices D and E) were sent to the consultant surgeon or gynaecologist and consultant anaesthetist. These questionnaires were identified only by a number, allocated in the NCEPOD office. Copies of operation notes, anaesthetic records and fluid balance charts and postmortem reports were also requested. Surgical questionnaires were sent directly to the consultant surgeon or gynaecologist under whose care the patient was at the time of the final operation before death. No more than five questionnaires were sent to each consultant surgeon or gynaecologist. When the local reporter had been able to identify the relevant consultant anaesthetist, the anaesthetic questionnaire was sent directly to him or her. However, in many cases this was not possible, and the local tutor of the Royal College of Anaesthetists was asked to name a consultant to whom the questionnaire should be sent. We did not restrict the number of anaesthetic questionnaires sent to each consultant.

Advisory groups

Completed questionnaires were reviewed by advisory groups for anaesthesia and surgery. The advisory group in pathology reviewed postmortem data from the surgical questionnaires as well as copies of postmortem reports. All copies of medical notes were rendered anonymous on receipt so that the groups were unable to identify the source of the questionnaires. These groups were nominated by the relevant Colleges and specialist societies. They were drawn from a variety of hospitals in England, Wales and Northern Ireland, and include academic and non-academic surgeons and anaesthetists.

Consultants

We hold a database, regularly updated, of all consultant anaesthetists, gynaecologist and surgeons in England, Wales and Northern Ireland. Appendices G and H list the consultants who returned at least one questionnaire to NCEPOD.

Data analysis

All questionnaires were examined by the NCEPOD Chief Executive to identify inconsistencies in the information provided and to prepare the data for entry to the computer database. The data were aggregated to produce the tables and information in this report. Overall data were aggregated to regional or national level only so that individual Trusts, hospitals and District Health Authorities cannot be identified. The data and the questionnaires were reviewed by the clinical coordinators and assistant clinical coordinators with the advisory groups.

Production of the Report

The advisory groups commented on the overall quality of care within their specialty and on any individual cases which merited particular attention. These comments formed the basis for the sections on anaesthesia, surgery and pathology, and all advisory groups contributed to the draft for their specialty. The Report was then reviewed by the coordinators and at least twice by the Steering Group.

General data 1992/93

(Tables M1 to M12 start on page 24)

Local reporters (see Appendix J) sent data to NCEPOD about patients who died in hospital between 1 April 1992 and 31 March 1993 within 30 days of a surgical procedure. We were also informed of a few deaths which occurred at home within the 30-day period, but most reporters are unable to provide this information.

Reporters have established their own methods of data collection; many are assisted by departments of clinical audit or information services. If an essential data item is omitted on the reporting form, the NCEPOD staff contact the medical records officer in the relevant hospital. We are grateful for the help given to us by the staff in these departments. New local reporters have taken over from those who were employed by a purchasing authority and whose role was no longer appropriate in the new NHS structure for obtaining data from the "provider" hospitals.

In October 1994, we wrote to the Chief Executives of all hospitals for which we had received reports of deaths in 1992/93, requesting confirmation of the total number of reported deaths. In several cases, additional deaths were reported to us via the Chief Executive after information systems had identified additional data. We are pleased to note that most of the hospitals listed in the 1991/92 report as having difficulties with data collection are now (October 1995) able to report deaths to NCEPOD.

Tables M1 and M3 to 5 refer to the total number of 19816 deaths reported to the Enquiry. This total does not include 35 reports where the data were incomplete, 61 reports received too late for inclusion in the analysis, and 445 inappropriate reports (see table M2). The totals of reports for previous years are shown in table M1 but we are not able to explain the fluctuations, which are more likely to be caused by local (hospital) problems with data collection rather than clinical factors. Independent sector participation has increased over the years as more groups of hospitals have joined the Enquiry.

Table M1

Deaths reported to NCEPOD

		Previous years		
	1992/93	1991/92	1990	1989
England				
Northern	993	1141	1069	1089
Yorkshire	1678	1126	1395	1596
Trent	2036	2014	1722	1849
East Anglia	1054	739	768	722
North West Thames	803	771	1019	1026
North East Thames	1422	1278	1427	1436
South East Thames	1324	1262	1443	1599
South West Thames	1121	1203	1014	1241
Wessex	1299	874	913	1028
Oxford	808	817	599	649
South Western	1194	973	1084	1278
West Midlands	1565	1578	1826	1902
Mersey	878	699	799	845
North Western	1500	1810	1937	2019
Special Health Authorities	290	78	108	147
Wales	1072	1079	1102	1162
Northern Ireland	474	375	316	380
Other authorities				
Guernsey	26	18	39	32
Jersey	32	25	22	26
Isle of Man	41	25	25	7
Defence Medical Services	40	75	60	94
Independent sector	166	172	130	120
Total	**19816**	**18132**	**18817**	**20247**

Table M2
Inappropriate reports received and not included

More than 30 days (day of operation to day of death)	319
No surgical procedure performed or inappropriate procedure (according to NCEPOD criteria)	74
Procedure not performed by a surgeon	34
Maternal deaths	14
Non-participating hospital (independent)	4
Total	**445**

Table M3
Calendar days* between death and receipt of report by NCEPOD

1 to 29	7985
30 to 59	3559
60 to 89	2029
90 to 119	1286
120 to 149	922
150 to 179	612
180 or more	3423

* i.e. days of the week, not 24-hour periods

It is disappointing that only 40% of the deaths were reported to us within one month. We hope, however, that this will improve for future years if more hospitals are able to provide data from computer systems, and more assistance is provided by clinical audit and information departments.

Delay in reporting of deaths (see table M3) causes an inevitable time lapse between the death and sending of questionnaires about sample cases. However, this does not seem to affect the return rate of surgical or anaesthetic questionnaires (see tables M7 and M11).

Tables M4 and M5 and Figure M1 show data very similar to those of previous years of the Enquiry.

Table M4
Calendar days* from operation to death

		%	%
0	2215		*11.2*
1	2431		*12.3*
2	1677		*8.5*
3	1267	*37.7*	*6.4*
4	1103		*5.6*
5	992		*5.0*
6	864		*4.4*
7	821		*4.1*
8	756	*18.7*	*3.8*
9	682		*3.4*
10	598		*3.0*
11	623		*3.1*
12	549		*2.8*
13	497	*13.0*	*2.5*
14	462		*2.3*
15	438		*2.2*
16 to 20	1716		*8.6*
21 to 25	1221	*19.4*	*6.2*
26 to 30	904		*4.6*

Figure M1 (see Table M4)
Calendar days from operation to death

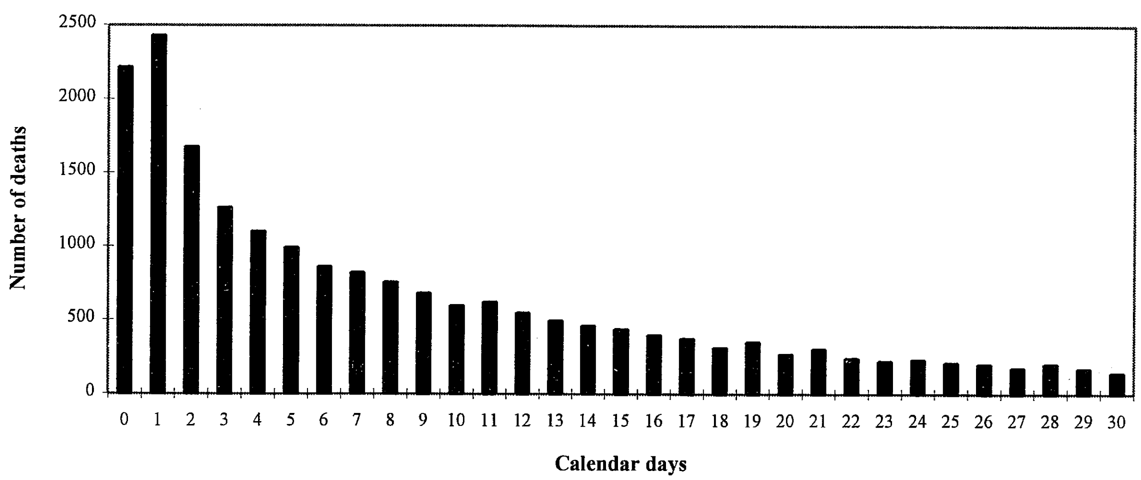


Table M5
Age/sex distribution of reported deaths

Age in years			Male	Female	Total
0	to	4*	166	112	278
5	to	9	14	11	25
10	to	14	20	18	38
15	to	19	46	31	77
20	to	24	62	32	94
25	to	29	83	39	122
30	to	34	72	45	117
35	to	39	79	69	148
40	to	44	141	91	232
45	to	49	225	151	376
50	to	54	303	211	514
55	to	59	518	313	831
60	to	64	877	566	1443
65	to	69	1447	936	2383
70	to	74	1912	1261	3173
75	to	79	1805	1469	3274
80	to	84	1515	1720	3234
85	to	89	791	1479	2270
90	to	94	242	680	922
95	to	99	49	181	230
100	or	more	7	27	34
Total			**10374**	**9442**	**19816**

* i.e. day of birth to the day preceding the fifth birthday.

The sample for more detailed study comprised patients aged 6 years to 70 years on the date of death (total number 6990, 35.3%). Some of these cases (697) were excluded from further study, however, because the surgical procedure was minor (e.g. insertion of central line).

Surgical questionnaires

The Steering Group had agreed that each consultant surgeon should receive no more than five questionnaires; 1200 cases were excluded because the limit for that consultant had been reached. We were unable to send a further 484 questionnaires for the following reasons;

Deaths reported after the "cut-off" date for distribution of questionnaires	406
The consultant was no longer working at the hospital	32
The consultant did not wish to participate (seven individuals)	28
The name of the consultant was unobtainable	18

Questionnaires were sent to consultant surgeons for further information on 4609 cases. The overall return rate (see table M6) was 72.4%. It is disappointing to note that the return rates for North East Thames and South East Thames were below 60%.

The complete data from 52 questionnaires have not been included in the surgical sections of this report because they were incomplete.

Table M6
Surgical questionnaires

	No. of SQs sent	No. returned	% return rate	No. returned and analysed	Number of hospitals represented in analysed SQs
England					
Northern	266	214	*80.4*	211	22
Yorkshire	362	255	*70.4*	251	21
Trent	502	397	*79.1*	391	21
East Anglia	183	138	*75.4*	137	10
N W Thames	193	145	*75.1*	143	21
N E Thames	336	198	*58.9*	191	21
S E Thames	272	162	*59.6*	160	21
S W Thames	203	169	*83.2*	168	18
Wessex	206	145	*70.4*	142	15
Oxford	198	132	*66.7*	126	13
South Western	245	189	*77.1*	187	17
West Midlands	442	301	*68.1*	297	29
Mersey	230	160	*69.6*	160	16
North Western	420	329	*78.3*	322	23
Special Health Authorities	57	39	*68.4*	39	3
Wales	270	196	*72.6*	194	19
Northern Ireland	122	95	*77.9*	93	16
Other authorities					
Guernsey	8	8	*100.0*	8	1
Jersey	7	7	*100.0*	7	1
Isle of Man	9	8	*88.9*	8	1
Defence Medical Services	10	9	*90.0*	9	4
Independent sector	68	44	*64.7*	44	22
Total	**4609**	**3340**	***72.4***	**3288**	**335**

Table M7

Calendar days between death and receipt by NCEPOD of initial report (sample cases only, for which surgical questionnaires were sent)

	Surgical questionnaires sent	Surgical questionnaires returned	%
1 to 29	2099	1552	*73.9*
30 to 59	928	646	*69.6*
60 to 89	496	360	*72.6*
90 to 119	290	198	*68.3*
120 to 149	218	149	*68.3*
150 to 179	144	92	*63.9*
180 or more	437	291	*66.6*

Table M8

Specialty of the surgical procedure for questionnaires <u>not</u> returned by surgeons (i.e. specialty section in which they would have been included in this report)

		% of questionnaires not returned
Oral/Maxillofacial	1	*8.3*
Gynaecology	12	*11.4*
Colorectal	135	*21.6*
Urology	48	*22.6*
Vascular	167	*24.4*
Orthopaedic	101	*30.3*
General	448*	*28.0*
Otorhinolaryngological	21	*33.3*
Neurosurgery	130	*35.5*
Cardiothoracic	185	*37.0*
Plastic	21	*40.4*
Total	**1269**	

* Laparotomies have been included in "General" because no further information was available.

All of the six questionnaires for ophthalmic surgery were returned to the Enquiry.

Surgeons gave one of the following reasons for non-return of a questionnaire;

Medical notes lost or unavailable	276
Case thought to be inappropriate for NCEPOD	15
No longer working at the hospital	56
Too busy to complete the questionnaire (15 individuals)	34

In 28 cases, the consultant was sure that the questionnaire <u>had</u> been returned. There was no reply at all to any of the three letters (one initial request, two reminders) sent by NCEPOD about each of 860 cases. This is a particularly frustrating aspect of the Enquiry; if clinicians are unable to return questionnaires, we would at least like to be aware of the reason(s) for non-return.

The frequency of "lost notes" has been noted previously by NCEPOD,[2, 3] and continues to be a problem to be considered by both clinicians and managers. Non-availability of notes was the stated reason for inability to return 22% (276/1269) of the surgical questionnaires and 36% (325/909, see page 35) of the anaesthetic questionnaires. In addition, surgeons who returned questionnaires commented on the lack of parts of the patients' records (see table S16, page 122). Many clinicians wrote to the NCEPOD Chief Executive to apologise and to express their frustration about the loss of notes.

"I made efforts to track down the notes without success. This really did take up quite a lot of my time and effort, and I'm afraid that the lack of results caused me to feel disillusioned with the whole business"
(Consultant anaesthetist)

"I am afraid that such is the chaos of our hospital's medical records department that I will be unable to comply with your requests until I can access our own database properly"
(Consultant anaesthetist)

"This must be one of the worst hospitals in Britain for medical records. Whenever one of our cardiac patients dies, the case notes disappear immediately and in most cases, permanently. We are never able to send out proper summaries on deceased patients, and I have been completely unable to remedy the situation."
(Consultant cardiothoracic surgeon)

The Audit Commission[5] has recently commented on the standards of record-keeping and the "paper chase" for notes and made recommendations for improvement. NCEPOD endorses these recommendations and in particular the provision of clear guidelines and standards for all staff, including doctors, based on professional good practice, involving "senior management in recognising the importance of the records function and in giving managers the authority they need to monitor users".

There was a high percentage within each Region of consultants who participated in the Enquiry (i.e. returned at least one questionnaire).

Table M9
Number of individual consultant surgeons who returned surgical questionnaires

	Consultants to whom SQs sent	Consultants who returned SQs *	%
England			
Northern	114	94	*82.4*
Yorkshire	127	105	*82.7*
Trent	182	156	*85.7*
East Anglia	64	55	*86.0*
N W Thames	87	75	*86.2*
N E Thames	144	101	*70.1*
S E Thames	111	84	*75.7*
S W Thames	93	85	*91.4*
Wessex	83	72	*86.7*
Oxford	71	54	*76.0*
South Western	108	97	*89.8*
West Midlands	171	141	*82.4*
Mersey	88	71	*80.7*
North Western	147	128	*87.1*
Special Health Authorities	25	21	*84.0*
Wales	109	86	*78.9*
Northern Ireland	57	47	*82.5*
Other authorities			
Guernsey	4	4	*100.0*
Jersey	2	2	*100.0*
Isle of Man	2	2	*100.0*
Defence Medical Services	7	7	*100.0*
Independent sector	52	35	*67.3*
Total	**1848**	**1522**	***82.3***

* the number of individual consultants who returned at least <u>one</u> surgical questionnaire.

Anaesthetic questionnaires

Questionnaires were sent directly to consultant anaesthetists for further information on 4026 cases. No anaesthetist was involved in 144 cases where local anaesthesia or sedation were used. We were unable to send 451 questionnaires for the following reasons;

Name of consultant anaesthetist unobtainable or notified too late to send questionnaire	436
Anaesthetist no longer working at the hospital	15

The name of the anaesthetist is requested as a data item on the form completed by local reporters when informing us of a death. However, it is often not possible for the reporter to obtain this information because it is frequently omitted from computerised patient administration systems. For the 1992/93 sample, it was agreed that we would send all questionnaires directly to a consultant anaesthetist. Tutors of the Royal College of Anaesthetists were extremely helpful in providing the name of the most appropriate consultant, if the name of a consultant was not provided on the local reporting form. Some tutors agreed to distribute questionnaires locally. The rate of return of questionnaires (77.4%) increased by 16% over the 1991/92 rate (see table M10). The complete data from 36 questionnaires have not been included in the anaesthetic section of this report as they were incomplete.

It is disappointing to note that the return rate for North East Thames was below 65%.

Table M10
Anaesthetic questionnaires

	No. of AQs sent	No. returned	% return rate	No. returned and analysed	Number of hospitals represented in analysed AQs
England					
Northern	240	194	*80.8*	194	22
Yorkshire	312	253	*81.1*	251	21
Trent	461	334	*72.4*	332	21
East Anglia	173	148	*85.5*	145	10
N W Thames	179	142	*79.3*	141	21
N E Thames	238	149	*62.6*	149	21
S E Thames	215	155	*72.1*	151	21
S W Thames	167	136	*81.4*	135	18
Wessex	188	152	*80.8*	149	15
Oxford	152	117	*77.0*	115	13
South Western	224	189	*84.4*	185	17
West Midlands	405	338	*83.4*	335	29
Mersey	201	159	*79.1*	156	16
North Western	383	306	*79.9*	302	23
Special Health Authorities	51	34	*66.7*	34	3
Wales	248	165	*66.5*	162	19
Northern Ireland	94	77	*81.9*	76	16
Other authorities					
Guernsey	8	8	*100.0*	8	1
Jersey	7	7	*100.0*	7	1
Isle of Man	6	4	*66.7*	4	1
Defence Medical Services	9	6	*66.7*	6	4
Independent sector	65	44	*67.7*	44	22
Total	**4026**	**3117**	*77.4*	**3081**	**335**

NB Anaesthetic questionnaires were sent for 12 cases for which a surgical questionnaire was <u>not</u> sent

There was a high percentage within each Region of consultants who participated in the Enquiry (i.e. returned at least one questionnaire).

Table M11
Number of individual consultant anaesthetists who returned anaesthetic questionnaires

	Consultants to whom AQs sent	Consultants who returned AQs*	%
England			
Northern	104	96	*92.3*
Yorkshire	113	105	*92.9*
Trent	145	126	*86.9*
East Anglia	79	72	*91.1*
N W Thames	80	69	*86.2*
N E Thames	99	76	*76.8*
S E Thames	96	73	*76.0*
S W Thames	92	79	*85.9*
Wessex	89	76	*85.4*
Oxford	70	61	*87.1*
South Western	97	94	*96.9*
West Midlands	170	146	*85.9*
Mersey	81	67	*82.7*
North Western	148	130	*87.8*
Special Health Authorities	19	16	*84.2*
Wales	104	83	*79.8*
Northern Ireland	61	52	*85.2*
Other authorities			
Guernsey	5	5	*100.0*
Jersey	4	4	*100.0*
Isle of Man	4	2	*50.0*
Defence Medical Services	8	5	*62.5*
Independent sector	57	41	*71.9*
Total	**1725**	**1478**	***85.7***

* the number of individual consultants who returned at least one anaesthetic questionnaire

Table M12

Calendar days between death and receipt by NCEPOD of initial report (sample cases only, for which anaesthetic questionnaires were sent)

	Anaesthetic questionnaires sent	Anaesthetic questionnaires returned	%
1 to 29	1899	1513	*79.7*
30 to 59	819	609	*74.3*
60 to 89	438	319	*72.8*
90 to 119	258	207	*80.2*
120 to 149	181	128	*70.7*
150 to 179	113	78	*69.0*
180 or more	318	227	*71.4*

Anaesthetists gave one of the following reasons for non-return of a questionnaire;

Medical notes lost or unavailable	325
Anaesthetist no longer working at the hospital or on sick-leave	55
Too many questionnaires to complete	7
Case thought to be inappropriate for NCEPOD	5
Too busy to complete the questionnaire (2 individuals)	4
Questionnaire not received	5

In 14 cases, the consultant was sure that the questionnaire had been returned. There was no reply at all to any of the three letters (one initial request, two reminders) sent by NCEPOD about each of 494 cases.

The problem of **lost notes** has already been discussed (page 30).

Anaesthesia

Anaesthesia

Introduction

This section of the report could not have been written without the help and counsel of the consultant anaesthetist advisors.

They were, for this report, Drs:

M M Crosse (Southampton)	S J Harris (King's Lynn)
J P Curran (Nottingham)	G S Ingram (London)
M C Derrington (Leicester)	J M Millar (Oxford)
D J Dye (Newport)	K N Robinson (Northampton)
J B Dyson (Leeds)	F J W Walters (Bristol)

D K Whitaker (Manchester)

Some of these individuals had also helped with the previous Enquiry and without all of them this report could not have been written. Drs Ingram and Derrington, Assistant Anaesthetist Coordinators, have particularly contributed to the preparation of this section of the report.

Readers are encouraged to remember throughout this report that the protocol to which the Enquiry works is directed to the identification of remediable factors in the delivery of anaesthetic and surgical care, that is, the improvement in the quality of these services, **not** the causation of death.

The advisors met as two groups separately over a period of two years on 25 occasions and examined in detail 1507 questionnaires. The coordinators selected the questionnaires for the groups by a screening process similar to that used before,[4] namely a combination of computer-generated and personal scrutiny. Outline vignettes were constructed at these meetings. These form the basis of those in the report. The advisors also met together in two meetings to review the draft report and saw the completed copy again at a later stage of its development.

The response rate (77.4%) by anaesthetists has risen considerably over previous years, probably as a result of the change in method of distribution of questionnaires (see page 32). The residual difficulty is that questionnaires cannot be sent unless the local department or College tutor identify the anaesthetist involved (see page 32).

Criticism has been expressed about our use of vignettes and particularly their misuse by the media. However, it has to be stated that the great majority of anaesthetists approve. The vignettes are perceived to bring to life the otherwise dry and large collection of unique data and serve to highlight issues. There is no intention to offend and if, inadvertently, they do then the anaesthetist advisors unreservedly apologise. All the details which are included are those entered by anaesthetists or surgeons on the questionnaires.

The total number of anaesthetic questionnaires received and input to our database was 3081. These were from 335 different hospitals.

Hospital

Table A1 (q1)
In what type of hospital did the anaesthetic take place?

District General	2099
University/teaching	787
Surgical specialty	124
Other acute/partly acute	15
Defence Medical Services*	6
Independent*	50
Total	**3081**

* these hospital types are combined in the remainder of the anaesthesia report as non-NHS hospitals.

Proxy anaesthetists

It is inevitable that a proportion of forms will have to be completed by anaesthetists other than those involved. These are called proxy anaesthetists.

Table A2 (q3)
If you were not involved in any way with this anaesthetic and have filled out a questionnaire on behalf of someone else, please indicate your position

Duty consultant	261
Other consultant	171
College tutor	120
Chairman of division	68
Clinical director	8
ICU director	4
Associate specialist	1
Senior registrar	21
Clinical fellow	2
Staff grade	3
Registrar	24
Senior house officer	18
Audit coordinator	1
Not specified	4
Total	**706**

Twenty-three percent of the forms were thus completed by those who were not themselves personally responsible for the conduct of the case although some may have been accountable. We are very grateful for the substantial contribution that these doctors have made to the data collection system. Unfortunately however, our need to rely on their efforts does indicate some limitations in what is being attempted by NCEPOD.

The delay between the events (operation and death) and the receipt of a questionnaire means that trainee or locum staff may have moved elsewhere. The proxy anaesthetist inevitably has less insight into the information available than the actual anaesthetist. The difficulties for proxy anaesthetists are often compounded by the chaotic state of the clinical notes described by one as in “total disarray”.

The anaesthetist advisors noted how often proxy anaesthetists did not answer the questions about the year and the country of the primary medical qualification, possession of specialist qualifications and experience of the 'most senior anaesthetist'. There may be many good reasons for Departments of Anaesthetics to keep a record of the experience and qualifications of those it employs but it seems quite uncommon for this to be done. Many of the proxy anaesthetists were consultants who would not necessarily have immediate access to these details and NCEPOD recognises their difficulties. Nevertheless systems do exist in some departments which do retain career details at least of their trainees and locum employees, and of duty rosters. Support services should be provided for this to be done efficiently. The responsibilities of a Clinical Director in this respect have recently been of concern to the General Medical Council.[6]

Table A3 (qs 3 and 4)

When the questionnaire was completed by a proxy anaesthetist, which was the most senior grade of anaesthetist present at the anaesthetic?

		(Locums)
Senior house officer	156	(11)
Registrar	191	(25)
Senior registrar	182	(10)
Consultant	119	(15)
Staff grade	16	(2)
Associate specialist	17	(-)
Clinical assistant	20	(4)
General practitioner	1	(-)
Not answered	4	
Total	**706**	**(67)**

The number of locums in this table (A3) is not large. The fact that trainees rotate and consultants retire may account for some of the proxy anaesthetists.

The anaesthetist(s)

Table A4 (q4)
Grades of anaesthetists who were present at this anaesthetic

		(Locums)
Senior house officer	1242	(40)
Registrar	947	(80)
Senior registrar	579	(39)
Consultant	1817	(70)
Staff grade	95	(8)
Associate specialist	90	(2)
Clinical assistant	82	(7)
General practitioner	3	
Hospital practitioner	2	
Other	3	
Not answered	11	
Total	**4871**	

NB this can be a multiple entry (see Table A5)

NCEPOD recognises that the framework of hospital grades takes little account of the length or quality of experience which an individual may have. There is no straightforward way to overcome this and the shortcoming of this categorisation is appreciated. Others outside the health professions may not always understand this.

Table A5 (q4)
Number of anaesthetists present at this anaesthetic

	n=3081
One	1509
Two	1296
Three	241
Four	24
Not answered	11

Teams

Fifty-one percent of the questionnaires indicated that more than one anaesthetist was involved in the anaesthetic. The previous report[4] emphasised the value for training and for clinical quality if anaesthetists work in teams which then occurred in 43% of cases, i.e. in 1991/92.

Here are three examples of work by anaesthetists in teams.

A team of anaesthetists (consultant, registrar and SHO) anaesthetised a 27-year-old man. He was very jaundiced, hypoalbuminaemic, cachectic and was receiving total parenteral nutrition. There was full consultation between surgeons and anaesthetists. The patient had metastatic carcinoma of stomach. Palliative surgery, a right hemicolectomy, was done and he was admitted to the ICU for controlled ventilation of his lungs. Bleeding occurred one and a half hours later and the patient was returned to theatre. Monitoring included capnometry, oximetry, intra-arterial and central venous blood pressure. The anaesthetic record is exemplary. A trained ODA assisted. The first operation started at 09.00 hours; the second one finished at 20.00 hours. Large volumes of blood, packed cells and colloid were transfused but the patient died of multi-organ failure in pulmonary oedema on the same day. The postmortem report states that overwhelming septicaemia caused the death but the consultant anaesthetist asserted that the sequence of events suggested that a toxic myocarditis preceded this and was complicated by massive haemorrhage.

A previously fit 62-year-old man had a leaking abdominal aortic aneurysm. He was admitted to a DGH at 10.30 hours. A team of anaesthetists (consultant, registrar and SHO) anaesthetised him at 11.30 until 13.10 hours and the operation went well. He was admitted to the ICU for controlled ventilation of his lungs. The anaesthetic, monitoring and fluid balance were state-of-the-art but he died three weeks later after gradual deterioration.

A 68-year-old man had a cardiac arrest but he was resuscitated successfully and admitted to the ICU in a DGH. He was obese (132 kg), diabetic and hypertensive. The next day he had a laparotomy for suspected intestinal obstruction. He was anaesthetised by a team (consultant, registrar and SHO). All the small bowel was necrotic. No procedure was done and he was allowed to die on return to the ICU.

It seems to the anaesthetist advisors that the quality of care in the above cases in which teams were involved could not easily be bettered. Everything reasonable was done and nothing obvious was omitted, nevertheless the patients died.

A solo consultant anaesthetist, assisted by a trained ODA, anaesthetised a patient in a University hospital. The patient was 68 years old and was described as ASA 3. He had sustained two myocardial infarctions previously and was receiving digoxin. Three years earlier he had undergone a laryngectomy and was now to have a repair of a pharyngeal fistula. The operation lasted seven and a half hours. There was an arterial line but the blood pressure was only written down every 15-25 minutes and oxygen saturations four times. The patient was admitted to the recovery room for 30 minutes and was then discharged to the ward. He died three days later from a presumed myocardial infarction.

A solo consultant anaesthetist experienced in anaesthesia for plastic surgery managed a 51-year-old man in a University hospital. He was described as ASA 2. He had a squamous cell carcinoma in the floor of his mouth which was widely excised and a microvascular bone graft was done. The anaesthetic started at 08.00 hours and finished 18 hours later at 02.00 hours. A trained ODA assisted the anaesthetist. Hypotension to 60mmHg systolic was maintained for more than four hours with halothane and controlled ventilation of the lungs. The record is complete and impeccable. Controlled ventilation of the lungs was continued in the ICU whilst rewarming occurred. The patient died three weeks later with pneumonia complicated by septicaemia and multisystem failure.

These two consultants worked alone for long periods. There are no indications that they had any relief. Would the quality of care have been improved if more than one anaesthetist had been present? (See also note after Table A71).

Table A6 (q4)
Grades of solo anaesthetists

		(Locums	%)
Senior house officer	269	(15	*5.6)*
Registrar	220	(29	*13.2)*
Senior registrar	158	(9	*5.7)*
Consultant	723	(44	*6.1)*
Staff grade	49	(6	*12.2)*
Associate specialist	38	(2	*5.3)*
Clinical assistant	46	(4	*8.7)*
General practitioner	3	(-)	
Hospital practitioner	2	(-)	
Other	1	(-)	
Total	**1509**	**109**	*7.2*

The proportion of solo SHOs who were also locums has apparently declined since our last report.[4] The two samples are not the same but this difference does not account for the reduction in the number of locums. The anaesthetist advisors suggested that this may be the result of more internal cover of leave, as a result of restricted funds, and of a shortage of suitable applicants for locum posts.

Table A7 (q4)
Most senior anaesthetist present

		%	(Locums	%)
Senior house officer	277	*9.0*	(16	*5.8)*
Registrar	380	*12.3*	(44	*11.6)*
Senior registrar	391	*12.7*	(25	*6.4)*
Consultant	1818	*59.0*	(70	*3.8)*
Staff grade	68	*2.2*	(6	*8.8)*
Associate specialist	68	*2.2*	(2	*0.3)*
Clinical assistant	62	*2.0*	(6	
General practitioner	3			
Hospital practitioner	2	*0.2*		
Other	1			
Not answered	11	*0.4*		
Total	**3081**			

More than 70% of these patients were anaesthetised in the presence of a senior registrar or consultant; this is the same as in the previous report.[4]

Table A8 (q6)
Did the anaesthetist (of whatever grade) seek advice at any time from another anaesthetist?

	n=3081
Yes	518
No	2489
Not known	8
Not answered	66

If yes, grade(s) of anaesthetist(s) from whom advice sought

Senior house officer	7
Registrar	53
Senior registrar	73
ICU consultant	1
Consultant	406
Staff grade	2
Associate specialist	5
Clinical assistant	2
Not answered	2

It appears that on 33 occasions more than one person's help was sought. Some consultants sought help from other consultants: this must be a healthy trend.

The advisors recommended that locally derived protocols for referral should be written (see glossary, Appendix C).

The role of staff grade and associate specialist anaesthetists in relation to trainee advice must be decided locally.[7] They should never be regarded as replacements for consultants and should themselves always be encouraged to consult. There may be a distinction to be drawn between intellectual advice and technical help about a practical problem. It is acknowledged that many doctors in these posts have skill and knowledge that would, in some circumstances be very useful to an inexperienced SHO who has to deal with an unfamiliar problem. [The current, 1995, view of the Royal College of Anaesthetists is that staff grade anaesthetists <u>without</u> the diploma FRCA should not be placed in a teaching or supervisory role.]

Table A9 (qs 4 and 6)

When the most senior anaesthetist was an SHO, registrar, or staff grade, was advice sought?

		Yes	No	Not answered
Senior house officer	(277)	112	148	17
Registrar	(380)	146	222	12
Staff grade	(68)	25	42	1

Table A10 (qs 4, 6 and 51)

When the most senior anaesthetist was an SHO or registrar was advice sought (by time of start of anaesthesia)?

<u>Senior house officers</u>	Yes	No
08.00 to 17.59 hrs	57	85
18.00 to 24.00 hrs	41	46
00.01 to 07.59 hrs	11*	12†
Not answered	3	5

* ASA 2-3, 6; ASA 4, 3; ASA 5, 2.
† ASA 2-3, 6; ASA 4, 2; ASA 5, 4.

<u>Registrars</u>	Yes	No
08.00 to 17.59 hrs	74	126
18.00 to 24.00 hrs	51	58
00.01 to 07.59 hrs	15*	25†
Not answered	6	13

* ASA 1-3, 4; ASA 4, 6; ASA 5, 5.
† ASA 1-3, 9; ASA 4, 11; ASA 5, 5.

Two-hundred-and-eleven trainee anaesthetists did not seek advice during daylight hours (when advice should be freely available); this was probably because the cases which they were undertaking then were straightforward.

If 37 patients needed to be anaesthetised after midnight by SHOs or registrars because they were so sick, should not the consultants at least know (as a result of having had their advice sought)? The fact that nine ASA 5 patients were anaesthetised by SHOs or registrars after midnight without advice from a more senior anaesthetist is alarming; all these questionnaires were scrutinised by the anaesthetist advisors and most are mentioned elsewhere in this report. Departments might wish to establish protocols (Appendix C) about this matter (see also Table A67, q51). Meanwhile the Royal College of Anaesthetists does issue guidance about appropriate responsibilities for junior trainees.

Table A11 (qs 4, 6, 15 and 94)
When the most senior anaesthetist was an SHO or registrar, was advice sought (by day of death)?

Days from operation to death	Yes	No
Same day	31	24
Next day	41	34
2 days	24	30
3 days	18	31
4 days	17	21
5 days	8	26
6 to 10 days	60	79
11 to 15 days	26	83
16 to 20 days	13	25
21 to 25 days	8	17
26 to 30 days	12	17

Table A12 (qs 4 and 6)
From whom was advice sought by SHOs and registrars?

Most senior anaesthetist from whom advice sought	SHOs	Registrars
Senior house officer	1	2
Registrar	30	4
Senior registrar	15	25
Consultant	63	112
Staff grade	1	-
Associate specialist	1	2
Clinical assistant	1	-
Other	-	1

It is clear that SHOs and registrars tended to ask for help from more senior colleagues.

Table A13 (qs 4 and 6)
Was advice sought by solo SHOs and registrars (non-proxy respondent)?

	SHOs	Registrars
	n=115	n=100
Yes	55	34
No	59	65
Not answered	1	1

Table A14 (q7)
Did any colleague(s) come to help at any time?

	n=518*
Yes	122
No	381
Not answered	15

If yes, grade(s) of anaesthetist(s) who came to help

Senior house officer	7
Registrar	19
Senior registrar	23
Consultant	76
Staff grade	1
Associate specialist	1
Clinical assistant	3

* number of anaesthetists who sought advice (see Table A8).

NB this may be a multiple entry

Table A15 (qs 4 and 7)
When the anaesthetist was a solo SHO or registrar did any colleague(s) come to help (non-proxy respondent only)?

	SHOs	Registrars
	n=55	*n*=34
Yes	12	8
No	41	26
Not answered	2	-

We can be confident that 48% of solo SHOs (55/115) sought advice (table A13) and 22% (12/55) (table A15) of them received actual help. This figure may be an underestimate, nevertheless some advisors considered that the request for advice should have resulted in help more frequently.

The three vignettes below illustrate various matters in addition to the grade, experience and qualifications of the trainee staff involved. Too often the anaesthetist advisors noted that junior grades of medical staff were associated with inappropriate operations at inappropriate times, overload of intravenous fluids without appropriate monitoring and the absence of relevant essential services.

A 34-year-old patient in a DGH was receiving controlled ventilation of his lungs in an ICU after a road traffic accident. His Glasgow Coma Score was 3; he developed signs of covert haemorrhage. An exploratory laparotomy was carried out by a surgical registrar from whom no questionnaire was received. The SHO anaesthetist, who worked alone, had been qualified for four years, had less than two years' experience in anaesthesia but possessed the DA. No advice was sought and the procedure, although brief, took place at 04.00 hours. No muscle relaxant drugs were given. A haematoma in the liver was found and the patient was declared brain stem dead nine hours after the operation.

Would a consultant surgeon or anaesthetist have approached the problem differently?

A 26-year-old man was admitted to a specialist unit in a District General Hospital for the evacuation of an intracranial haematoma which may have arisen from an arteriovenous malformation. He was described by the registrar surgeon (two years' experience) as ASA 1 and by the SHO anaesthetist (two years' experience) as ASA 5. A more senior anaesthetist was not consulted. The operation took place at 04.00 hours on a Saturday. He died the same day.

The advisors commented that this team was grossly inadequate for the task. Should there be protocols* which insist that more senior staff be involved in specialist units?

A 68-year-old woman was recovering from a fractured hip and a Colles' fracture sustained and treated six weeks earlier. She developed peritonitis from perforated diverticulitis in the convalescent hospital and was transferred to a DGH for a Hartmann's procedure and colostomy. She suffered from diabetes and had controlled thyrotoxicosis. She was classified as ASA 4. The anaesthetic was managed by an SHO with six years' experience, but no qualifications in anaesthesia, who did not seek any advice. The locum registrar surgeon did not state how many of these procedures he had done before and the surgical questionnaire was not checked by a consultant. Fluid administration before operation included 1500 ml crystalloid and 1000 ml colloid; 2500 ml gelatin preparations were given during and immediately after the operation which lasted one and a half hours. There was no central venous pressure line. She went to a recovery room and thence to the ward. Seven hours later she complained of shortness of breath, became hypotensive and had a cardiac arrest from which she died. Postmortem examination showed faecal peritonitis, oedematous lungs and bilateral pleural effusions.

Many departments have instituted protocols* for their trainee staff about the requirement to seek senior help and advice when ASA 4 or 5 patients are to be anaesthetised. NCEPOD has made this recommendation before.[4] Doctors in training grades must not feel obliged (for whatever reason) to deal with patients like this single-handed. On some occasions trainees may be over confident and on others they may be too inexperienced. The provision of anaesthetic skills must be matched to the condition of the patient.

* See glossary, Appendix C

The most senior anaesthetist

Qualifications and length of service

These tables raise more questions than answers (see page 52).

Table A16 (q8)
Country in which the primary medical qualification was awarded

	n=3081	(completed by proxy)
UK	2153	(334)
EU (non-UK)	92	(21)
Non-EU as at 1992	618	(208)
Not answered	218	(143)

There were 75 (218-143) individuals who did not state the country of graduation of the most senior anaesthetist. Ten of these were SHOs or registrars.

Table A17 (qs 4 and 8)
Country in which the primary medical qualification was awarded (SHO or registrar as most senior anaesthetist)

	SHO n=277	Registrar n=380	(completed by proxy)
UK	118	195	(131)
EU (non-UK)	20	18	(24)
Non-EU	102	119	(117)
Not answered	37	48	(75)

The advisors noted that there is a chance that, since some of these trainees are graduates from outside the UK, *some* may be allowed too much responsibility and left unsupervised too early in their careers. Difficulties arise because of differences in background knowledge amongst apparently similarly experienced doctors and these may be compounded by inadequate language skills.

Table A18 (q8a)
Year of primary medical qualification

	n=3081	(Proxy)	(SHOs and Registrars)	(Proxy)
1990 or later	34	(17)	(28)	(14)
1984 to 1989	480	(219)	(352)	(166)
1974 to 1983	1177	(185)	(122)	(55)
1964 to 1973	776	(82)	(37)	(17)
pre-1964	384	(39)	(6)	(4)
Not answered	230	(164)	(112)	(91)

Table A19 (q9a)
Year of first full-time anaesthetic training post

	n=3081	(Proxy)	(SHOs and registrars)	(Proxy)
1990 or later	211	(101)	(191)	(96)
1984 to 1989	572	(225)	(268)	(121)
1974 to 1983	1130	(118)	(60)	(25)
1964 to 1973	642	(59)	(23)	(12)
pre-1964	261	(28)	(5)	(3)
Not answered	265	(175)	(110)	(90)

Table A20 (q9b)
Which higher diploma in anaesthesia was held?

	n=3081	(Proxy)
FFARCS/FCAnaes/FFARCSI/FFARACS, FFA(SA)	2337	
DA or Part I FCAnaes	747	
Part II FCAnaes etc.	70	
DA (non-UK)	12	
MD (Anaes)/MSc Anaes	40	
"Specialist anaesthetist"	3	
DEAA (Diploma of European Academy of Anaesthesiology)	5	
Other, not specified	18	
None	174	(91)
Not answered	86	(57)

NB this can be a multiple entry

A total of at least 2821 individual anaesthetists involved held one of the above higher diplomas or degrees.

Table A21 (q9c)
Year of award of higher qualification (FCAnaes etc. only)

	n=2337	(Proxy)
1990 or later	261	(114)
1984 to 1989	585	(105)
1974 to 1983	852	(56)
1964 to 1973	473	(33)
Pre-1964	57	(5)
Not answered	109	(68)

Table A22 (qs 8 and 9)

Years between primary medical qualification and award of FCAnaes or equivalent (senior house officers and registrars only)

	n=158	(proxy)
Four years	8	(6)
Five years	18	(10)
Six to ten years	81	(38)
Eleven to fifteen years	8	(6)
More than fifteen years	5	(4)
One or more questions not answered	38	(31)

Table A23 (qs 8 and 9)

Years between primary medical qualification and award of FCAnaes or equivalent (excluding SHOs and registrars)

Years	Senior registrar	Consultant	Staff grade	Associate specialist	Other
Less than four years	3	21	-	1	-
Four years	19	352	-	-	2
Five years	71	484	1	-	3
Six to ten years	199	744	15	5	3
11 to 15 years	16	91	13	14	1
More than 15 years	2	17	3	1	2
One or more questions not answered	58	37	1	-	-

There are difficulties in interpretation of Tables 16 to 23. The advisors suggest that those who have responsibility for training should study these tables and draw their own conclusions. For example, there seems to be evidence here that the problem of the long-term trainee or 'stuck doctor' is not yet resolved by the introduction of the staff grade. Allowance needs to be made for those who took maternity leave or those who changed specialty mid-career. Many quite senior doctors (in terms of years since qualification) seem to be in trainee grades for extended periods.

A 64-year-old patient was to have a graft for a ruptured abdominal aortic aneurysm in a DGH. The anaesthetist was an SHO, not a locum, who had held posts in anaesthesia since 1966, having qualified overseas in 1958, and had both the FRCA diploma and the DA. The procedure, done by a consultant surgeon, took place at 01.00 hours but no definitive operation was possible and the patient died 20 minutes afterwards. No advice was sought. The anaesthetic and the monitoring were orthodox. The form was completed by a proxy anaesthetist.

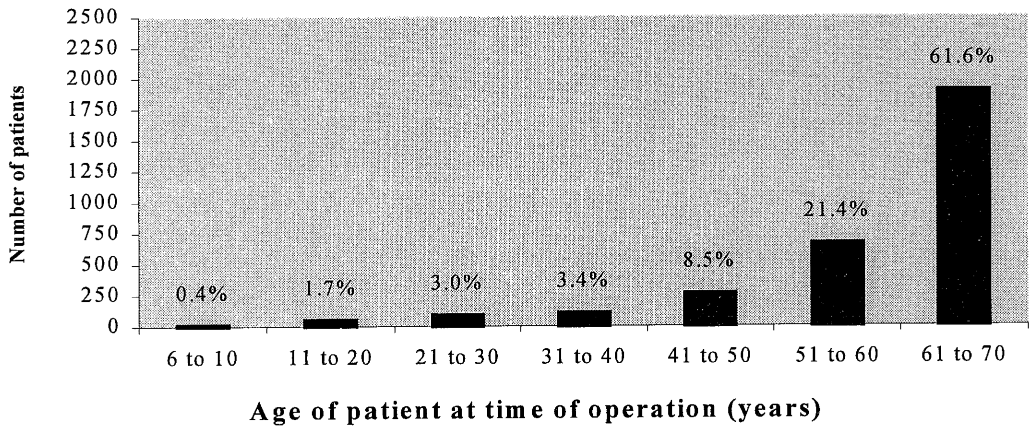
The evidence is that this individual anaesthetist was well qualified and thus may not have needed help or advice. SHO posts are for training: this post was blocked and was not appropriate for such an experienced doctor.

The patient

Table A24 (q12)
Age of patient at time of operation

Years	n=3081	%
6 to 10	13	*0.4*
11 to 20	51	*1.7*
21 to 30	91	*3.0*
31 to 40	106	*3.4*
41 to 50	262	*8.5*
51 to 60	661	*21.4*
61 to 70	1897	*61.6*

Figure A1 (q12)

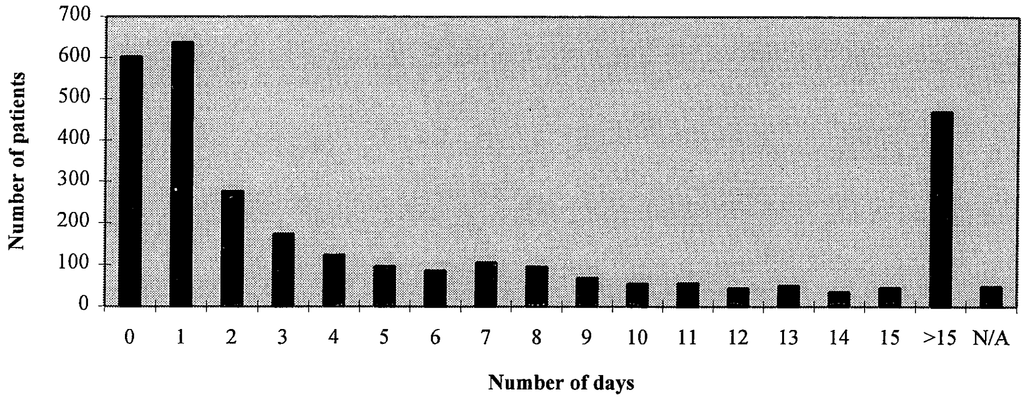


There were a few deaths in children, but most of the questionnaires referred to patients aged between 61 and 70. The problem of diagnosis of abdominal pain in children is well-known. It is disturbing to have to report the death of a child from acute appendicitis which is still a dangerous condition.

A nine-and-half-year-old (38-kg) boy complained of abdominal pain and vomiting for three days. He was treated for constipation by his General Practitioner. He was admitted to a DGH under the care of paediatricians. Antibiotics and modest fluid therapy were given but he was described at induction of anaesthesia as dehydrated, restless and confused. The registrar anaesthetist, who had four years' experience and the DA, did not seek advice or help. There was faecal soiling in the pharynx seen at laryngoscopy after a rapid sequence induction with cricoid pressure. There was no evidence of aspiration on suction through the tracheal tube. A locum surgical registrar removed a perforated appendix. Five hundred ml dextrose were given. He spent one-and-a-quarter hours in the recovery room where 50 mg pethidine was given intramuscularly. Twenty-five minutes after return to the ward cardiac arrest occurred. He remained comatose after this. He was managed in the ICU but 12 days later brain stem death was confirmed. Postmortem examination was not possible since the body was returned overseas for burial. The sequence was believed to have been triggered by profound septicaemia.

This child was sicker than was realised. Should he have stayed longer in recovery?

Figure A2 (qs 13 and 15)
Calendar days from admission to final operation



N/A = date of admission not provided on questionnaire

For further details see Anaesthesia Appendix (Table A112)

Transfer

Table A25 (q17)
Was the patient transferred from another hospital?

	n=3081
Yes	447
No	2629
Not answered	5

Table A26 (q18)
From what type of hospital was the patient transferred?

	n=447
District General	303
University/teaching	38
Surgical specialty	15
Other acute/partly acute	18
Community	25
Non-NHS	9
Other	39

Table A27 (q19)
Who accompanied the patient during transit?

	n=447
Ambulance crew	264
Relative(s)	33
Nurse	159
Anaesthetist	96
Other doctor	16
Other, specified, are each ICU technician, care attendant, porter, social worker, mental handicap nurse, ODA	6
Other - not specified	3
Not specified in notes	87
Not answered	27

NB this can be a multiple entry

Table A28 (q20)
Was there any special care of the airway during transfer?

	n=447
Yes	160
No	225
Not answered	62

If yes, which?

Added oxygen	104
Pharyngeal airway	2
Tracheal tube	81
Controlled ventilation	84
Other	3
Not answered	1

NB this can be a multiple entry

Table A29 (q21)
Did the patient's condition deteriorate during transfer?

	n=447
Yes	18
No	286
Not known	134
Not answered	9

The absence of knowledge about deterioration in 134 cases illustrates the poor record-keeping of patients who are transferred. In addition, there was some evidence of inadequate monitoring during transfer. Do trainees and others require protocols* about this clinical problem?[8]

* See glossary, Appendix C

Table A30 (q22)
What was the patient's clinical circulatory state on arrival?

	n=447
Well-perfused and warm	295
Cold and vasoconstricted	97
Not applicable	44
Not answered	11

The observation that 97 patients arrived in the receiving hospital cold and vasoconstricted suggests that some patients were not in a suitable condition to be transferred and were physiologically unstable.

Table A31 (q23)
What was the patient's state of clinical oxygenation on arrival?

	n=447
Well oxygenated	311
Mild hypoxaemia	63
Severe hypoxaemia	14
Not applicable	47
Not known	12

Table A32 (q24)
Was cardiorespiratory resuscitation required immediately on arrival?

	n=447
Yes	47
No	384
Not answered	16

Table A33 (q25)
What was the patient's neurological status at the time of arrival?

	n=447
Glasgow Coma Score less than 7	105
Glasgow Coma Score 7 or more	294
Not answered	48

Table A34 (qs 19 and 20)
Who accompanied patients in transit when a tracheal tube and (or) controlled ventilation were used?

	n=100
Ambulance crew	64
Relative(s)	3
Nurse	53
Anaesthetist	80
Other doctor	4
Other	5
Not answered	9

NB this can be a multiple entry

Physiological deterioration may be unavoidable during transfer of very sick patients. The information presented in these questionnaires strongly suggests that there are many cases in which resuscitation techniques *before* and management *during* journeys are unsatisfactory.

Twenty percent of the patients were transferred with tracheal tubes and (or) receiving controlled ventilation without an anaesthetist. Surely this must be regarded as unacceptable?

Table A35 (qs 19 and 21)
Who accompanied patients in transit (patients who deteriorated during transfer)?

	n=18
Ambulance crew	8
Relative(s)	1
Nurse	5
Anaesthetist	6
Other doctor	1
Not answered	3

NB this can be a multiple entry

Table A36 (qs 19 and 22)
Who accompanied patients in transit (patients who were "cold and vasoconstricted" on arrival)?

	n=97
Ambulance crew	35
Relative(s)	5
Nurse	24
Anaesthetist	25
Other doctor	4
Not answered	10

NB this can be a multiple entry

Tables A35 and A36 indicate that some of the personnel accompanying these patients who did deteriorate were not equal to the difficult task. Furthermore, too many of these patients were not accompanied by doctors of any specialty. It does not bode well for patients if an inexperienced trainee is sent from the referring hospital to the receiving hospital. Some departments of anaesthetics and intensive care medicine in receiving units themselves undertake transfers; this should be encouraged.[8]

The anaesthetist advisors consider that more attention should be paid to this problem locally. Written protocols* should be prepared so that suitable and well timed plans are followed by everyone involved, both at the transferring and receiving hospital.

The operation

Figure A3 (q30)
Classification of operation

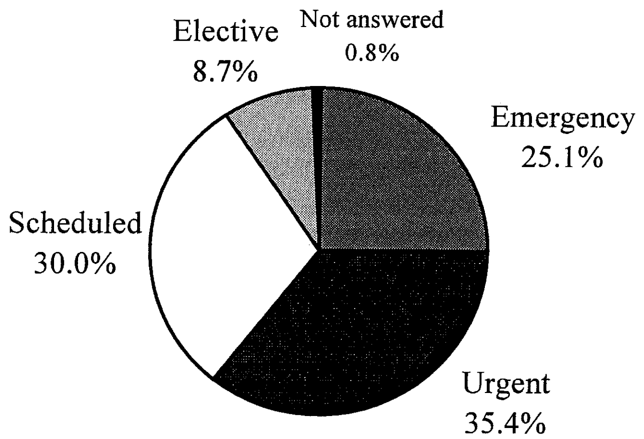


Table A37 (qs 4 and 30)
Classification of operation/most senior anaesthetist

	Emergency	Urgent	Scheduled	Elective	Not answered
Senior house officer	40	166	61	9	1
Registrar	94	193	75	16	2
Senior registrar	164	146	65	14	2
Consultant	423	509	664	205	17
Staff grade	16	26	16	9	1
Associate specialist	19	19	24	4	2
Clinical assistant	14	27	12	9	-
General practitioner	1	-	1	1	-
Hospital practitioner	-	1	1	-	-
Other	-	-	1	-	-
Not answered	2	5	3	1	-
Total	**773**	**1092**	**923**	**268**	**25**

* See glossary, Appendix C

Table A38
Emergency and urgent operations/advice sought by SHOs and registrars?

Emergency	Advice sought		Advice not sought		Not answered
		%		*%*	
SHO	20	*50*	17	*42*	3
Registrar	47	*50*	44	*47*	3
Urgent					
SHO	69	*42*	85	*51*	12
Registrar	79	*41*	109	*56*	5

Allocation of the title "emergency" by anaesthetists is still not sufficiently rigorous and according to the NCEPOD classification. An emergency operation is defined by NCEPOD as a **life-saving one in which resuscitation is carried out at the same time as the surgery** (see glossary, Appendix C). A quarter of the anaesthetics for emergency and urgent operations are still managed by SHOs and registrars as the most senior anaesthetist reported to be present in the operating room, and in approximately half of these no advice was sought.

Condition before operation

Table A39 (q31)
Was a record of the patient's weight available?

	n=3081
Yes	1409
No	1649
Not answered	23

Table A40 (q32)
Was a record of the patient's height available?

	n=3081
Yes	380
No	2662
Not answered	39

Table A41 (q33)
Was an anaesthetist *consulted* by the surgeon (as distinct from informed) before the operation?

	n=3081
Yes	1562
No	1428
Not known/not recorded	86
Not answered	5

Communication between surgeon and anaesthetist is improving: this must be to the benefit of both, to say nothing of the patient, but close examination of the remainder of this report shows that this is not yet happening in every case.

Some deaths after repair of ruptured aortic aneurysm happened several days or even weeks after surgery and expert care. The advisors were considerably impressed by the standard of clinical care which many of these patients received. The anticipated early mortality of this procedure as an emergency is about 45% in a vascular centre but outside such centres it may be as much as 80%. Selection of those patients with minimal chance of recovery should be rigorous.

A 64-year-old man died in a DGH after a laparotomy for appendicitis revealed a perforated gastric ulcer. He had widespread arterial disease, chronic obstructive airways disease and non-insulin dependent diabetes mellitus (ASA 4). He was presented to a consultant anaesthetist and SHO at half an hour's notice by a consultant surgeon. There was biochemical evidence of dehydration and there was also a pleural effusion. Physicians had managed his diabetes on a specialist ward and the blood glucose on arrival in the anaesthetic room was 1.1 mmol/litre. He died the next day in respiratory failure.

Would the perioperative care of the patient have been improved if the surgeons had consulted the anaesthetist sooner (leave alone the physicians consulting the surgeons)?

Table A42 (q34)

Did an anaesthetist visit the patient before the operation?

	n=3081	(Emergency operations)
Yes	2898	(674)
No	149	(85)
Not known/not recorded	34	(15)

If yes, was <u>this</u> anaesthetist present at the start of the operation?

Yes	2781
No	106
Not known/not recorded	11

It is probable that the 94% figure for patients visited before operation cannot increase, partly because many were true emergency operations. The visiting anaesthetist was also present at the subsequent operation on 96% occasions.

This is good quality care. Anaesthetists should do all that they can to ensure that this estimable practice continues despite pressure from whatever source.

Table A43 (q35)

Were any investigations done before the operation?

	n=3081
Yes	3006
No	61
Not answered	14

For further details see Anaesthesia Appendix (Table A113).

Sixty-one patients were anaesthetised without any laboratory tests or other investigations beforehand. Further analysis showed that 40 of these were classified as emergencies and included many for ruptured aortic aneurysms, head injury or multiple trauma; this is understandable.

There were some others for whom no investigations were recorded, yet whose general condition might warrant enquiry.

One patient had an anal carcinoma; another was to have an elective debulking of a cerebral tumour; another was a chronic alcoholic with a fractured forearm; another was a 61-year-old, who was described as ASA 3, who was to have a biopsy of larynx; an ASA 1 patient aged 52 was to have a repeat excision of a liposarcoma of the leg and skin grafting; one woman had been extensively investigated by physicians including a negative sigmoidoscopy, but died of a perforated carcinoma of the rectum.

Most anaesthetists would expect some tests to be done before anaesthesia in these conditions.

The place of "routine" investigations before anaesthesia is being debated. The advisors had varying views on this topic. One stated that within his department, audit had shown that full use of screening tests revealed unforeseen early pathology (e.g. diabetes mellitus, Addison's disease). Another stated that these tests were seldom of much value to the anaesthetist and insistence on their use often encouraged junior doctors to delay operations inappropriately. It is claimed by some clinical biochemists that it is more cost-effective to perform a battery of tests on one sample of blood rather than *ad hoc* tests at random times during the day or night. Thus in these hospitals, every patient with some exceptions is screened. Other clinicians assert that there must be justification for all tests and that clinical observation should prompt blood sampling.

The advisors were agreed that the results of tests if done should be available and scrutinised before anaesthesia is induced. Random, isolated, abnormal results may need to be discounted or repeated. Written protocols* might be prepared to guide decision-making. Departments might wish to enquire further into this subject.

* (see glossary, Appendix C)

Table A44 (q36)
Coexisting medical diagnoses

	n=3081
None	490
Respiratory	851
Cardiac	1218
Neurological	453
Endocrine	429
Alimentary	524
Renal	384
Musculoskeletal	274
Haematological	280
Genetic abnormality	15
Other	703
Not answered	135

NB this can be a multiple entry

The advisors were concerned at the frequency with which mental subnormality, senile dementia or schizophrenia featured in this series ("other"). Sometimes it was difficult to escape the conclusion that treatment options were influenced in the presence of some of these conditions.

A 37-year-old mentally subnormal schizophrenic patient was admitted to a University hospital with a head injury. His Glasgow Coma Score was less than 8. A senior registrar anaesthetist refused to intubate his trachea until he was instructed to do so by the consultant on call. Furthermore the patient was given morphine before his airway was protected. Tracheal intubation was performed, as noted by the A & E staff, "without any stabilisation of his neck which was twisted during this procedure". A craniotomy and evacuation of subdural haematoma was performed. Death occurred 21 days later. The senior registrar, now a consultant, refused to complete the questionnaire which was completed by the duty consultant.

This was a single case and the management appears at best dilatory in the events described clearly in an accompanying note. The anaesthetist advisors concluded, after discussion of all similar cases, that when dealing with "mental subnormality" the most important point is that the impact of the acute pathology on the patient's quality of life be considered and that preconceived (and possibly ill-informed) prejudices should not determine management. This complex matter requires discussion at consultant level, meanwhile the patient should receive standard treatment.

Table A45 (q37)
What drug or other therapy was the patient receiving at the time of operation (excluding premedication or drugs for anaesthesia)?

	n=3081
None	424
Drugs specified	2584
Not answered	73

For further details see Anaesthesia Appendix (Table A114).

A 52-year-old man had a uvulopalatopharyngoplasty in a non-NHS hospital. He was known to have hypertension (ECG showed left ventricular strain and the blood pressure was 180/90 mm Hg). He was treated with beta blockers (atenolol). Hypotension to 85/40 mmHg in the theatre and recovery room was treated with colloid intravenous infusion and naloxone. He appears to have gone home on the same day despite this critical incident and the General Practitioner advised him to omit the beta blocker until his blood pressure stabilised. He died one week after operation with an acute dissection of his coronary vessels.

This operation is done to treat the symptom of snoring. Pulmonary hypertension is associated with it. Should this patient have gone home on the day of his operation? He also had systemic hypertension. Are the dangers of withdrawal of antihypertensive therapy appreciated?

Table A46 (q38)
Was there any history of a drug reaction (excluding minor reactions to penicillin)?

	n=3081
Yes	155
No	2850
Not answered	76

There were two reports of reaction to thiopentone. One patient had a prolonged effect after the use of thiopentone a year earlier and the other had an anaphylactoid response on the same day as the final operation. Another patient previously had prolonged apnoea after suxamethonium. None of these patients received these drugs again.

Seventy reactions were to various antibiotics, five to aspirin and two each to elastoplast and opioids; all the others were single occurrences and no report of a serious reaction was made.

Table A47 (q39)
ASA status (see glossary, Appendix C)

	n=3081
Class 1	85
Class 2	517
Class 3	869
Class 4	998
Class 5	594
Not answered	18

Figure A4
ASA status

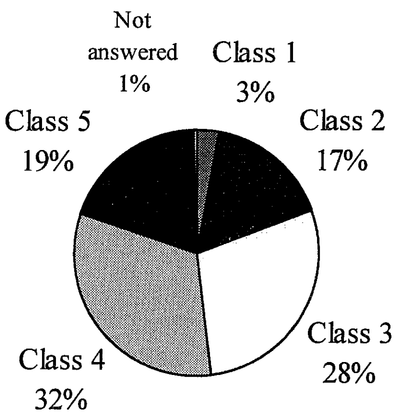


Table A48 (qs 30 and 39)
ASA status/classification of operation

	1	2	3	4	5	Not answered
Emergency	7	29	57	228	446	7
Urgent	17	130	352	466	125	2
Scheduled	40	255	353	256	14	5
Elective	19	99	103	43	-	3
Not answered	2	4	4	5	9	1

The distribution of classes is as one might expect: the sicker patients were found to need emergency procedures.

Table A49 (qs 4 and 39)
ASA status/most senior anaesthetist

	1	2	3	4	5	Not answered
Senior house officer	11	79	102	65	19	1
Registrar	11	49	127	140	52	1
Senior registrar	3	26	86	147	127	2
Consultant	54	309	498	586	361	10
Staff grade	2	17	12	23	14	-
Associate specialist	1	14	18	22	12	1
Clinical assistant	3	18	19	12	7	3
General practitioner	-	1	1	-	1	-
Hospital practitioner	-	2	-	-	-	-
Other	-	-	1	-	-	-
Not answered	-	2	5	3	1	-

The ASA classification is not applied consistently by all anaesthetists.[9] There is a need for clearer understanding about the influence of the surgical condition on the ASA grade, for example, a patient with a head injury and raised intracranial pressure can hardly be described as ASA 1.

Preparation of patient before operation

Table A50 (q40)
When was the last fluid/food given by mouth?

	n=3081
More than 6 hours before operation	2343
Between 4-6 hours before operation	192
Less than 4 hours before operation	34
Not known/not recorded	445
Not answered	67

Table A51 (q41)
Indicate measures taken to reduce gastric acidity and volume, as prophylaxis against acid aspiration

	n=3081
None	1897
Antacids	62
H_2 antagonists	462
Metoclopramide	241
Nasogastric/stomach tube	504
Other	163
Not answered	81

It is interesting to note how widespread the use of measures to reduce gastric acidity have become; by no means all the patients anaesthetised in this series were obviously at risk and yet 15% received H_2 antagonists or antacids, perhaps because of the use of NSAIDs for postoperative pain or prophylaxis against stress ulcers.

Table A52 (q42)
Did the patient receive intravenous fluid therapy in the 12 hours before induction?

	n=3081
Yes	1838
No	1148
Not answered	95

If yes, which?

Crystalloid or dextrose	1476
Colloid	726
Whole blood	279
Red cell component	218
Other components e.g. platelets	152
Mannitol	96
Total parenteral nutrition	136
Other	85
Not answered	34

NB this can be a multiple entry

Table A53 (q43)
Was anything added to the intravenous solution?

	n=1838
Yes	478
No	1030
Not answered	330

Table A54 (q44)
Were measures (other than those specified in questions 20 and 24) taken to improve the respiratory system before induction of anaesthesia?

		(Emergency operations)
Yes	737	(207)
No	2257	(551)
Not answered	87	(16)

For further details see Anaesthesia Appendix (Table A115)

Table A55 (q45)
Were premedicant drugs prescribed?

Yes	1072
No	1987
Not answered	22

For further details see Anaesthesia Appendix (Table A116).

Sixty-four percent of the questionnaires revealed that no premedicant drugs were given at all. Nearly twice as many patients received benzodiazepine drugs as opioids.

Table A56 (qs 39 and 45)
ASA status/premedication

	Premedication prescribed	All questionnaires	%
ASA Class 1	54	85	*63.5*
ASA Class 2	316	517	*61.1*
ASA Class 3	419	869	*48.2*
ASA Class 4	249	998	*24.9*
ASA Class 5	25	594	*4.2*
Not answered	9	18	
Total	**1072**	**3081**	

Table A57 (qs 30 and 45)
Classification of operation/premedication

	Premedication prescribed	All questionnaires	%
Emergency	57	773	*7*
Urgent	254	1092	*23*
Scheduled	548	923	*59*
Elective	205	268	*76*
Not answered	8	25	
Total	**1072**	**3081**	

Table A58 (qs 34 and 45)

When premedication was not prescribed, did the anaesthetist visit the patient before the operation?

	n=1987
Yes	1830
No	130
Not answered	27

Premedication was omitted for the sickest patients (96% ASA 5 patients received none whereas half the ASA 3 patients had premedicant drugs). Similarly patients to have operations called emergencies seldom (7%) received drugs for premedication.

Table A59 (q46)

Was non-invasive monitoring established just before the induction of anaesthesia?

	n=3081
Yes	2748
No	254
Not answered	75
No need to induce anaesthesia	4

If yes, which?

Pulse oximetry	2480
ECG	2462
BP	2068
Respired gas monitoring	97
Temperature	11
Peripheral nerve stimulator/neuromuscular monitoring	5
Blood gases	2
Plethysmography	2
Airway pressure	1
Other - not specified	39
Not answered	8

NB this can be a multiple entry

The fact that 89% patients in this series had non-invasive monitoring instruments attached to them before anaesthesia started (ECG and oximeter) indicates that this could be a standard* for all. It has now reached the point at which the absence of such monitoring is unacceptable and would need explanation.

Table A60 (q47)
Was invasive monitoring established before induction of anaesthesia?

Yes	925
No	2056
Not answered	100

Table A61
What invasive monitoring was used?

	n=925
CVP	545
Arterial line	712
Pulmonary arterial line	63
"Fully monitored as transferred from ICU"	17
Other	73
Not specified	39

NB this can be a multiple entry

Thirty percent patients received this type of monitoring: this is an indication of its perceived value. Some patients already had these lines in place but the advantages of their early insertion during resuscitation before anaesthesia and is becoming clearer to all.

Table A62 (q48)
Was it necessary to take measures additional to those specified in questions 24 to 43 to improve the patient's cardiovascular function just before and at the induction of anaesthesia?

	n=3081
Yes	579
No	2405
Not answered	94
Patient transferred anaesthetised	3

If yes, specify:

Crystalloid IV fluids	220
Colloid IV fluids	263
Whole blood transfusion	114
Blood components	87
Antiarrhythmic drugs	32
Cardiac glycoside	30
Diuretics	52
Vasopressors	79
Inotropic drugs by infusion	171
Others	93

Table A63 (q49)
Was there an inappropriate delay before the start of the operation?

	n=3081
Yes	73
No	2958
Not answered	50

If yes, this was due to non-availability of:

Radiology	3
Haematology	1
Pathology	1
Operating theatre	16
Anaesthetist	6
Anaesthetist's assistant	2
Surgeon	13
Theatre staff	8
Other - delay in diagnosis/wrong diagnosis	6
surgeon reluctant to operate	3
uncertainty re availability of ICU bed	3
transfer between hospitals	2
delay waiting for perfusionist	1
lack of staff for ultrafiltration	1
should have been resuscitated earlier	1
wait in A&E	1
cause uncertain	1
delay in arrival of organ	1
miscellaneous	17

NCEPOD has commented before about the desirability of a fully staffed operating room to be available for urgent cases; non-availability was a problem in 16 cases. This needs a solution by managers.

A 68-year-old man was admitted to a District General hospital under the care of physicians with a severe haematemesis. The patient had a high intake of alcohol and was taking aspirin. Cardiac arrest occurred twice on the ward and then he was taken to the operating room where he was anaesthetised by a consultant assisted by an SHO. Induction of anaesthesia was by inhalation with nitrous oxide and oxygen during transfusion of the 16th unit of blood. The blood pressure was unrecordable. Cardiac arrest and death occurred as a result of hypovolaemia. The consultant anaesthetist considered that inappropriate delay had ensued while arrangements for endoscopy were being made by the physicians. The autopsy showed a benign duodenal ulcer.

It is time that this common problem of haematemesis was managed by a team of doctors governed by a protocol* from the moment of admission to hospital and the recommendations of the Royal College of Physicians followed.[10]

* See glossary, Appendix C

Table A64 (q50)
Were any measures taken (before, during or after operation) to prevent venous thrombosis?

	n=3081
Yes	1367
No	1637
Not answered	77

If yes, which measure(s)?

	Before or during	After
Aspirin	75	31
Heparin	706	637
Dextran infusion	26	17
Leg stockings	363	312
Calf compression/stimulation	255	50
Warfarin	39	24
Elevation of legs/ankles	19	2
Epidural block/spinal anaesthesia	11	6
Vena cava filter	1	-
Airflow bed	-	1
Flowtron boots	2	1
Other - not specified	5	6

It is still not standard practice to use prophylactic measures against venous thrombosis even when they are indicated (age more than 40 years, obesity, varicose veins, previous thromboembolism, carcinomatosis). There needs to be greater awareness of the value of protocols*. Some anaesthetist advisors denied that anaesthetists have any responsibility for prophylaxis not only against venous thrombosis but also against subacute bacterial endocarditis and infection after prosthetic implants. Anaesthetists have at least a role in confirming that treatment plans are fulfilled and some require their action. This is one area of practice in which anaesthetists can demonstrate their commitment to total patient care.

The anaesthetic

Table A65 (q51)
Time of start of anaesthesia

	n=3081
08.00 to 11.59	857
12.00 to 15.59	934
16.00 to 19.59	608
20.00 to 23.59	338
24.00 to 03.59	138
04.00 to 07.59	72
Time not stated	134

* See glossary, Appendix C

Table A66

Time of start of anaesthesia: 24.00 - 03.59

n=138

Most senior anaesthetist	Emergency	Urgent
SHO	9	11
Registrar	12	15
Senior registrar	25	9
Consultant	37	15
Staff grade	1	1
Associate specialist	2	-
Clinical assistant	1	-

Table A67

Time of start of anaesthesia: 04.00 - 07.59

n=72

Most senior anaesthetist	Emergency	Urgent	Scheduled
SHO	1	6	-
Registrar	7	8	-
Senior registrar	11	3	-
Consultant	22	5	6
Staff grade	-	1	-
Associate specialist	2	-	-

Of the six scheduled operations mentioned in Table A67, five were liver transplants and one was an urgent mitral valve replacement.

A 58-year-old manic depressive patient had an unexceptionable general anaesthetic given by an SHO for fixation of a tarsometatarsal joint in a DGH. She had been injured in a road traffic accident. The operation was done at midnight. A tourniquet was used and she developed venous thrombosis in the same leg; no prophylaxis had been given. She died on the eighth day.

Why was it necessary to do this operation at midnight?

NCEPOD, and CEPOD[1] before, recommended strongly that operating should not take place at night unless limb- or life-saving operations were to be performed. NCEPOD has been informed that a few Chief Executives have now (1995) insisted that their Trusts will only open operating rooms after midnight if consultant (or senior registrar) surgeons and anaesthetists are present, presumably to ensure that clinical need is being met. NCEPOD supports these initiatives, provided that there are adequate daytime facilities. The data (tables A66 and A67) show the timing of the 210 operations which took place after midnight.

Incision and drainage of an abscess, even a massive one, does not at first sight seem a suitable operation to be done at 01.37 hours. The patient, aged 63 years, was very sick and was in a University hospital. He was paraplegic as a result of spina bifida and was schizophrenic. He was morbidly obese (140 kg), anaemic (Hb 8.8 gm/dl), hyponatraemic (126 mmol/l), uraemic (22 mmol/l) with a raised creatinine (229 mmol/l) although he was still receiving a non-steroidal analgesic. He was classified as ASA 4 and the surgeon informed us that he was in congestive cardiac failure. The SHO and registrar anaesthetist sought advice from their senior registrar who did not come to help them. The registrar had had the FRCA for a few months. The oxygen saturation on air before operation was 75%. Two thousand ml of crystalloid were given intravenously in the six hours before operation. The anaesthetic agents included propofol, ketamine and nitrous oxide. Monitoring was with an ECG and an oximeter. An unrecorded volume of saline was administered intravenously. ICU or HDU admission were apparently not considered although both were available. He died thirty minutes later on the ward in acute pulmonary oedema.

Not only should the time of this operation be questioned, but also the continued use of NSAIDs, the anaesthetic technique, the experience of the anaesthetists, the advice they received and the fluid administration they gave.

Table A68 (qs 52 and 53)

Length of operation (time from start of surgery until transfer out of operating room)

	n=3081
1 minute to 30 minutes	153
31 minutes to 59 minutes	232
1 hour to 1 hour 59 minutes	846
2 hours to 2 hours 59 minutes	533
3 hours to 3 hours 59 minutes	261
4 hours to 4 hours 59 minutes	118
5 hours or more	160
Information not provided	778

Table A69 (q54)

What was the grade of the most senior surgeon in the operating room?

Senior house officer	47
Registrar	542
Senior registrar	417
Associate specialist	49
Clinical assistant	15
Hospital practitioner	1
Staff grade	24
Consultant	1975
Not answered	11

Table A70 (qs 4 and 54)
Grades of most senior anaesthetist and most senior surgeon present

	SURGEON							
	SHO	Reg.	Sen. reg	Assoc. spec.	Clinical assist.	Staff grade	Consultant + other	Not answered
ANAESTHETIST								
Senior house officer	8	121	39	7	7	4	89	-
Registrar	15	138	75	8	2	4	138	2
Senior registrar	2	75	131	2	1	2	175	3
Consultant	12	156	155	21	4	11	1456	3
Staff grade	2	13	11	2	-	1	38	1
Associate specialist	3	14	3	7	-	2	39	-
Clinical assistant	-	24	4	2	1	-	31	-
General practitioner	1	-	-	-	-	-	1	-
Hospital practitioner	-	1	-	-	-	-	1	-
Other	-	1	-	-	-	-	-	-
Not answered	-	1	1	-	-	-	9	

SHO anaesthetists were six times more likely to be the most senior anaesthetist than were SHO surgeons to be the most senior surgeon. Conversely registrar surgeons were 1.4 times more likely than registrar anaesthetists to be in this position. It is clear that many SHOs in anaesthesia are given responsibility early. The anaesthetist advisors considered that this deployment of staff was unlikely to be perceived as the delivery of the highest quality of anaesthesia.

Consultant surgeons were more frequently working with trainee anaesthetists (227) than were consultant anaesthetists with trainee surgeons (168). Is this indicative of the problem of recruitment of consultants in anaesthesia?

Recent figures quoted by The Audit Commission[11] indicate that in anaesthesia the ratio of trainees to consultants is 1:1 whereas that for general surgery and urology is 1.4:1 and for obstetrics and gynaecology 2.5:1.

There is an additional factor to be considered in relation to the involvement of a consultant anaesthetist. Surgical disciplines each have their own consultant on call (viz. general, orthopaedic, gynaeocological, neurosurgical etc.) whereas the on-call team of anaesthetists often includes only one consultant.

An SHO surgeon worked with an SHO anaesthetist on eight occasions according to the answers on the anaesthetic questionnaire. No confirmation of the grade of surgeon was available in five instances. The operations were incision and drainage of abscess over scapula, resection of gangrenous bowel after strangulation of an inguinal hernia, appendicectomy, excision of hydrocoele, transurethral resection of prostate, incision and drainage of an ischiorectal abscess, debridement of gluteal area, and a laparotomy for small bowel obstruction. Are these procedures appropriate for junior trainees?

Table A71 (q55)
Did you have non-medical help with anaesthesia?

Yes	3048
No	14
Not answered	19

If yes, specify:

Trained anaesthetic nurse	565
Trainee anaesthetic nurse	28
Theatre nurse	227
Trained operating department assistant	2305
Trainee operating department assistant	162
Operating department orderly	120
Ward nurse	68
Physiological measurement technician	80
Student nurse	1
ICU nurse	7
Perfusionist	9
Auxiliary nurse	2
Recovery nurse	2
Medical physics technician	1
Casualty nurse	1
Ambulance paramedic	1
Other - not specified	1
Not specified	18

NB this can be a multiple entry

There were fourteen questionnaires which stated that there was no non-medical help. These included two occasions on which an SHO was working alone and one on which two anaesthetists were present. The other 11 questionnaires referred to some major cases (thoracotomy, nephrectomy, two laparotomies, ruptured abdominal aortic aneurysm) and it seems likely that in at least some there was an error in the answer.

Eighty-four percent of questionnaires reported one non-medical assistant, 13%, two and 2.5%, three. It is now common practice for there to be an individual to assist but the list above demonstrates that the provision is not yet of a uniform high standard of training, discipline, or experience.

The anaesthetist advisors considered that the provision of a trained non-medical assistant (ODA or anaesthetic nurse) should now be standard*.

* See glossary, Appendix C

Anaesthetic records

Table A72 (q56)
Is there an anaesthetic record for this operation in the notes?

Yes	2976
No	92
Not answered	13

(2820 copies of anaesthetic records were returned with questionnaires).

It is often claimed that anaesthetic records are not conscientiously retained in the hospital notes. Although any loss is regrettable, but not perhaps defensible, in 96.5% of cases a record was available.

Table A73
Review of 500 copies of anaesthetic records received by NCEPOD

Item	Present on the record
Patient identification	465
Name of anaesthetist	470
Date of operation	480
Nature of operation	467
Time of start	461
Time of finish	454
Grid chart	491
Grid chart completed	485

A series of 500 anaesthetic records was inspected by the Chief Executive before the identities were removed. Nine did not have a grid for physiological variables. This is a serious deficiency albeit a relatively uncommon one. The other deficiencies (less than 10%) have many explanations. It is important for all types of retrospective examination that anaesthetic records are well kept. A comprehensive review of case notes in one Region[12] has recently observed that anaesthetic records are deficient in a number of aspects including preoperative condition and the identity of the anaesthetist. This finding is confirmed by NCEPOD.

The Royal College of Anaesthetists is preparing a model record of essential information. This would certainly facilitate retrospective review. Overall the anaesthetic records were of a high standard although a very few were abysmal. Meanwhile purchasers of monitoring equipment should insist on the provision of chart recorders (in the interests of legibility and interpretability) and clinical directors of anaesthetic departments should ensure that the print-outs are suitably stored with the anaesthetic record.

Fluids and monitoring

Table A74 (q57)
Did the patient receive intravenous fluids during the operation?

Yes	2829
No	165
Not answered	87

If yes, which:

Crystalloid

Dextrose 5%	175
Dextrose 4% Saline 0.18%	319
Dextrose 10%	35
Saline 0.9%	882
Hartmann's (compound sodium lactate)	1640
Other	139

Colloid

Modified gelatin	1382
Human albumin solution	229
Starch (HES)	273
Dextran	33
Mannitol	171
Other	54

Blood

Whole blood	567
Red cell component	666
Other component	389

Table A75 (q59)

Were monitoring devices used during the management of this anaesthetic?

	n=3081
Yes	3066
No	2
Not answered	13

If yes, which?

	Anaesthetic room	**Operating room**
Room not used	840	7
Not recorded	8	4
Not answered	32	14
ECG	1893	3011
Pulse oximeter	1909	2974
Indirect BP	1517	2407
Pulse meter	286	582
Oesophageal or precordial stethoscope	34	57
Fresh gas O_2 analyser	379	1590
Inspired gas O_2 analyser	307	2074
Inspired anaesthetic vapour analyser	120	1006
Expired CO_2 analyser	354	2605
Airway pressure gauge	441	2423
Ventilation volume	262	1768
Ventilator disconnect device	362	2343
Peripheral nerve stimulator	68	695
Temperature	78	489
Urine output	260	1490
CVP	264	1288
Direct arterial BP (invasive)	288	1117
Pulmonary arterial pressure	32	177
Intracranial pressure	3	13
Other	9	63

NB this can be a multiple entry

Basic instrumental monitoring

More than ninety-nine percent of patients were monitored with instruments. Ninety-seven percent had *oximetry* and *electrocardiography*. It is clear that these two methods are now regarded as standard.* The apparent increase in the use of expired carbon dioxide monitoring (85%) should be noted.

Instrumental monitoring was not used in two cases by consultant anaesthetists.

A fifty-six-year-old woman with widely disseminated carcinomatosis was found by the anaesthetist to have malignant pleural effusion, to be thyrotoxic, hypertensive, dyspnoeic, barely conscious and moribund. No monitoring instruments were attached to her. There was a brief examination under anaesthesia and she die four hours later on the ward in a DGH. No questionnaire was received from the gynaecological surgeon.

Why do the operation at all? If it must be done why not try to improve the patient beforehand and monitor properly? If a job is worth doing, it is worth doing well.

A seventy-year-old man had a cystoscopy and biopsy by a surgical registrar in a University hospital. He had a large pelvic mass. Routine haemoglobin and plasma electrolytes were within the reference ranges ar an ECG and chest x-ray were done. The patient had chronic bronchitis and emphysema and was classified as ASA 3, but the anaesthetic record describes his condition as "poor". A general anaesthetic (thiopenton nitrous oxide and halothane) was given and intravenous fluids administered for the 25-minute procedure. trained ODA assisted the anaesthetist. No monitoring instruments were attached. He died 11 days later wi peritonitis after bowel perforation. No surgical questionnaire was received.

The outcome of these operations was unlikely to be changed by instrumental monitoring. It is the advisors view that basic monitoring instruments should be attached to *every* patient who is to have anaesthesia. A standard* could be written about this matter. NCEPOD suggests that urgent consideration be given to this and suggests the wording might be as follows, "Every patient who is to have a surgical procedure under general or regional anaesthesia in the presence of an anaesthetist or a surgeon shall have, as a minimum standard, the ECG, non-invasive blood pressure and pulse oximeter monitored."[8]

Invasive monitoring

Pulmonary artery pressure was measured in 177 cases. One-hundred-and-twenty-six of these questionnaires referred to patients who were not having cardiac surgery. This increased usage in very sick patients is interesting and reflects an increased appreciation of the value of this technique.

The other fifty-one questionnaires, where pulmonary artery pressure was monitored, were about cardiac surgical patients. There was an apparently wide regional variation in usage which could partly be a result of different response rates to NCEPOD (see page 33).

The anaesthetist advisors suggested that high risk cardiac patients in particular may benefit during and after operation from this device, where high risk is defined as repeat revascularisation procedures, unstable angina, or impaired left ventricular function.[13]

* See glossary, Appendix C

Table A76 (q60)
Was there any malfunction of monitoring equipment?

	n=3081
Yes	26
No	2976
Not answered	79

Malfunction was usually recorded when the patient's condition made the instrument fail, particularly vasoconstriction and (or) hypotension, which render the oximeter less useful.

Table A77 (q61)
Did anything hinder full monitoring?

	n=3081
Yes	126
No	2898
Not answered	57

Thirty-seven of the affirmative answers were because of non-availability of monitors, 23, because of technical difficulties, 16, because of extremes of blood pressure; 12, because of the site of operation or the size of the patient; the remainder were a random mix of reasons. It must be emphasised that there was no case in which a deficiency of instruments led inexorably to a patient's demise.

Type of anaesthesia

Table A78 (q64)
What type of anaesthetic was used?

	n=3081
General alone	2574
Local infiltration alone	5
Regional alone	51
General and regional	283
General and local infiltration	98
Sedation alone	11
Sedation and local infiltration	15
Sedation and regional	42
Not answered	2

The choice of anaesthetic technique rarely influences outcome overtly but sometimes advisors were puzzled about what was chosen.

A 62-year-old man was to have an internal carotid endarterectomy in a DGH. He had bronchitis, was hypertensive and had both sensory and motor deficits which had developed over five years. These were believed to be as a result of transient ischaemic attacks. He was receiving aspirin, oxprenolol and diuretics. The anaesthetic was given by a consultant assisted by an SHO. It consisted of droperidol 5mg, phenoperidine 2 mg, thiopentone 250 mg and vecuronium 8 mg; his lungs were ventilated with a mixture which included enflurane. The systolic blood pressure was 180 mm Hg on the ward, 160 just before induction and then decreased to 65 mm Hg and did not recover to 100 mm Hg for 40 minutes. This hypotension was treated solely with fluids. There was evidence of a stroke when the patient awoke and he died on the second day from a myocardial infarction.

Is the hypotension caused by the combination of droperidol and a large dose of thiopentone not well recognised? What was the reason for not using vasoconstrictors to treat hypotension in a patient who had impaired cerebral perfusion?

General anaesthesia

Table A79 (q65)
Did you take precautions at induction to minimise pulmonary aspiration?

	n=2954
Yes	1386
No	1250
Not answered	318

If yes, which?

Cricoid pressure	1206
Postural changes - head up	31
Postural changes - head down	12
Postural changes - lateral	8
Pre-oxygenation without inflation of the lungs	1170
Aspiration of nasogastric tube	413
Removal of nasogastric tube	4
Rapid sequence induction	27
"Competent intubation"	1
Awake fibreoptic intubation	2
Ranitidine	3
Other drugs	3
Other - not specified	3
Not answered	4

NB this can be a multiple entry.

Table A80 (q69)
How was the airway established during general anaesthesia?

	n=2954
Face mask (with or without oral airway)	81
Laryngeal mask	141
Orotracheal intubation	2444
Nasotracheal intubation	33
Tracheostomy	47
Patient already intubated prior to arrival in theatre suite	370
Awake intubation	2
Bronchoscope	4
Double lumen tube	23
Endobronchial intubation	11
Fibreoptic assisted nasotracheal tube	2
Other	9
Not answered	10

NB this can be a multiple entry.

Table A81 (q67)
What was the mode of ventilation during the operation?

	n=2954
Spontaneous	223
Controlled	2730
Not answered	9

NB this can be a multiple entry.

Table A82 (q68)
If the trachea was intubated, how was the position of the tube confirmed?

Tube seen passing through cords	2205
Chest movement with inflation	2077
Auscultation	1615
Expired CO_2 monitoring	1871
Oesophageal detector device	8
Chest x-ray	29
Fibreoptic -oscopy	15
Airway pressure	1
Blood gas analysis	1
Listening to chest/visual observation	7
Oximetry	10
Not answered/not relevant	400

Table A83 (q69)
Were muscle relaxants used during the anaesthetic?

	n=2954
Yes	2705
No	235
Not answered	14

If yes, which?

	n=2705
Depolarising	173
Non-depolarising	1432
Both	1077
Not answered	23

Table A84 (q70)
How was general anaesthesia maintained?

	n=2954
Nitrous oxide	2580
Volatile agent	2608
Narcotic agent	2197
Intravenous infusions	300
O_2 only	6
No anaesthesia after induction	1
Not answered	29

NB this can be a multiple entry

Table A85 (q71)
Were there any problems with airway maintenance or ventilation?

	n=2954
Yes	127
No	2808
Not answered	19

Table A86 (q72)

Was the method of airway management changed during the operation?

	n=2954
Yes	88
No	2850
Not answered	16

Table A87 (q73)

Did you induce hypotension deliberately to aid the surgeon?

	n=2954
Yes	59
No	2877
Not answered	18

The technique of induced hypotension has both advocates and detractors. There are a few procedures for which its use is justified.

A 65-year-old man was to have an anterior resection in a DGH. A consultant anaesthetist had a trained ODA to assist. The registrar surgeon had done four of these procedures in the last year. The patient had ECG evidence of ischaemic heart disease with mild angina, an enlarged prostate and a duodenal ulcer. His blood pressure before operation was 120/70 mmHg. The serum potassium was reported to be 8.2 mmol/litre. General anaesthesia was planned to include induced hypotension. The drugs used were morphine, propofol, vecuronium, N_20, 0_2 and isoflurane. Intra-arterial blood pressure monitoring was not used. Monitoring included capnometry, oximetry and central venous manometry. A thoracic epidural was inserted: 10ml 0.5% bupivacaine was given at first; an hour later 10ml 0.25% bupivacaine and 100 micrograms fentanyl was given; 45 minutes later another 10 ml 0.25% bupivacaine was injected. The systolic blood pressure was 70 mm Hg at the end of the $2^1/_4$ hour operation. The patient was admitted to the recovery room and thence discharged to the ward. (There was not an HDU and the ICU was full). Cardiac arrest occurred two days later and it was presumed that this was as a result of myocardial infarction since ST depression had been noted on the ECG during the operation.

Not all anaesthetists would necessarily agree with the consultant and call this technique induced hypotension but does this operation warrant this degree of physiological trespass?

Regional anaesthesia

Table A88 (q74)
If the anaesthetic included a regional technique, which method was used?

		n=376
Epidural -	caudal	16
	lumbar	122
	thoracic	101
Interpleural		2
Intravenous regional		1
Peripheral nerve block		25
Plexus block		15
Subarachnoid (spinal)		103
Surface		-
Not answered		2

NB this can be a multiple entry.

Table A89 (q75)
Which agent was used?

	n=376
Local	359
Narcotic	103
Other	12
Not answered	4

NB this can be a multiple entry

A 70-year-old patient had a right inguinal herniorrhaphy for an obstructed hernia done by a registrar surgeon in a DGH. A consultant surgeon made the decision to operate. The patient was anaesthetised during the day by an SHO, with no qualifications in anaesthesia, who sought advice from a consultant because the patient had cardiomegaly, atrial fibrillation and severe aortic stenosis. No intravenous fluids were given before operation. A subarachnoid spinal anaesthetic with 3 ml 0.5% heavy bupivacaine caused hypotension which was treated with ephedrine and crystalloid fluids. A registrar anaesthetist came to help in the recovery period when hypotension became profound. The patient died the same day in acute left ventricular failure. The postmortem showed severe aortic stenosis and 90% narrowing of all coronary arteries.

NCEPOD neither knows the questions asked nor the answers given when the SHO asked for advice: but was this really the most appropriate technique in the circumstances?

Sedation

Table A90 (q76)
Which sedative drugs were given for this procedure (excluding premedication)?

	n=68
Inhalant	4
Narcotic analgesic	17
Benzodiazepine	45
Sub-anaesthetic doses of IV anaesthetic drugs	16
Other	8
Not answered	5

Table A91 (q77)
Was oxygen given?

	n=68
Yes	59
No	4
Not answered	5

If yes, for what reason?

Routine	45
Otherwise indicated	13
Not answered	1

Essential services

Table A92 (q78)
Which special care areas exist in the hospital in which the operation took place?

	n=3081	%
Recovery area or room equipped and staffed for this purpose	2785	*90.4*
High dependency unit	666	*21.6*
Intensive care unit	2495	*81.0*
Other		
Cardiac ICU	36	
Neurological ICU	10	
Cardiac specialised recovery/HDU	5	
Renal transplant unit/renal dialysis	3	
HDU beds on surgical wards	5	
Burns unit	6	
1:1 nursing on ward	1	
Trauma unit for ventilated patients	3	
Area outside the anaesthetic room	2	
Paediatric ICU	4	
Thoracic HDU	1	
Medical monitoring unit	1	
None of the above	4	
Not answered	73	

NB this can be a multiple entry

This question is capable of misinterpretation because it is not specific enough for all our respondents' practices. NCEPOD noted inconsistency between the answers which emanate apparently from the same institution. The units are subject to frequent closure, partly or completely, because of lack of staff (see table A94). The presence of specialist units within a DGH may also confuse respondents since their specialist practice (e.g. cardiac or neurosurgery) may be for patients to bypass the standard recovery room and return direct to specialist postoperative wards. NCEPOD recognises these difficulties in interpretation.

NCEPOD has repeatedly drawn attention to the absence of essential services in hospitals in which nevertheless major surgical operations are done. **It is not an acceptable standard for postoperative patients to be unable to receive proper postoperative care safely because of the absence of suitably equipped and staffed high dependency units**. Neither the staff nor the equipment of the average general hospital ward are adequate for this purpose and high dependency is essential for many modern techniques of nursing, analgesia, physiological support and monitoring.

There is some evidence[14] that there may be too many intensive care units but too few functional intensive care beds because the units provide high dependency care as well. Most ICUs are regularly under pressure not only for patients after emergency operations, but also for elective operations or for medical conditions. Anaesthetists are often in charge of these units and the advisors were concerned that the units may sometimes be congested with patients with hopeless prognoses. These situations can only be avoided by careful planning and consultation between specialists *before* operation. There is a real risk that local developments in postoperative pain management and other therapy will be inhibited if high dependency beds are not available.

Recovery room

Ninety percent of questionnaires (2785/3081) indicated that there was a recovery room in existence in the hospital. If the question was interpreted as it was intended, this means that there are still hospitals in which no recovery facilities exist. This provision does not reach the most basic level.

Recovery rooms are sometimes however *misused.*

A 62-year-old man was to have a palliative oesophagogastrectomy through a thoracic and abdominal approach for oesophageal carcinoma. The surgeon in a DGH had done eight of these cases during the previous year. The consultant anaesthetist worked by himself for six hours. There was no ICU bed available so, after the operation when the patient's temperature was 34 deg C, intermittent positive pressure ventilation was continued overnight in the recovery room but stopped the next morning. The patient developed adult respiratory distress syndrome and died in respiratory failure three weeks later.

Should these operations be attempted when the services essential for success are not available? Was the decision to stop controlled ventilation the next morning influenced by the lack of a bed on the ICU?

Table A93 (q79)
After leaving the operating room, did the patient go to a specific recovery area or room?

	n=3081
Yes	1619
No	1227
Patient died in theatre	230
Not answered	5

Two-hundred-and-thirty deaths were reported to have happened in the operating room. Many of these were during attempts to save a patient with a ruptured abdominal aortic aneurysm. A few of these patients were already actually dying before operation or had already had cardiac arrest and the advisors found it difficult to understand why these operations were even started.

A 42-year-old woman with morbid obesity was admitted to a DGH. She had a strangulated hernia and a laparotomy by a consultant surgeon was planned. She had multiple abdominal abscesses and was septicaemic. Cardiac arrest occurred 30 minutes before induction of anaesthesia. Nevertheless general anaesthesia was induced by a consultant anaesthetist accompanied by an associate specialist. Automatic ventilation of her lungs proved impossible and ventilation had to be manual. She was profoundly hypotensive throughout and a second cardiac arrest led to the abandonment of the procedure.

Would a period of resuscitation after the first arrest have been a preferable tactic?

An SHO, with less than one year's experience, called a consultant who came to help after the start of the anaesthetic in a DGH. The patient was 67 years of age, had peritonitis and was known to have an advanced gastric carcinoma. The laparotomy was just an open and close procedure. This very sick patient had received 500 mg thiopentone and 6 mg of morphine; the blood pressure was very labile throughout the operation. The patient failed to breathe afterwards and was allowed to die.

It is difficult now to understand what benefit this operation was anticipated to have.

A 49-year-old patient had a ruptured aortic aneurysm repaired in a DGH. A consultant anaesthetist was assisted by an SHO and registrar. A consultant surgeon did the operation. No surgical questionnaire was returned but it appears that the patient was in hospital overnight and was stable before the operation. Uncontrollable haemorrhage is reported to have occurred five hours after the start of the operation and the patient died. No invasive monitoring was used. Four peripheral intravenous lines were in place: three 16-gauge and one 18-gauge cannulae.

Are the advantages of invasive vascular monitoring and of wide-bore cannulae still not appreciated?

Table A94 (q80)
Were you unable at any time to transfer the patient into an ICU, HDU, etc?

	n=2851*
Yes	78
No	2626
Not answered	147

* excludes patients who died in theatre.

If yes, why?

Closed at night	4
Closed at weekends	1
Understaffing	6
Lack of beds	51
No ICU/HDU in hospital	11
Deemed inappropriate by ICU Director	1
Other - not specified	3
Not answered	10

NB this can be a multiple entry

Table A95 (q81)
Were monitoring devices used during the management of this patient in the recovery room?

	n=1619
Yes	1578
No	25
Not answered	16

If yes, which?

ECG	883
Pulse oximeter	1407
Indirect BP	1479
Pulse meter	177
Oesophageal or precordial (chest wall) stethoscope	8
Inspired gas O_2 analyser	33
Expired gas O_2 analyser	29
Airway pressure gauge	40
Ventilation volume	39
Ventilator disconnect device	41
Peripheral nerve stimulator	16
Temperature	153
Urine output	327
CVP	156
Direct arterial BP (invasive)	69
Pulmonary arterial pressure	10
Intracranial pressure	4
Other†	13

† For further details see Anaesthesia Appendix (Table A119).

Ninety-four percent questionnaires reported the use of indirect blood pressure measurement: this clearly remains a standard*. The use of pulse oximeters in the recovery room has increased now to 87% questionnaires. This frequency indicates that this technique is perceived to be useful. Is it not time that oximetry became standard* for recovery rooms?[8]

Table A96 (q82)
Who decided that the patient should be discharged from the recovery room?

	n=1619
The most senior anaesthetist	956
Another anaesthetist	119
Surgeon	11
Nurse	447
ICU nurse	2
Consultant surgeon and consultant anaesthetist together	1
Not known	21
Not answered	35
Patient died in the recovery room	27

* See glossary, Appendix C

Table A97 (q84)
Had this patient recovered protective reflexes before discharge from the recovery room?

	n=1592†
Yes	1395
No	87
Not known	82
Not answered	28

† excludes patients who died in the recovery room

Table A98 (q85)
Where did this patient go next (i.e. after the recovery room)?

	n=1592
Ward	1350
High dependency unit	81
Intensive care unit	104
Specialised ICU	43
Another hospital	2
Not answered	3
Neurosurgical HDU	2
CT scan/x-ray/angiography suite	3
Day case unit*	1
Back to theatre	1
Another recovery area	1
Renal HDU	1

* This was a patient who had a repeat cystoscopy and returned to the day unit before admission to hospital in which he died 21 days later from an unrelated condition.

Table A99 (q86)
If the patient was not admitted to a recovery room, where did this patient go on leaving theatre?

	n=1232
Ward	27
High dependency unit	37
Intensive care unit	911
Specialised ICU	205
Another hospital	1
Recovery in theatre	4
Cubicle on ward or private room with monitoring	2
Transferred to another hospital's ICU	2
Trauma unit	1
Area outside anaesthetic room	1
Burns unit	3
CT scan room	3
Operated on in ICU	1
Other - not specified	3
Not answered	31

The 27 patients who went directly to the ward died at various intervals after their operations and there was no consistent pattern. Four, however, died on the same day as the operation.

Two of these patients were "not for resuscitation" on account of widespread infarction of bowel and one had irreversible brain damage.

The fourth patient died of a pulmonary embolus but the management before that terminal event was revealing.

A 70-year-old man was to have a strangulated umbilical hernia repaired in a University hospital. He was obese and had been in bed for five days. He had an active chest infection treated with antibiotics, and was described as ASA 2. A registrar surgeon did the operation at 03.30 hours with an SHO anaesthetist. The latter had no qualifications in anaesthesia and did not ask for advice. 1200 ml 5% dextrose were transfused during the procedure. Prophylaxis against deep vein thrombosis was with heparin and TED stockings. The oxygen saturation declined from 98% to 90% by the end of the procedure for no given reason and prompted no therapeutic action. The recovery room was closed at night. The patient died 15 hours later and the postmortem showed a pulmonary embolus.

Why was this operation performed at 3.30 am? Was the quality of care for this patient up to standard?

Table A100 (q87)
Was controlled ventilation used postoperatively?

	n=2851
Yes	1143
No	1523
Not answered	185

If yes, why?

Respiratory inadequacy	592
Control of intracranial pressure or other neurosurgical indications	154
Part of the management of pain	215
Other reasons	554
Not answered	51

NB this can be a multiple entry

Critical incidents

Three-hundred-and-sixty-five of these are multiple occurrences in patients who had two or more (up to eight) recorded.

Table A101 (q88)
Did any of the following events, which required specific treatment, occur during anaesthesia or recovery?

Yes	831
No	2148
Not answered	102

If yes, which?

Air embolus	2
Airway obstruction	14
Anaphylaxis	4
Arrhythmia	150
Bradycardia (to or less than 50% of resting)	137
Bronchospasm	24
Cardiac arrest (unintended)	218
Convulsions	5
Cyanosis	55
Disconnection of breathing system	1
Hyperpyrexia (greater than 40^0C or very rapid increase in temperature)	1*
Hypertension (increase of more than 50% resting systolic)	25
Hypotension (decrease of more than 50% resting systolic)	493
Hypoxia	106
Misplaced tracheal tube	10
Pneumothorax	12
Pulmonary aspiration	14
Pulmonary oedema	36
Respiratory arrest (unintended)	18
Total spinal	-
Wrong dose or overdose of drug	3
Other	135
Not answered	6
Total	**1469**

* a patient who developed overwhelming infection.

NB this can be a multiple entry

Air embolus

This was recorded twice, once as a possible explanation for events and once during massive haemorrhage after rupture of an abdominal aortic aneurysm. The evidence was not diagnositic.

Anaphylaxis

There were four reports of anaphylaxis. Three out of four patients received orthodox but unavailing management as in the first case below.

Two consultant anaesthetists came to help a General Practitioner with 17 years' experience and the DA. A 35-year-old man was to have an examination under anaesthesia of his larynx, pharynx and oesophagus in a DGH. The patient weighed 98 kg, had asthma and was allergic to penicillin and erythromycin. Induction of anaesthesia, with thiopentone and suxamethonium, was monitored with an ECG, blood pressure measurement and oximetry. Cardiovascular collapse followed the suxamethonium. Resuscitation included the use of adrenaline and, although the heart restarted, consciousness was not regained and he was declared brain dead six days later. The diagnosis of anaphylaxis to suxamethonium was fully substantiated by laboratory tests.

The second example is more equivocal.

A consultant anaesthetised a 43-year-old patient in a non-NHS hospital for an exploration of middle ear. There was no instrumental monitoring in the anaesthetic room and none at first in the operating room. Induction was with thiopentone and vecuronium. Ten minutes after induction at skin incision bradycardia developed and asystolic cardiac arrest followed. There is no report of the use of adrenaline. Resuscitation lasted 45 minutes and the patient was transferred to a DGH for intensive therapy. The postmortem examination showed low grade myocarditis but could not exclude an allergic drug reaction which was the anaesthetist's working diagnosis.

What really happened? Would instrumental monitoring (particularly end expired carbon dioxide measurement) have given an early warning?

Convulsions

There were five cases reported; four were after neurosurgery and one was after cardiopulmonary bypass.

Disconnection

The single report of disconnection was reported by a consultant anaesthetist about an elective operation for aortic aneurysm. The tracheal tube 'fell out' when the patient was in ICU two days after operation. It was immediately replaced after manual inflation of the lungs with 100% oxygen. It seems unlikely that this event was associated with the death three days later from multi-organ failure.

Pulmonary aspiration

A surgical registrar who had three years' experience and had done a similar operation once before undertook a triple bypass procedure for jaundice in a DGH on a 52-year-old man with carcinoma of the head of the pancreas. The operation lasted three and a half hours. No senior surgeon was immediately available. It was a Saturday afternoon. The registrar anaesthetist had the DA examination but did not seek advice or help. The patient had had no oral fluid or food for 24 hours. Induction of anaesthesia was with etomidate, fentanyl and atracurium and no precautions against regurgitation were employed. Pulmonary aspiration took place on induction. Bronchial lavage was used. Mannitol was not given at any stage and the patient died nine days after operation in hepatorenal failure. The immediate recovery period was complicated by respiratory inadequacy and the patient was then transferred to the ICU.

Where were the consultants? Why operate out-of-hours?

Wrong dose or overdose

There were three questionnaires which reported the use of an overdose or the wrong dose of a drug. Two patients received relative overdoses of papaveretum and hyoscine at premedication: their early deaths were more related to their surgical disease than to the overdoses. The third was about the administration of potassium which was given despite written instructions to the contrary.

Table A102 (qs 4 and 88)
Critical incident/grade of most senior anaesthetist

	Yes	No	Not answered	All questionnaires
Senior house officer	42	232	3	277
Registrar	87	278	15	380
Senior registrar	107	267	17	391
Consultant	553	1203	62	1818
Staff grade	16	48	4	68
Associate specialist	13	53	2	68
Clinical assistant	11	51	-	62
General practitioner	1	1	1	3
Hospital practitioner	-	2	-	2
Other	-	1	-	1
Not answered	1	10	-	11
Total	**831**	**2146**	**104**	**3081**

The frequency of reported critical incidents increases as the seniority of the anaesthetist increases. This presumably reflects the complexity of the cases or the confidence to report the incidents.

Table A103 (q89)
Was there any mechanical failure of equipment (excluding that for monitoring)?

Yes	6
No	2874
Not answered	201

There were six reports. One was of a wet and sticky expiratory valve; one was a failure of the suction apparatus but no other explanation was offered; one was a report that an epidural catheter was cut accidentally by a nurse on a general ward; one was of a chart recorder which jammed; one was of the failure of an automatic ventilator of the lungs in the face of massive (fatal) pulmonary oedema in a patient with 50% burns (manual ventilation was satisfactory).

The last case is an example of apparent *misuse* of equipment. We are particularly grateful to the experienced consultant anaesthetist who completed the questionnaire.

A woman with known carcinoma of the breast was anaesthetised in a DGH. She was graded as ASA 3 and was obese. Her lungs were being ventilated during an operation to explore her breast by a consultant surgeon. An oximeter and capnometer were attached, an old Blease ventilator was supplied with a fresh gas flow of 4 litres/minute and the tidal volume was set at 600 ml. Soon after the start of the operation cardiac arrest occurred. Resuscitation did not reverse the asystole. It was realised that the gas flow switch had been inadvertently deflected from 'closed' to 'open' circuit so that ventilation of the lungs failed. A machine check was done before the anaesthetic started.

Modern design should eliminate this type of hazard. Should departments decommission all out-of-date, although fully functional, ventilators? There is Departmental guidance[15] about replacement of equipment and Directorates of Anaesthesia should be aware of these.

Early postoperative period

Table A104 (q90)
Were there early (i.e. up to 7 days) complications or events after this operation?

	n=2824*
Yes	2047
No	651
Not answered	126

* excludes patients who died in the theatre or recovery room.

If yes, which (multiple entry possible)?

Ventilatory problems	858
Cardiac problems	923
Hepatic failure	140
Septicaemia	535
Renal failure	601
Central nervous system failure	340
Other	497
Not answered	25

Table A105 (q91)

Were narcotic analgesic drugs given in the first 48 hours after operation?

	n=2851
Yes	2296
No	448
Not answered	107

If yes, specify:

Alfentanil	170
Buprenorphine	2
Codeine phosphate	62
Dextropropoxyphene	1
DF-118	3
Dihydrocodeine	4
Fentanyl	201
Morphine/diamorphine	1177
Nalbuphine	1
Papaveretum	239
Pethidine	228
Phenoperidine	9
Not specified	278

NB this can be a multiple entry

A repair of a strangulated inguinal hernia was done in a DGH at 04.30 hours. The patient was 64 years old and was being treated for hypertension. The SHO anaesthetist did not seek advice. Some small bowel was resected by a registrar surgeon (who did not inform the consultant) but the patient had a cardiac arrest on the second day after operation. His postoperative analgesia consisted of one tablet of codydramol but no narcotic analgesics were given. The postmortem showed atheroma, pulmonary oedema but no myocardial infarction.

Was the postoperative analgesia adequate? This operation was undertaken at 4.30 am by juniors without any advice. Is this good practice?

Table A106 (q92)
Did complications occur as a result of these analgesic methods?

Yes	73
No	2186
Not answered	37

If yes, specify:

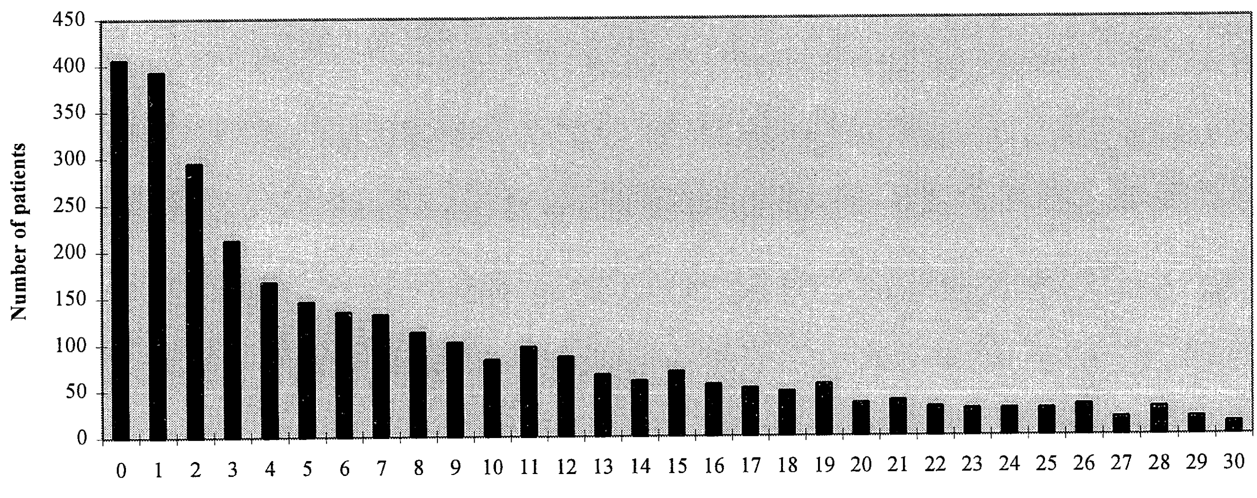
Nausea/vomiting	11
Drowsiness and confusion	15
Deteriorating respiratory function/respiratory depression	22
Hypotension	8
Long weaning period from IPPV	2
Not specified	15

Table A107 (q93)
Were other sedative/hypnotic or other analgesic (non-narcotic) drugs given?

	n=2851
Yes	1202
No	1396
Not answered	253

Deaths

Figure A5 (qs 15 and 94)
Days from operation to death



For further details see Anaesthesia Appendix (Table A120).

Table A121 in the Anaesthesia Appendix shows the grade of the most senior anaesthetist and the day of death. There are many concerns about staff grade anaesthetists whose numbers are increasing rapidly. The number of deaths on the same or next day for staff grade anaesthetists are closer to the numbers for senior registrar and consultants than are those for SHOs or registrars. This appears to suggest that allocation of their (staff grade) duties needs to be examined.

Table A108 (qs 39 and 94)
ASA status/days from operation to death

	1	2	3	4	5	Not answered
Same day	6	29	47	108	212	4
Next day	5	37	86	133	129	3
Two days	7	47	65	114	62	-
Three days	3	42	61	69	34	3
Four days	5	28	45	67	22	-
Five days	3	25	42	53	23	-
Six to ten days	22	107	184	191	60	1
Eleven to fifteen days	12	89	124	122	29	4
Sixteen to twenty days	13	50	106	67	11	-
Twenty-one to twenty-five days	4	38	61	45	7	1
Twenty-six to thirty days	5	25	48	29	5	2
Total	**85**	**517**	**869**	**998**	**594**	**18**

Table 109 (q96)
Place of death

Theatre	230
Recovery area	27
Intensive care unit	1172
High dependency unit	74
Ward	1457
Home	36
Another hospital	39
Other	36
Not answered	10

Coroners' reports

Previous reports of CEPOD and NCEPOD have commented occasionally on the reported conclusions of Coroners. These two vignettes are interesting for anaesthetists.

A 26-year-old man with Down's syndrome and hypothyroidism who was morbidly obese had a ventral hernia. He refused to accept monitoring whilst he was still conscious. He was given intramuscular ketamine by a consultant anaesthetist in a University hospital. General anaesthesia included muscle paralysis and his lungs were ventilated. Paralysis was reversed with glycopyrronium and neostigmine. Doxapram was also used. He had an apnoeic episode on the ward and was found there later the same day with fixed dilated pupils and he died. The Coroner recorded an 'open verdict' and noted that there was no evidence of 'ketamine toxicity'.

None of the anaesthetist advisors had heard of this diagnosis.

This patient, aged 68, was in a University hospital for oesophagectomy for carcinoma. She had chronic obstructive airways disease. She was on long-term aspirin therapy. She spent four hours in recovery and had a thoracic epidural (fentanyl) for analgesia but, since there was no bed available for her on the ICU, she was sent back to the ward. Her epidural infusion was continued and she died three days later after major postoperative haemorrhage and consolidation of her lung. The Coroner's inquest recorded 'death by misadventure'.

These decisions by Coroners, whose function is to record the circumstances of death, if taken in isolation, do not help doctors to be objective: an open verdict can imply more than seems to be justified by the evidence here; misadventure implies that there was something amiss in the management of this lethal condition.

Audit

Table A110 (q98)
Did you have morbidity/mortality review meetings in your department?

	n=3081
Yes	2851
No	167
Not answered	63

If yes, will this case be, or has it been discussed at your departmental meeting?

Yes	978
No	1775
Not known	3
Not answered	95

The anaesthetist advisors were at a loss to understand how 167 respondents could claim that no review meetings were held in their departments. This is a criterion which the Royal College of Anaesthetists sets for accreditation of departments for training.

Table A111 (q99)
Has a consultant anaesthetist seen and agreed this form?

Yes	2675
No	140
Not answered	266

An opportunity for review of trainees' work is lost on each occasion that a questionnaire is not reviewed by a consultant.

Discussion

One matter was so frequently the subject of comment that it must be given pride of place in the discussion. The absence of a **high dependency unit** in many hospitals results in the misuse of expensive intensive care unit beds, where these are available. Too often intensive care units are full. Patients are then returned to the relatively unsafe environment of a general ward. Safe provision of postoperative care (analgesia, nursing, monitoring and pharmacological/physiological support) may be jeopardised by the absence of high dependency units.

Key issues for anaesthetists emerged during the meetings of advisors and coordinators. These were naturally influenced by current events in the NHS during 1994-5. The advisors continually reminded themselves that these immediate events were not necessarily relevant to the practice of anaesthesia in the period 1992-3 from which these data were derived. The subjects are listed below in two groups. One group contains aspects of practice which could best be improved by the introduction of standards and the other, of more local application, by protocols.

Practice amongst anaesthetists is not stereotyped but the fact that more than 90% of practitioners do follow certain patterns supports the notion that **standards of practice*** could now be written. The subjects for potential inclusion in this category are listed here and the reader is referred to the main text for details.

Visiting and assessment of patients before operation [see page 60].

The need for experienced staff for very sick patients (e.g. ASA 4 and 5); all such patients should be anaesthetised in the knowledge and (or) presence of a senior registrar or consultant [see page 46].

Trained non-medical staff should always be present specifically to help the anaesthetist [see page 75].

The use of basic monitoring instruments throughout anaesthesia (ECG, blood pressure cuff and oximeter) [see page 79].

The provision of a fully staffed and equipped recovery room wherever and whenever patients are to recover from general or regional anaesthesia [see page 87].

The use of pulse oximeters in recovery rooms [see page 88].

None of these are new or revolutionary; indeed they have wide support and are mostly included in the guidelines for purchasers produced by the Royal College of Anaesthetists[16] or as recommendations in various publications of the Association of Anaesthetists of Great Britain and Ireland (eg Recommendations for Standards of Monitoring during Anaesthesia and Recovery).[8] The anaesthetist advisors would welcome an effort by either, or preferably both, organization(s) to adopt and *endorse* these standards.

* See glossary, Appendix C

Meanwhile, individual hospitals may wish to write **protocols*** about various matters and these too have suggested themselves to the anaesthetist advisors. Some such are listed here.

Prophylaxis against deep vein thrombosis and pulmonary embolism [see page 71].

Transfer of sick patients from one hospital to another [see page 58].

Referral of sick patients to more senior staff [see page 46].

Essential laboratory tests and investigations before operation; the scrutiny of the results; their role, if any, in postponement or cancellation of operations [see page 61].

Retention of staff records and duty rosters [see page 41].

Out-of-hours operating [see page 72].

* See glossary, Appendix C

Anaesthesia Appendix

Table A112 (qs 13 and 15)
Calendar days from admission to final operation

None	603
One	638
Two	277
Three	175
Four	124
Five	97
Six	86
Seven	106
Eight	96
Nine	69
Ten	56
Eleven	57
Twelve	45
Thirteen	51
Fourteen	36
Fifteen	46
More than fifteen	470
Admission date not answered	49

Table A113 (q35)
Were any investigations done before the operation?

If yes, which?

Haemoglobin		2929
Packed cell volume (haematocrit)		2168
White cell count		2773
Sickle cell test (e.g. Sickledex)		70
Coagulation screen		1118
Plasma electrolytes	- Na	2792
	- K	2702
	- Cl	928
	- HCO_3	1352
Blood urea		2695
Creatinine		2381
Serum albumin		1539
Bilirubin (total)		1409
Glucose		1518
Urinalysis (ward or lab.)		1034
Blood gas analysis		725
Chest x-ray		2173
Electrocardiography		2301
Respiratory function tests		229
Echocardiography		203
Special cardiac investigation		204
Special neurological investigation		231
Others relevant to anaesthesia		401

Table A114 (q37)

What drug or other therapy was the patient receiving at the time of operation (excluding premedication of drugs for anaesthesia)?

None	424
Analgesic - aspirin	247
Analgesic - other non-narcotic	617
Analgesic - narcotic	755
Anti-angina	367
Anti-arrhythmic	270
Anticoagulant	407
Anticonvulsant	147
Antidepressant	126
Antidiabetic	279
Antihypertensive	554
Anti-infective	613
Anti-Parkinson's	17
Anxiolytic	97
Benzodiazepines	321
Bronchodilator	372
Cardio-or vaso-active drug	298
Contraceptive	10
Corticosteroid	380
Cytotoxic	47
Diuretic	629
H_2 blockers	548
Psychotropic	64
Other	1046
Not answered	73

Table A115 (q44)

Were measures (other than those specified in questions 20 and 24) taken to improve the respiratory system before induction of anaesthesia?

If yes, which measures?

Chest physiotherapy	323
Airway management including ventilation/intubation, IPPV, IPPR	278
Antibiotic therapy	245
Bronchodilators	243
Pre-oxygenation/oxygen therapy	37
Pleural aspiration/chest drains/pleurodesis	20
Corticosteroids	13
Inotropes	4
Diuretics	4
Dialysis (haemo- and renal)	2
Not specified	16

NB This can be a multiple entry.

Table A116 (q45)
Were premedicant drugs prescribed?

If yes, which?

Atropine	45
Chloral hydrate	1
Diazepam	100
Droperidol	25
Fentanyl	16
Glycopyrronium	19
Hyoscine	125
Lorazepam	112
Ketamine	-
Metoclopramide	190
Methohexitone	-
Midazolam (Hypnovel)	13
Morphine	103
Papaveretum (Omnopon)	152
Pethidine	98
Prochlorperazine	60
Temazepam	411
Promethazine	74
Trimeprazine	6
Other	215
Not specified	10

Table A117 (q62)
What was the initial main position of the patient during surgery?

Supine	2632
Lateral	164
Prone	34
Sitting	5
Knee-elbow	1
Lithotomy	180
Jack knife	1
Head down	3
Head-up tilt	9
Manchester Orthotec/orthopaedic table	10
Kidney position	1
Head turned laterally	1
"Ventricular" position	1
Half lateral	11
Special bed	1
Semi-sitting	3
Other - not specified	6
Not answered	18

Table A118 (q63)
Was the main position changed during the procedure?

Yes	129
No	2901
Not answered	51

Table A119 (q81)
Were monitoring devices used during the mangement of this patient in the recovery room?

Other

Pulse rate	2
Cardiac output	2
Blood gases/blood glucose	2
BM stix	3
Haemoglobinometer	1
Reflocheck	1
Hydrocath	1
Atrial pressure line	1

Table A120 (qs 15 and 94)
Days from operation to death

Same day	406
1 day	393
2 days	295
3 days	212
4 days	167
5 days	146
6 days	135
7 days	132
8 days	113
9 days	102
10 days	83
11 days	97
12 days	86
13 days	67
14 days	60
15 days	70
16 days	56
17 days	52
18 days	48
19 days	56
20 days	35
21 days	38
22 days	31
23 days	29
24 days	29
25 days	29
26 days	33
27 days	19
28 days	30
29 days	19
30 days	13

Table A121 (qs 4 and 94)

Days from operation to death/most senior anaesthetist

	SHO	Registrar	Senior Registrar	Consultant	Staff Grade	Associate Specialist	Clinical Assistant	Other
Same day	23	35	50	272	13	10	3	-
Next day	27	53	63	230	7	6	6	-
2 days	21	35	43	176	9	4	7	-
3 days	23	27	24	114	2	10	8	1
4 days	12	28	19	94	4	3	4	1
5 days	9	28	28	75	1	2	2	-
6 to 10 days	63	78	69	328	9	8	8	1
11 to 15 days	38	40	44	222	14	9	9	1
16 to 20 days	28	22	22	154	6	8	6	1
21 to 25 days	13	23	13	95	3	5	4	-
26 to 30 days	20	11	16	58	-	3	5	1
Totals	**277**	**380**	**391**	**1818**	**68**	**68**	**62**	**6**

Surgery

Surgery

Introduction

The manner in which the surgical data were collected has been described in the management section (pages 22 and 27). The sample of deaths and the number of surgical questionnaires which were reviewed was the largest which NCEPOD has handled. Each surgical questionnaire was reviewed by a panel of advisors relevant to the specialty involved. The authors gratefully acknowledge the assistance of these advisors; their names are listed at the beginning of each section.

The decision as to which advisory group should review the questionnaire was dictated by the nature of the final operation involved. It was sometimes necessary for more than one group to review a case, where there was a sequence of events involving multiple operations and different specialties.

This section of the report deals with the replies received. The pertinent information relating to each specialty has been abstracted from the questionnaires and is presented as a commentary for each discipline, supported by relevant tables. The authors have been impressed by the improved standard of pre-operative investigation of these surgical patients.

Subspecialization is now an established fact in general surgery but the average hospital needs to provide 24-hour care. This means that some surgeons must now provide cover outside their chosen subspecialty. This should be borne in mind when interpreting the subsequent tables in the surgery section. This problem will only be solved by the appointment of more specialist surgeons and (or) the development of collaborative arrangements between hospitals. These data for 1992/93 make us concerned about this problem.

Contents

Review of operation notes

The authors are appreciative of the work done on this section by Mr M.A.C. Leonard, Assistant Clinical Coordinator. It is essential to be able to read and interpret surgical operation notes. The Audit Commission[5] has stressed the serious consequences of poor record-keeping:

" - patient care may be compromised
- the hospital loses protection against negligence claims
- the quality of coded information suffers, thereby jeopardising the contracting process and clinical audit"

Copies of operation notes were received with 59% of the surgical questionnaires. A random selection of **800 (42%) operation notes** were reviewed. Information included in the tables below relates to analysis of these notes. Given that 41% of the questionnaires were not accompanied by operation notes, despite requests that this should be the case, the authors would point out that it is the responsibility of the consultant surgeon in charge of the case to check that all the documents requested are sent to NCEPOD.

NCEPOD remains confidential. In order that the clinical coordinators did not see data which would break this confidentiality, the NCEPOD Chief Executive reviewed the operation notes to check whether date of operation, the patient's name and/or reference, the name of the operating surgeon, surgeon's signature, the name of the consultant responsible and the name of the anaesthetist were present on the notes. The operation notes were then rendered anonymous and the clinical coordinators reviewed them for content on the basis of the other items listed in Table S1. The Guidelines of The Royal College of Surgeons of England[18] produced in 1990 and revised and reissued in 1994 were used as a basis of this analysis.

Table S1
Items included on operation notes

	Yes	%	No	Not applicable
Date of operation	775	*97.0*	25	-
Name/ref. every page	428	*53.5*	372	-
Name of operating surgeon	616	*77.0*	184	-
Surgeon's signature	735	*91.9*	65	-
Name of consultant responsible	448	*56.0*	352	-
Name of anaesthetist	578	*72.2*	222	-
Diagnosis made	394	*49.2*	406	-
Procedure performed	752	*94.0*	48	-
Description of the findings	592	*74.2*	207	-
Tissue details	459	*62.1*	275	61
Details/serial nos. of prostheses	123	*79.3*	33	65
Details of sutures used	344	*47.4*	382	74
Accurate description of difficulties/complications	355	*45.3*	429	16
Immediate postoperative instructions	199	*33.0*	541	60*

* died in theatre or recovery room

Table S2
Specialty of surgical team who completed the operation note

	n=800
Cardiothoracic	79
Colorectal	128
General surgery	286
Gynaecology	16
Neurosurgery	53
Ophthalmic	3
Oral/Maxillofacial	2
Orthopaedic	40
Otorhinolaryngological	9
Plastic	9
Urology	41
Vascular	134

Dating of operation notes

Three percent of operation notes were not dated. All notes should clearly indicate the date and time of the operation.

Name and/or reference on every page

The patient's name and record number should appear on every page of the medical record. These were omitted from at least one page in 46.5% of the operation notes.

Names of surgeons and anaesthetists

Identification of the surgeon performing the procedure was omitted on 23% of the notes; the surgeon's signature (often illegible) was, however, present on 91.9%. The anaesthetist's name was omitted from 28%.

Only 56% of the records included the name of the consultant surgeon with responsibility for the patient. This is disappointing and represents only a 12% increase since our 1990 review[3].

A lack of identification of either surgeon or anaesthetist has medico-legal implications and also makes coding of grades difficult. It is also unhelpful when undertaking retrospective analysis for research purposes.

Clinical diagnosis

In many cases there was a diagnosis by implication, but 13% of records did not even identify a diagnosis which could be used for coding purposes.

Procedure performed

Forty-eight records did not indicate the procedure performed.

Description of the findings at operation

Three-quarters of the records had a good description of the operative findings. There were however many instances of drawings which were not intelligible and in which written commentary was poor. Five percent of records were considered inadequate and indecipherable and in some cases a single word was used, which was inadequate for complete understanding.

Tissue details

Two thirds of the relevant records were satisfactory but one-third failed to detail either the organ involved or tissues removed both in terms of size and shape or relied on a bland uninformative statement to describe what took place.

Details of prostheses and serial numbers

In general there was very good detail in relation to the type of prosthesis used. In the majority of cases manufacturers' data had been attached to the operation record.

Details of sutures

Suture detail was in general terms very poor. Less than 50% of operation records gave accurate details of sutures used. There were often unintelligible abbreviations and the most common statement of suture detail was "layered closure with clips to skin".

Accurate description of difficulties/complications

Forty-five percent of records contained accurate descriptions of difficulties or complications. The data can be interpreted to indicate that 55% of all procedures were straightforward and uncomplicated.

Postoperative instructions

Postoperative instructions were only present in one third of all the notes reviewed.

The most common postoperative instruction written by surgeons was "routine postoperative management" or "patient to return to ITU/HDU". The authors are aware that there may be postoperative instructions written elsewhere by surgeons and anaesthetists and also there would be care plans written by nurses. These may be on separate sheets and many of these would not have been sent to the Enquiry.

Conclusions

There was a considerable variability in quality throughout the specialties, although it is clear that the majority of records which were typed e.g. in cardiothoracic and neurosurgery, were extremely good. In general surgery, colorectal surgery and otorhinolaryngology, many of the operation notes were unsatisfactory.

Computer-generated operation notes were often difficult to interpret and lacked clarity of information. Although these notes were visually pleasing they were often poorly designed.

In the review of operation notes no attempt was made to look at the identification of right and left sides. Where there is an operation relating to a limb, laterality must be clearly stated on the operation note.

There is a clear need for further improvement in keeping operation records and The Royal College of Surgeons' guidelines and recommendations really need to be re-emphasised.

Overall review of surgical data

These data are based on 3288 questionnaires which were returned to the Enquiry based on a sample of patients who were aged between 6 years and 70 years (see page 22). Questionnaires were allocated to the advisory group for the most relevant specialty for the procedure performed.

Table S3
Specialty of questionnaires reviewed (as grouped in the specialty sections of this report)

Cardiothoracic	315
Colorectal	491
General	1149
Gynaecology	93
Neurosurgery	236
Ophthalmic	6
Oral/Maxillofacial	12
Orthopaedic	232
Otorhinolaryngological	42
Plastic	31
Urology	164
Vascular	517

Table S4 (qs 5 and 6)
Age of patient at final operation

Years	Male	Female	Total
6 to 10*	7	3	10
11 to 15	6	8	14
16 to 20	24	14	38
21 to 25	23	12	35
26 to 30	35	17	52
31 to 35	42	16	58
36 to 40	33	33	66
41 to 45	66	55	121
46 to 50	97	79	176
51 to 55	162	100	262
56 to 60	258	167	425
61 to 65	470	297	767
66 to 70	774	490	1264

* i.e. up to the day before the eleventh birthday.

The sample included only patients aged between 6 and 70 years.

Figure S1
Age and sex of patients (see table S4)

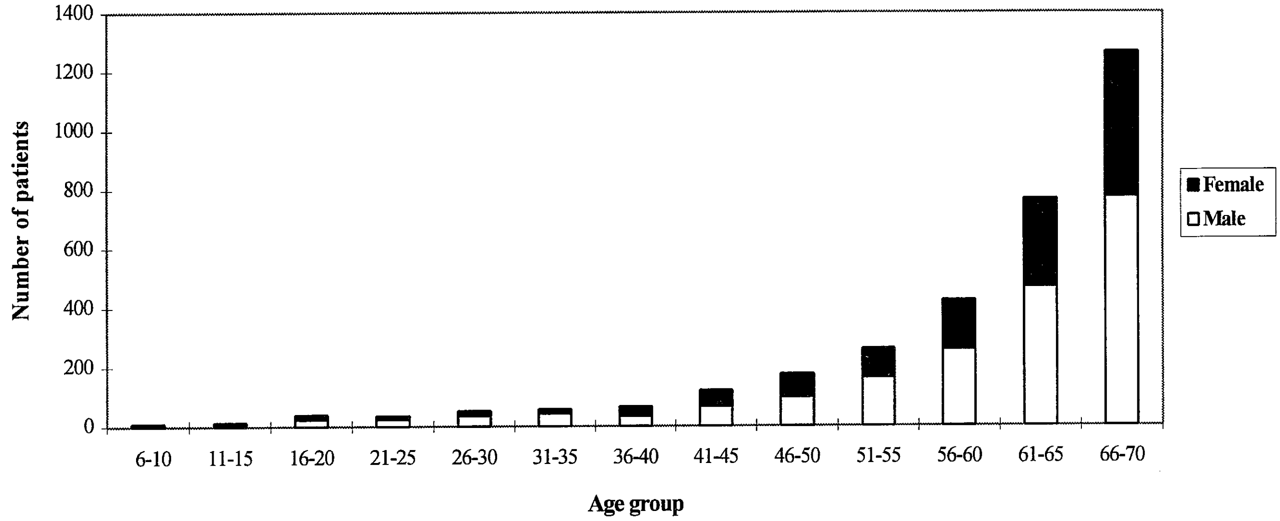


Table S5
Deaths of patients aged less than 40 years

	n=258	%	% of specialty
Cardiothoracic	17	*6.6*	*5.4*
Colorectal	13	*5.0*	*2.6*
General	104	*40.3*	*9.0*
Gynaecology	4	*1.5*	*4.3*
Neurosurgery	64	*24.8*	*27.1*
Ophthalmic	-	-	-
Oral/maxillofacial	4	*1.5*	*33.3*
Orthopaedic	18	*7.0*	*7.7*
Otorhinolaryngological	3	*1.2*	*7.1*
Plastic	13	*5.0*	*41.9*
Urology	11	*4.3*	*6.7*
Vascular	7	*2.7*	*1.3*

The authors thought that the readers might like to see the numbers of deaths which occurred in the younger patients. The high percentage of neurosurgical patients is mainly accounted for by trauma. Similarly the high percentage of young patients who died under the care of plastic surgeons is mainly accounted for by burns.

Table S6 (q12)
Initial admission intention for the last operation performed

Elective	873
Urgent	642
Emergency	1766
Not answered	7
Total	**3288**

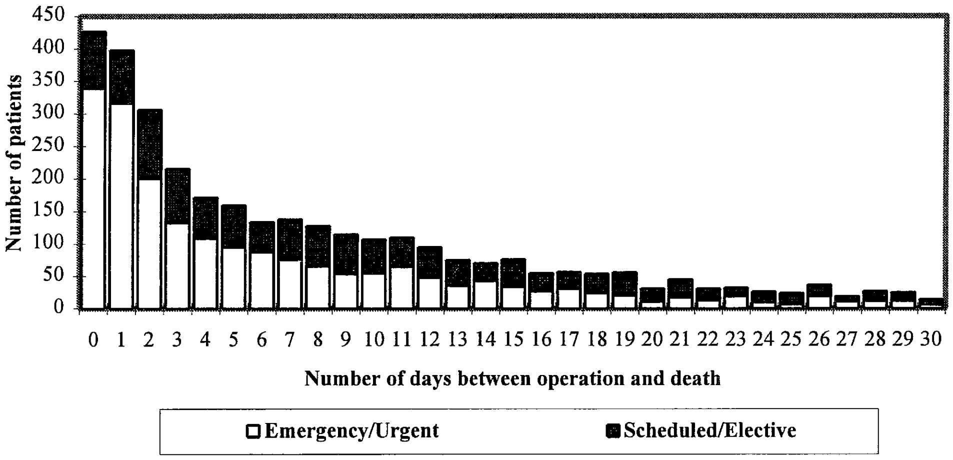
There is a large number of emergency or urgent admissions amongst this sample of patients who died. The importance of this is discussed further in the various specialty sections.

Table S7 (q57)
Classification of the final operation

Emergency	937
Urgent	1060
Scheduled	934
Elective	329
Not answered	28
Total	**3288**

The large number of emergency and urgent operations has a considerable impact on the provision of services in surgery; this is discussed further in the specialty sections.

Figure S2
Number of days between operation and death/classification of operation (see glossary, Appendix C)



It is clear from Figure S2 that urgent and emergency surgery is succeeded sooner by death than after scheduled or elective surgery. Furthermore the number of deaths occurring per day after scheduled or elective surgery is approximately constant after the first four days after an operation; it then declines very slowly. These are unstandardised, crude data and make no allowances for all known determinants of death. Nevertheless, one explanation may be that the emergency and urgent operations result in death as a result of the actual surgical condition, whereas the elective and scheduled operations result in death less closely related to the surgical condition and to co-existing diseases and complications following the intervention.

Table S8 (q40)
ASA Class*

ASA class 1	168
ASA class 2	710
ASA class 3	854
ASA class 4	1009
ASA class 5	306
Not answered	241
Total	**3288**

* American Society of Anesthesiologists classification of physical status (see glossary, Appendix C)

Table S9
Comparison of ASA Class as stated on anaesthetic and surgical questionnaires (when both questionnaires were received)

n=2339
Anaesthetic questionnaire

Surgical questionnaire	1	2	3	4	5	Not answered
1	30	52	23	8	10	2
2	23	213	158	86	33	2
3	6	80	272	190	52	1
4	5	34	132	356	175	2
5	3	2	8	58	148	2
Not answered	2	26	56	64	24	1

NCEPOD has highlighted before the difference between anaesthetic and surgical assessments in terms of ASA Class. Part of this difference may be that anaesthetists are familiar with pre-operative assessment and classification of patients whereas surgeons tend to supply their answers to the Enquiry retrospectively. The authors recommend that surgeons develop the habit of prospectively recording the ASA grades of patients being prepared for surgery.

Table S10 (q46)
Day of operation
(the time of operation was not stated in 199 cases)

		("Out-of-hours" 18.01 to 07.59 and weekends)
Monday	513	(122)
Tuesday	583	(143)
Wednesday	587	(134)
Thursday	560	(133)
Friday	522	(123)
Saturday	285	(285)
Sunday	238	(238)
Total	**3288**	**(1178)**

Table S11 (q47)
Out-of-hours operations (Monday to Friday 18.01 to 07.59 hrs, all day Saturday and Sunday)

	Weekday	Weekend
Cardiothoracic	35	26
Colorectal	108	101
General	262	204
Gynaecology	5	3
Neurosurgery	67	49
Ophthalmic	-	-
Oral/maxillofacial	-	-
Orthopaedic	20	36
Otorhinolaryngological	5	1
Plastic	-	1
Urology	7	5
Vascular	146	97
Total	**655**	**523**

The two tables above demonstrate that a considerable amount of work is still being done outside routine hours on a weekday. It is during all these out-of-hours periods including weekends that we believe hospitals are less well-staffed and less efficient in their patient care. The presentation of pathology does not respect the calendar or the clock; hospitals need to ensure that adequate provisions are made to deal with emergencies both during the working day and at the weekends.

Table S12 (q49)
Grade of the most senior operating surgeon

		%	(Locums)
Consultant	2090*	*63.6*	(91)
Associate specialist	44	*1.3*	(1)
Senior registrar	437	*13.3*	(32)
Staff grade	33	*1.0*	
Registrar	599	*18.2*	(52)
Clinical assistant	9	*0.3*	(1)
Senior house officer	59	*1.8*	
Other	5	*0.1*	(1)
Not answered	12	*0.4*	
Total	**3288**		**(178)**

* in 11 cases, two consultants operated together

Table S13 (q78)
Place of death

Theatre	230
Recovery room	31
Ward	1537
ICU/HDU	1353
Cardiac care unit	24
Home	34
Another hospital	35
Other	35
Not answered	9
Total	**3288**

Table S14 (q91)
Was the death considered at a local audit/quality control meeting?

		%
Yes	2655	*80.7*
No	507	*15.4*
Not answered	126	

The achievement of at least 80.7% of these deaths considered at audit meetings is a demonstration of the real commitment of surgeons to audit. Nevertheless there is room for improvement.

Table S15 (qs 93 and 97)
Who completed the questionnaire?

		(Checked by consultant)
Consultant	1822	
Associate specialist	29	(21)
Senior registrar	332	(239)
Staff grade	20	(18)
Registrar	713	(574)
Senior house officer	308	(236)
House officer	18	(15)
Other	10	(7)
Not answered	36	
Total	**3288**	**(1110)**

Table S16 (q94)
Did you have any problems in obtaining the patient's notes?

Yes	319
No	2930
Not answered	39

It remains a matter of concern that just under 10% of patients' notes were difficult to obtain and as can be seen from the tables below even those which were found were often incomplete (see also general data, page 30).

Table S17 (Q95)
Were all the notes available?

Yes	2796
No	439
Not answered	53
Total	**3288**

If no, which part was inadequate or unavailable?

Pre-operative notes	30
Operative notes	26
Postoperative notes	23
Death certificate	230
Postmortem report	90
Anaesthetic record	44
Referring hospital notes	14
ICU notes	12
Referral letter/GP notes	5
Details of death	16
Other reports	6
Complete notes folder	10

Table S18 (q98)

Calendar days between the date of operation and completion of questionnaire by the surgical team

Number of days	Number of questionnaires
1 to 29	78
30 to 59	402
60 to 89	502
90 to 119	479
120 to 149	424
150 to 179	301
180 or more	1102

The length of this interval depends on two variables - the number of days between the death and the notification of it to NCEPOD (see table M7, page 29), and the length of time taken by the surgical team to locate the notes and to complete the questionnaire.

Cardiothoracic Surgery

NCEPOD wishes to thank the consultants in cardiothoracic surgery who acted as advisors in the preparation of this section:

Mr J S Bailey	(Trent)
Mr S W Fountain	(North West Thames)
Mr R Vaughan	(East Anglia)
Mr A J Wood	(North East Thames)

Key issues

- Many patients on whom cardiothoracic surgeons operate are very ill and at risk of death.
- There is effective referral of the workload into specialist centres.
- In those cases of death reported to us there was a high level of consultant involvement.

Sample

There were 315 questionnaires returned from 54 hospitals.

Table S19 (q54)
List of procedures

These may be multiple for individual patients. Cases of trauma and revisional surgery have not been identified separately.

Cardiac/vascular procedures

Coronary artery bypass graft (any number of vessels)	116
Mitral valve replacement	42
Aortic valve replacement	31
Replacement of thoracic aorta (aneurysm, dissection or tear)	18
Repair of VSD (post infarct)	10
Heart transplant	7
Ventricular aneurysmectomy	6
Pericardiectomy	4
Evacuation of tamponade	4
Correction of congenital cardiac anomalies	4
Pulmonary embolectomy	2
Repair thoracoabdominal aortic aneurysm	2

Pulmonary/pleural procedures

Pulmonary resection	29
Bronchoscopy	15
Exploratory thoracotomy	12
Drainage of intrathoracic abscess	5
Thoracoscopy	4
Pleurodesis	2

Oesophageal procedures

Oesophagogastrectomy	6
Oesophagogastroscopy (+/- dilatation)	5
Removal of Celestin tube	3
Oesophageal bypass	3
Jejunostomy	3
Insertion of Celestin tube	2

Miscellaneous 16

Most of the procedures listed above were considered appropriate, but not all.

A patient developed a bronchopleural fistula from a pneumonectomy stump seven years after resection and irradiation for a bronchial carcinoma. Bronchoscopy was done by a consultant who identified the fistula but delayed a rib resection and drainage of an empyema until the next day. Subsequently, after the drainage of the empyema, an inexperienced registrar performed two bronchoscopies and attempted to cauterise the fistula with sodium hydroxide. The patient died eight days after the initial bronchoscopy. A postmortem examination showed that the defect in the stump was too big for cautery and that the cause was ischaemia; there was no recurrence of the original tumour.

Should such a difficult case be left to a registrar?

A patient with a malignant pleural effusion, which had been drained four days before, underwent thoracoscopy followed by thoracotomy in order to do a talc pleurodesis. The procedure was done by a registrar at a time when the patient's haemoglobin was 9.1 gm/dl. The patient died from bronchopneumonia and carcinomatosis.

Was this thoracotomy necessary?

Audit

There is a highly developed structure for audit within this specialty and 271 (86%) cases were considered at an audit meeting. Often specialists from neighbouring regions will meet to discuss specific problems and hence not every case will be discussed in detail.

Patient profile

Table S20 (qs 5 and 6)
Age and sex of patient at final operation

Years	Male	Female	Total
6 to 10	2	-	2
11 to 20	5	1	6
21 to 30	3	2	5
31 to 40	3	3	6
41 to 50	17	12	29
51 to 60	66	23	89
61 to 70	113	65	178
Total	**209**	**106**	**315**

The above table shows a preponderance of patients over the age of 50 years (267/315, 85%); 182 (58%) patients were in ASA classes 3 and 4. There were 25 (8%) patients who were in ASA class 5 and 201 (64%) patients were at high risk or expected to die. Thus information about the patients who died suggests that cardiothoracic surgeons operate on a population that includes patients that are older and at risk.

There were cases where the preoperative assessment was thought to be inadequate.

A 67-year-old man was admitted to a specialist hospital for the repair of a hiatus hernia. The preoperative manometry and pH measurements did not indicate severe gastro-oesophageal reflux, but nevertheless a thoracic surgeon booked the patient for surgery. The patient was known to have ischaemic heart disease and was taking coronary vasodilators and antihypertensives in addition to his anti-acid therapy. When surgery was first scheduled the patient arrived in theatre without premedication and was so anxious that he experienced severe chest pain and his surgery was cancelled. The patient's ECG showed severe ST segment depression but this was not seen by the anaesthetist. Seven weeks later the patient was readmitted for surgery. The anaesthetist did not see the ECG prior to anaesthetizing him for this final operation. This specialist unit did not have an HDU and the patient was returned directly to the surgical ward. The patient died two days after surgery from proven myocardial infarction and severe ischaemic heart disease.

In retrospect this man's symptoms were due to ischaemic heart disease and not oesophagitis. The preoperative assessment was inadequate and it was regrettable that this death followed an elective procedure for a non-life-threatening condition. It is to the credit of the anaesthetist involved that he wrote to NCEPOD under separate cover pointing to deficiencies in the preoperative assessment and also admitting that he had failed to see the relevant ECG which showed the ischaemic heart disease.

Table S21 (q2)
Type of hospital in which the final operation took place

University/teaching hospital	149
Surgical specialty hospital	74
District General hospital	70
Independent hospital	22
Total	**315**

The number of cases admitted as emergencies or urgently were equal to the number of elective cases (158 elective admissions versus 156 emergency or urgent admissions). In seven elective admissions the surgeon stated that the outcome was altered by time spent on a waiting list. There were four cases of coronary artery disease awaiting bypass surgery, a patient with a post viral cardiomyopathy awaiting cardiac transplantation and two patients with valvular disease. Similarly there were delays in admitting five emergency/urgent cases. The delay was thought to have affected the outcome in two cases. Patients awaiting cardiac transplant suffered delays that were due to availability of donors rather than any other reason.

Transfer took place in 112 cases, mainly from a DGH to a specialist centre (79/112, 71%). Not unexpectedly, the condition of six patients deteriorated between the time they were admitted to the DGH and the arrival at the tertiary centre. It is not clear whether deterioration occurred whilst in the DGH or during the transfer.

The surgical team

Table S22 (q1)
Specialty of consultant surgeon in charge at time of final operation

Cardiac - adult	135
Cardiothoracic	68
Thoracic	63
Cardiac - mixed	36
General with special interest in vascular surgery	4
Cardiac/transplantation	3
General	2
Cardiac - paediatric	2
Transplantation	1
Urology	1
Total	**315**

The advisors were pleased to note that 307 (97%) cases were dealt with by a surgeon specialised in the field of cardiothoracic surgery and its subspecialties. The number of cases treated by an apparently inappropriately experienced surgeon were small and even then the care delivered was usually very good.

A 29-year-old woman was treated by a general surgeon. The patient had Crohn's disease and was treated with high dose steroids; she developed a pneumonia. After five days in ICU for respiratory failure a laparotomy was done because of peritonitis; a mycotic splenic artery aneurysm was identified and ligated. Three days later a lung abscess was diagnosed and a thoracic surgeon called in. There was a bronchoabdominal fistula for which a right lower lobectomy was done. The patient died three days later of overwhelming sepsis and both the clinical and operative diagnoses were confirmed at postmortem examination.

This was a difficult case which was managed jointly by a general surgeon and thoracic surgeon. They both appeared to have done their best with a case that clearly had a poor prognosis. The high dose of steroids being received by this patient may well have influenced the outcome.

Table S23 (qs 34 and35)
The most senior grade of surgeon involved in decision-making prior to surgery

		(Locums)
Consultant	312	(5)
Associate specialist	1	
Senior registrar	2	

This table shows an extremely high commitment from consultants, associate specialists and senior registrars in this specialty. This is emphasised even more when it is realised that 35 operations were done "out-of-hours" during the week and 26 operations were done at weekends (giving a total of 61 cases, or 19% of the total, which were done at unsociable times).

Table S24 (qs 49 and 52)
Grade of most senior operating surgeon and the availability of a more senior surgeon

		(Locums)	Senior surgeon was immediately available in the operating room/suite
Consultant	283	(6)	-
Associate specialist	4		3
Senior registrar	22	(1)	15
Registrar	6		5
Total	**315**	**(7)**	

Teamwork is usual for many cardiothoracic procedures. Unfortunately information is lacking either because the operative records are inadequate or because the information is not returned to the Enquiry, such that it is difficult to know exactly what happened in some cases. Within the cardiothoracic team it would be of interest to know who did the cannulation for individual patients, who opened the chest etc. Performing a sternotomy for revision surgery can be hazardous and an appropriately experienced surgeon is required.

A 54-year-old man was to undergo surgery for recurrent angina after coronary artery grafting many years previously. During an early phase of the operation there was great difficulty in opening the pericardium and one of the old vein grafts was torn. This was repaired with some difficulty. From then on the procedure became more and more difficult culminating with a failure to get the patient off by-pass. The patient died on the operating table six hours after the operation commenced.

Who opened the chest in this case?

Which cases are suitable for training? Revisional surgery and unstable, acutely ill patients may not be appropriate situations for training a registrar.

A 53-year-old man was admitted urgently to a University Hospital because of unstable angina. The operation, a four vessel coronary artery bypass graft, was done by a registrar assisted by a consultant. This took nine hours following which the patient could not be weaned off cardiopulmonary bypass and died on the operating table.

The operating time was unusually long; this was not a proper case for training.

Table S25 (q57)
Classification of operation

Emergency	69
Urgent	73
Scheduled	95
Elective	70
Not answered	8
Total	**315**

Table S26 (qs 42 and 57)
Preoperative precautions or therapeutic manoeuvres to ensure adequate physiological function

	Emergency	Urgent	Scheduled	Elective	N/A
Total number of cases	**69**	**73**	**95**	**70**	**8**
Pulse rate recording	69	70	92	70	7
Blood pressure recording	69	71	92	70	8
Respiratory rate recording	63	62	77	59	7
Temperature	58	70	89	70	8
Central venous pressure measurement	48	33	22	18	1
Cardiac support drugs or anti-arrhythmic agents	47	31	20	22	4
Gastric aspiration	19	12	4	5	-
Intravenous fluids	53	36	30	20	1
Correction of hypovolaemia	31	15	8	9	1
Urinary catheterisation	48	31	23	22	1
Blood transfusion	23	6	2	4	1
Diuretics	28	24	26	20	2
Anticoagulants	7	10	12	7	-
Vitamin K	3	3	2	2	-
Antibiotics (pre- or intra-operative)	49	46	68	55	2
Bowel preparation	1	2	-	-	-
Chest physiotherapy	14	36	53	31	3
Oxygen therapy	58	45	31	19	2
Blood gas analysis	51	38	22	19	2
Pulse oximetry	44	33	32	20	1
Airway protection (e.g. in unconscious patients)	19	7	3	5	-
Tracheal intubation	33	19	12	13	1
Mechanical ventilation	33	19	11	12	-
Nutritional support	5	4	6	3	-
DVT prophylaxis	9	23	38	29	2
Others	3	3	7	1	-

N/A = not answered

Table S27 (q39)
Co-existing problems at time of final surgery

	$n = 315$
Respiratory	100
Renal	57
Haematological	21
Gastrointestinal	16
Vascular	29
Sepsis	19
Neurological	14
Endocrine (including diabetes mellitus)	23
Musculoskeletal	6
Psychiatric	4
Alcohol-related problems	4
Genetic abnormality	1
Other	30

NB this can be a multiple entry

Use of resources

Most hospitals were able to offer a full range of support services. However on one occasion when an orthopaedic surgeon appropriately resuscitated a case of chest trauma before handing the patient over to a thoracic surgeon, there was no CT scanner available. Should a unit without suitable scanning facilities admit trauma cases?

Following surgery, 213 patients were admitted to either an ICU or an HDU. Only eight patients required subsequent readmission to an ICU/HDU; this demonstrates that the admission and discharge policies for ICU/HDU were appropriate and worked well in this specialty.

Following an oesophagogastrectomy, it is good practice to nurse a patient in an HDU/ICU.

Table S28 (q74)
Postoperative complications

	n=257*
Low cardiac output	133
Renal failure	76
Cardiac arrest	71
Respiratory distress	66
Haemorrhage/postoperative bleeding requiring transfusion	50
Generalised sepsis	34
Stroke or other neurological problems	22
Hepatic failure	21
Other organ failure	19
Persistent coma	10
Endocrine system failure	8
Peripheral ischaemia	7
Anastomotic failure	5
Wound infection	5
Wound dehiscence	4
DVT and/or pulmonary embolus	4
Upper respiratory obstruction	2
Nutritional problems	2
Problems with analgesia	2
Other	22

NB this can be a multiple entry

* 58 patients died in theatre

Table S29 (qs 46 and 76)
Days from operation to death

Same day	86
Next day	29
2 days	29
3 days	25
4 days	15
5 days	9
6 to 10 days	54
11 to 15 days	31
16 to 20 days	19
21 to 30 days	18
Total	**315**

Colorectal Surgery

NCEPOD wishes to thank the consultants in colorectal surgery who acted as advisors in the preparation of this section:

Mr B D Hancock	(North Western)
Mr R J Nicholls	(North East Thames)
Mr B A Taylor	(Mersey)
Mr M R Thompson	(South Western)
Mr W H F Thomson	(South Western)
Mr J Thornton Holmes	(East Anglia)

Key issues

- The detection of anastomotic leakage is difficult and sometimes delayed and diagnostic proctograms may be helpful.
- When laparoscopically-assisted colorectal resections are not progressing satisfactorily this should be acknowledged and the procedure converted to a conventional approach.
- Rare colorectal conditions should be referred to a surgeon with the appropriate experience.
- There should be serious scrutiny of policies in those hospitals which still fail to provide emergency theatres on a 24-hour basis.

Sample

There were 491 questionnaires received concerning deaths following colorectal procedures. These questionnaires were submitted by surgeons working in 213 hospitals.

Table S30 (q54)
List of procedures

These may be multiple for individual patients and the list also includes coincidental procedures undertaken simultaneously.

Surgery for malignancy

Right hemicolectomy	43
Hartmann's procedure	35
Laparotomy and transverse colostomy	29
Sigmoid colostomy	28
Laparotomy only ("open and close")	26
Ileotransverse bypass	23
Anterior resection of rectum	18
Abdominoperineal resection of rectum	13
Sigmoid colectomy	11
Left hemicolectomy	9
Caecostomy	9
Subtotal colectomy	6
Transverse colectomy	2
Colo-colic bypass	2
Sigmoidoscopy and biopsy	2
Transanal excision of rectal tumour	1
Removal of pack	1

Surgery for benign conditions

Hartmann's procedure for complicated diverticular disease	30
Right hemicolectomy	28
Laparotomy only	25
Hartmann's procedure (other than for diverticular disease)	21
Defunctioning loop ileostomy	19
Laparotomy for anastomotic dehiscence	15
Total colectomy and ileostomy	14
Subtotal colectomy	13
Sigmoid colectomy	9
Small bowel resection	9
Sigmoid loop colostomy	8
Laparotomy for postoperative bleeding	7
Incision and drainage of abscess	6
Refashioning of colostomy	5
Closure of intestinal fistula	5
Appendicectomy	4
Division of adhesions	4
Total colectomy and ileorectal anastomosis	4
Panproctocolectomy and ileostomy	4
Cholecystectomy	4
Primary repair of colonic perforation	4
Transverse colostomy	3
Left hemicolectomy	3
Reduction of sigmoid volvulus	3
Resuture of abdominal dehiscence	3
Removal of packs	3
Formation of urinary conduit	3
Gastroscopy	3
Reversal of Hartmann's procedure	2
Procedures for rectal prolapse	2
Closure of colostomy	2
Splenectomy	2

Refashioning of ileostomy	2
Debridement for necrotizing fasciitis	2
Division of adhesions	2
Excision of rectal stump	2
Partial gastrectomy	2
Anal dilatation	2
Closure of urinary fistula	2
Miscellaneous	11
(one each of: restorative panproctocolectomy and ileal pouch, closure of ileostomy, rectal polypectomy, dilatation of stoma, manual evacuation of faeces, flexible sigmoidoscopy, banding of piles, nephrectomy, biopsy of inguinal node, repair of incisional hernia and biopsy of skin lesion)	

The advisors considered that almost all of the procedures were appropriate. However, there were criticisms of a small number of cases. The following are three examples.

A surgeon with a colorectal interest operated on a 22-year-old patient with cerebral palsy. Twenty-four days previously the patient had been operated on by another consultant general surgeon for intestinal obstruction. A defunctioning colostomy had been done but it transpired that the wrong piece of colon was brought out. The patient's condition deteriorated until the second surgeon re-operated. By this time there was a ruptured caecum with faecal peritonitis and despite appropriate surgery the patient died five days later.

There is no criticism of the second surgeon who completed the questionnaire but the actions of the first surgeon are questionable.

A locum consultant general surgeon operated electively on a fit woman with an extensive anorectal tumour. Histology showed a cloacogenic carcinoma. The tumour was stuck to the pelvic wall, uterus and vagina. There was considerable bleeding which necessitated further surgery one hour after the patient was initially admitted to the recovery area. The patient bled to death the same day.

This was an extensive, rare tumour. Were alternative treatments considered? Should the patient have had surgery at all?

A 69-year-old man had a carcinoma of the rectum, chronic obstructive airways disease and ischaemic heart disease. He was also hepatitis B positive and was classed as ASA 3. An established consultant general surgeon, who claimed to have done 100 laparoscopic procedures in the previous year, did a laparoscopically assisted anterior resection of the rectum. There was difficulty in mobilising the rectum and the whole procedure took five hours. In the postoperative period there was a wound infection, an abdominal dehiscence and generalised sepsis leading to death.

At the time of this operation laparoscopic procedures such as this were in their infancy. This patient presented a considerable challenge. Why did the surgeon embark on the operation in the first place and why did he persist when difficulties arose?

Audit

Table S31 (q91)
Has this death been considered at a local audit/quality control meeting?

Yes	425
No	50
Not answered	16
Total	**491**

Eighty-six per cent of the deaths were considered at an audit meeting. This is a gratifying improvement over the figure of 72% reported in the 1990 Report of the Enquiry[3] and similar to the 90% reported in 1991-92[4] for colorectal resections.

The problem of missing medical notes remains a major hindrance to audit.

Table S32 (qs 46 and 98)
Time between date of operation and completion of questionnaire by surgeon

Less than 1 month	12
1 month to 2 months	78
>2 months to 3 months	90
>3 months to 6 months	185
>6 months to 1 year	104
>1 year	22
Total	**491**

The authors and advisors acknowledge that there may be a delay in the report of the death to NCEPOD. The table above shows that 63% of questionnaires were not completed until more than three months after the operation, including 22 cases where the questionnaire was not completed for more than a year. Surgeons complained that the absence of the patient's case record made it quite impossible to complete the questionnaires earlier and return them to NCEPOD, highlighting yet again the problems of lost patients' notes.

Despite the difficulties of obtaining the notes, consultant surgeons took an active interest in the completion of the returns.

Table S33 (q93)
Who completed the questionnaire?

Consultant	261
Registrar	115
Senior house officer	57
Senior registrar	46
Staff grade	3
House officer	3
Associate specialist	1
Not answered	5

Of the 230 questionnaires not completed by a consultant, 170 were at least seen and agreed by a consultant surgeon, thus consultant surgeons had direct input into the content and accuracy of 88% (433/491) of the questionnaires. However, there were instances where, if the consultant in charge had seen the completed questionnaire, he might have been prompted to ask a few pertinent questions about the management of the case.

The postmortem is another form of audit. Problems surrounding communication between surgeon and pathologist and the value of the postmortem are discussed in the pathology section.

Patient profile

Table S34 (qs 5 and 6)
Age and sex of patient at final operation

Years	Male	Female	Total
6 to 10	1	-	1
11 to 20	2	1	3
21 to 30	1	2	3
31 to 40	5	1	6
41 to 50	16	25	41
51 to 60	57	41	98
61 to 70	177	162	339
Total	**259**	**232**	**491**

One-hundred-and-forty-five patients were in ASA classes 1 to 2, 289 were in classes 3 to 4 and 29 were in ASA class 5 (i.e. moribund). The advisors questioned the wisdom of surgery in many of these ASA 5 patients. The information on ASA class was unavailable in 28 cases. Surgeons were asked about their assessment of the risk. They estimated that there was a definite risk of death in 270 (55%) cases and that death was expected in 20 cases.

Table S35 (q12)
Initial admission intention for the final operation

		%
Elective	130	*26.5*
Urgent	101	*20.6*
Emergency	257	*52.3*
Not answered	3	*0.6*
Total	**491**	

There was a preponderance of emergency/urgent admissions. In addition the advisors thought that four of the "elective" admissions should have been classified as urgent. The majority (384/491, 78.2%) occurred during normal weekdays; the remainder occurred at weekends, or on public or extra-statutory NHS holidays.

None of the admissions had been cancelled previously but the outcome in four cases was considered to have been altered by the time spent on the waiting list. In a further four (0.8%) cases out-patient delays whilst waiting for a barium enema allowed an unnecessary deterioration in the patient's condition.

Delays in referral occurred in 40 (11.2%) urgent or emergency admissions. The causes were doctor-related in 16 (4.5%) cases, patient-imposed reasons in 14 (3.9%) cases, a combination of doctor- and patient-related causes in five cases and a variety of reasons in a further four cases.

A 62-year-old woman was referred for surgery when her colon perforated as a result of a toxic megacolon. She was extremely ill and the surgeon noted that the toxic dilatation had been present radiologically for 10 days but the referring physician had taken no action. A total colectomy, ileostomy and rectal mucous fistula was done. Three days later it was necessary to remove the rectal stump as this was also perforated. The patient died two days after this second operation; the cause of death was multiple organ failure.

There is no criticism of the surgical management but any delay in making the decisions is detrimental to a successful outcome for such a patient. We advise that such patients should be jointly managed by a (gastroenterological) physician and a colorectal surgeon and decisions about management should be made in a timely and collaborative way. (See also Anaesthesia, pages 60 and 70).

Transfers

Forty-eight patients were transferred, mainly from District General Hospitals to tertiary referral centres. There was no evidence that the outcome, in these patients who subsequently died, was affected by the transfer process itself.

Site of admission

Table S36 (q31)
Type of area to which the patient was first admitted

Medical ward	73
Geriatric ward	4
Surgical ward	347
Mixed medical/surgical ward	10
Gynaecological/obstetric ward	6
Paediatric ward	1
Admission ward	4
High dependency unit	3
Intensive care unit	7
A&E holding area (or emergency admission ward)	11
Direct to theatre	4
Other	3
Not answered	18
Total	**491**

Ten cases were reported where the site of admission was thought to be inappropriate. Six of these cases were initially admitted to either medical or geriatric wards, two cases were in surgical wards when an ICU would have been more fitting, one case was originally admitted to an inappropriate hospital and there was no explanation given in one case. The advisors acknowledged the surgeons' comments about the inappropriate admissions but considered that the events were understandable.

The surgical team

Table S37 (q1)
Specialty of consultant surgeon in charge at time of final operation

General with special interest in gastroenterology/colorectal surgery	222
General	98
General with special interest in vascular surgery	89
General with special interest in urology	30
General with special interest in breast surgery	13
General with special interest in surgical oncology	8
General with special interest in endocrinology	5
General with special interest in paediatric surgery	6
General with special interest in transplantation	3
Urology	3
Gynaecology	6
Vascular surgery	2
General with special interest in hepatobiliary surgery	2
General with special interest in urology and vascular surgery	2
General with special interest in head and neck surgery	1
Paediatric	1
Total	**491**

The advisors considered that the spread of interests shown here were acceptable, given the degree of specialism of British surgery and the fact that 358 (73%) cases were emergency/urgent admissions. General surgeons and those with an interest in gastroenterology or colorectal surgery were responsible for the care of 65% of these patients.

Table S38 (qs 1 and 57)
Specialty of consultant surgeon in charge at time of final operation/classification of operation

	Emergency	Urgent	Scheduled	Elective	N/A
Total number of cases	**108**	**219**	**134**	**28**	**2**
General	27	47	19	5	-
General with special interest in:					
paediatric surgery	1	2	3	-	-
urology	8	14	7	1	-
vascular surgery	27	38	17	5	2
gastroenterology	35	85	69	9	-
endocrinology	-	4	1	-	-
colorectal surgery	4	9	5	5	-
surgical oncology	2	3	3	-	-
breast surgery	2	9	1	1	-
head and neck surgery	-	-	1	-	-
transplantation	-	1	1	1	-
hepatobiliary surgery	-	1	1	-	-
urology and vascular surgery	-	-	2	-	-
Gynaecology	1	3	2	-	-
Paediatric	-	1	-	-	-
Urology	-	1	2	-	-
Vascular surgery	1	1	-	-	-
Colorectal surgery	-	-	-	1	-

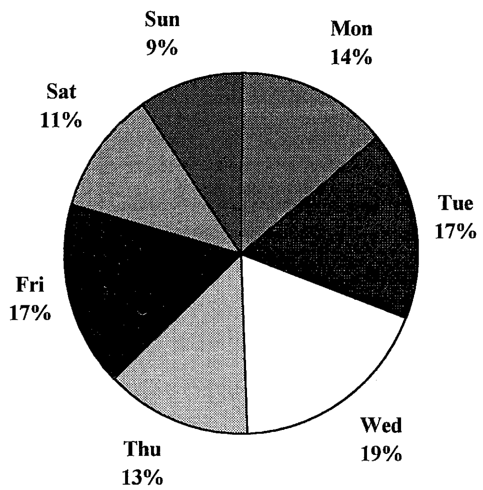
Table S46 (q42)
Methods of thromboembolic prophylaxis

	n=341
Subcutaneous heparin (fractionated and non-fractionated)	237
TED stockings	64
Inflatable boots/leggings	22
Patient on warfarin	2
Aspirin	2
Dextran	1
Not specified	58

The above tables are interesting in that they give an overview of the preoperative management of a group of patients undergoing a variety of colorectal procedures. The advisors commented on the acceptable use of thromboembolic prophylaxis (69% overall) but noted that the prophylaxis given to emergency and urgent admissions was lower (62%) in a group where the risks were higher and therefore the utilisation of prophylaxis should reasonably be expected to increase. There were 150 patients who did not receive prophylaxis; in 48 cases the surgeon replied that it was his usual practice not to use any prophylaxis. The advisors found this surprising as it is contrary to accepted current practice.

Time and day of surgery and type of operation

Figure S3
Day of operation



One-hundred-and-seven cases (22.1%) were performed between 18.01 hrs and 07.59 hrs Monday to Friday (NCEPOD's definition of "out-of-hours") and 101 (20.6%) cases were operated on at weekends. The time of operation (Monday to Friday) was not stated in 19 cases. On a Saturday, surgery was performed between 08.00 hrs and 13.00 hrs in 13 cases. Time of surgery was not stated in six Saturday cases and eight Sunday cases.

There were 16 cases where delays in getting a patient to the operating theatre were due to factors other than clinical. Eight of these were due to the lack of a suitable theatre at the time when the patient was considered fit for anaesthesia and surgery. **The advisors remarked that this situation had been commented on in previous reports from NCEPOD and that it was a situation which could and should be corrected.**

Following a two-month wait for a barium enema, an obese 70-year-old patient (ASA 3) presented as an emergency with intestinal obstruction and had a right hemicolectomy for a carcinoma of the ascending colon. Several days later she developed a postoperative small bowel obstruction which required a further laparotomy. The patient was prepared for theatre, on a consultant's advice, but there was no emergency theatre during the day-time and the operation was finally done by a registrar at 01.00 hours. The patient died two weeks later with multiple system failure.

There is now ample evidence that the introduction of a well-managed emergency theatre reduces delays and the number of cases done after midnight whilst allowing excellent opportunities for supervision and training.[18,19] **There must be serious scrutiny of all hospitals which fail to provide this necessary service for our patients.**

Other causes of delay were: patient choice (3), a delay in availability of blood products (1), inadequate bowel preparation (1), lack of a suitably senior surgeon (2) and one case where no explanation was given.

Table S47 (q74)
Postoperative complications

	n=482*
Cardiac problems	201
Generalised sepsis	160
Respiratory problems	130
Renal failure	113
Haemorrhage/postoperative bleeding requiring transfusion	41
Anastomotic failure	35
DVT and/or pulmonary embolus	31
Hepatic failure	28
Other organ failure	27
Wound infection	25
Nutritional problems	24
Stroke or other neurological problems	15
Wound dehiscence	8
Problems with analgesia	8
Urinary retention/catheter blockage	7
Peripheral ischaemia	6
Endocrine system failure	6
Urinary tract infection	4
Ureteric injury/fistula	3
Pressure sores	3
Miscellaneous other problems	48

NB this can be a multiple entry

* nine patients died in the operating theatre

There were 35 deaths following anastomotic failure and in addition 15 of the final operations were for an anastomotic dehiscence following a prior procedure. There seemed to be no relationship between these postoperative leaks and surgical experience.

Table S48 (qs 49, 52 and 74)
Anastomotic leakage: the grade of the most senior operating surgeon at the initial procedure and the availability of help

		(Locums)	Senior help was immediately available in the operating room/suite
Consultant	23	(2)	-
Senior registrar	3		-
Registrar	8	(1)	4
Staff grade	1		-

With the exception of the staff grade surgeon all the surgeons recorded a reasonable annual experience with colonic resections. The specialties of the surgeons in charge were: general/gastroenterology (20), general/urology (5), general/vascular (4), general (4), general/endocrinology (1) and urology (1). Leakage was often suspected too late. Diagnosis and management decisions in these situations can be difficult and should not be delegated or left to surgeons in training.

A 55-year-old epileptic patient developed a sigmoid volvulus. He was on long term warfarin because of mitral stenosis and aortic regurgitation with known vegetations on the aortic valve. Following discussion with a consultant surgeon, a registrar of six years experience did a sigmoid colectomy. The consultant did not attend. The patient died within 24 hours and a postmortem examination revealed an anastomotic breakdown and intra-abdominal haemorrhage.

In the opinion of the advisors, the management of this case was questionable. The anastomosis became necrotic within 24 hours suggesting poor technique and local haemorrhage. Should this case have been done by a consultant?

A previously fit 52-year-old man presented with intestinal obstruction. After four days of investigation an elective left hemicolectomy was done by a registrar supervised by the consultant. A primary anastomosis of the obstructed bowel was done and there was no covering colostomy. Seven days after surgery the patient developed septicaemia and was admitted to an ICU. He died nine days after surgery without any further intervention. A postmortem showed an anastomotic leak and peritonitis.

The anastomotic leak was neither detected nor treated.

A 67-year-old man was referred with a carcinoma of the rectum. He also suffered from diabetes mellitus. He was admitted three days before Christmas. A consultant surgeon performed an anterior resection of the rectum the following day. During the Christmas period the patient was unwell but, although an anastomotic leak was suspected, no action was taken and the patient died five days after surgery. Postmortem examination showed an acute purulent peritonitis.

There was a suspicion of an anastomotic failure in this case but nothing was done. Was it relevant that these events took place over a public holiday?

The management of patients who have developed an anastomotic leak is not easy and should not be delegated to inexperienced surgeons. When an anastomotic leak is recognised there is often inactivity and the outcome is inevitable. The three vignettes above are illustrations of these problems.

Venous thromboembolism

There were 31 patients who died in whom a venous thrombosis or pulmonary embolus occurred. Twenty-six of these patients had received some form of prophylaxis, despite which there was a thromboembolic complication.

Medication

In 28 cases the surgeon thought that the patient's medication influenced the outcome. The main problems were related to long-term corticosteroid therapy associated with sepsis or anastomotic failure. Anticoagulants (given therapeutically) and cytotoxics were also cited.

Use of ICU or HDU

Table S49 (qs 67 to 73)
Was the patient admitted immediately to an ICU/HDU postoperatively?

ICU	193
HDU	27
Neither of the above	260
Died in theatre	9
Not answered	2
Total	**491**

In addition, 36 patients were admitted to ICU/HDU after an initial period on a general postoperative ward.

There were 12 cases in which the patient could not be admitted to an ICU/HDU. The reasons given were:

No ICU/HDU available	6
Non-availability of bed	5
No HDU available (admitted to ICU)	1

The inability to admit patients to an ICU adversely influences the chance of survival.

A patient had a potentially curative abdominoperineal resection of the rectum, done by a consultant. Five days later she deteriorated and a second laparotomy demonstrated a mesenteric venous thrombosis. A portion of small bowel was resected with a primary anastomosis. There was no ICU bed available so the patient was extubated in the recovery area and then observed there for 10 hours before being returned to a general surgical ward. There was no subsequent admission to ICU although the patient died 10 days after the second laparotomy. The cause of death was multisystem failure.

Table S50 (q72)
Discharge from ICU/HDU was due to:

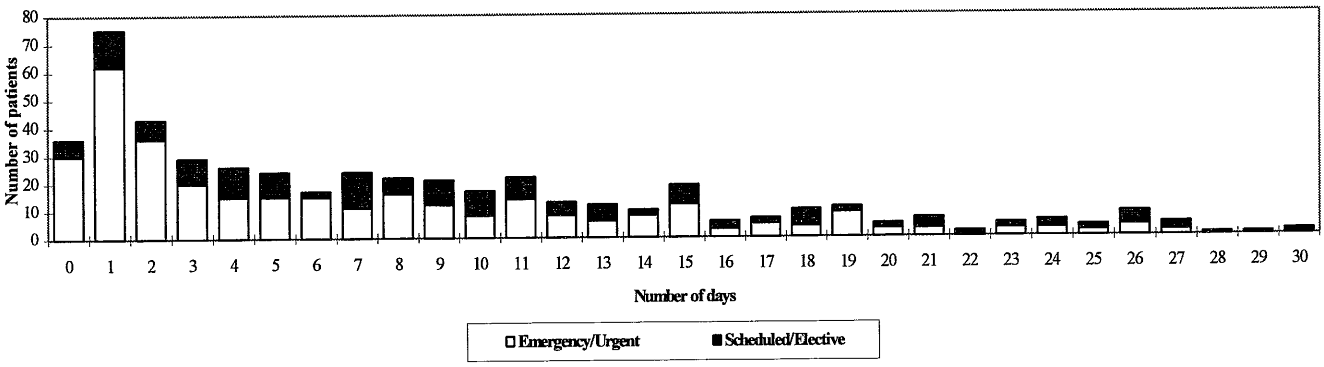
	n=256
Death in ICU/HDU	186
Elective transfer to ward	59
Pressure on beds necessitating discharge to ward	3
Transfer to HDU from ICU or vice versa	2
Transfer to another hospital for ICU	1
Not answered	5

Table S51 (qs 46 and 76)
Calendar days from operation to death (i.e. not 24-hour periods)

Same day	36
Next day	75
2 days	43
3 days	29
4 days	26
5 days	24
6 to 10 days	101
11 to 15 days	76
16 to 20 days	39
21 to 30 days	42
Total	**491**

This table demonstrates the initially high number of deaths following surgery for colorectal diseases. This should be interpreted in the light of the high percentage of emergency/urgent admissions in patients who are severely compromised at presentation; 65% (318/491) of the sample were in ASA classes 3, 4 & 5.

Figure S4
Number of calendar days between operation and death by classification of operation



For comment on the presentation and implications of Figure S4, see text on page 119 below Figure S2.

General Surgery

NCEPOD wishes to thank the advisors in general surgery.

Mr T Bates	(South East Thames)
Mr M B Clague	(Northern)
Mr J F Clegg	(Mersey)
Mr J F Colin	(East Anglia)
Professor T G Parks	(Northern Ireland)
Mr A Radcliffe	(Wales)
Mr J E L Sales	(North West Thames)
Mr M Whittaker	(Yorkshire)

Sample

There were 1149 questionnaires returned to the Enquiry from 264 hospitals.

Table S52 (q54)
List of procedures

In view of the large numbers involved, the operations done under the description of general surgery have been broken down into smaller groups in this table according to the procedures performed or the pathology involved.

Hernia surgery
(may be multiple and includes coincidental procedures undertaken simultaneously)

There were 29 deaths associated with hernia surgery in the sample.

Uncomplicated unilateral inguinal hernia repair	6
Laparoscopic inguinal hernia repair	1
Strangulated inguinal hernia repair	4
Uncomplicated femoral hernia repair	1
Strangulated femoral hernia repair	2
Incisional hernia repair	9
Paraumbilical hernia repair	3
Epigastric hernia repair	1
Resection of gangrenous small bowel	4
Laparotomy for postoperative haemorrhage	1

Breast surgery

Mastectomy +/- axillary node sampling or clearance	5
Resuturing of wound dehiscence	1

Oesophageal surgery
(may be multiple and includes coincidental procedures undertaken simultaneously)

One-hundred-and-forty-six deaths associated with oesophageal surgery were reviewed by the advisors in general surgery.

Oesophagectomy (all approaches for malignant disease)	43
Endoscopic dilatation and intubation (carcinoma)	34
Diagnostic fibreoptic oesophagogastroduodenoscopy	34
Oesophageal transection of oesophageal varices	11
Endoscopic sclerotherapy for oesophageal varices	6
Oversewing of oesophageal varices	4
Insertion of Minnesota/Sengstaken tube for oesophageal varices	3
Thoracotomy for anastomotic leak following oesophagectomy	3
Drainage of empyema	2
Thoracotomy only	2
Miscellaneous (one each of: gastroenterostomy, insertion of Hickman line, cholecystectomy, thoracotomy & ligation of thoracic duct, endoscopic laser resection of oesophageal tumour, oesophagoscopy & dilatation of stricture, liver biopsy, retrosternal oesophageal bypass, replacement of gastrostomy tube, transthoracic revision of fistula following previous laparoscopic fundoplication)	10

(NB there are also oesophageal procedures in the section on Cardiothoracic Surgery)

Surgery for the complications of peptic ulcer
(may be multiple and includes coincidental procedures undertaken simultaneously)

There were 109 deaths in this sample which were associated with surgery for complications of peptic ulceration (including bleeding mucosal lesions e.g. Dieulafoy's erosions and erosive gastritis).

Bleeding gastric ulcer	
Under-running of bleeding ulcer	10
Partial gastrectomy	5
Truncal vagotomy and pyloroplasty	3
Total gastrectomy	1
Perforated gastric ulcer	
Biopsy or excision and simple closure	19
Partial gastrectomy	3
Truncal vagotomy and pyloroplasty	1
Truncal vagotomy and antrectomy	1
Bleeding duodenal ulcer	
Under-running of bleeding ulcer	27
Truncal vagotomy and pyloroplasty	15
Gastroenterostomy	5
Partial gastrectomy	2
Laparotomy only	1
Duodenotomy and injection of ulcer	1
Endoscopy only	1
Perforated duodenal ulcer	
Oversewing and/or omental patch	44
Gastroenterostomy (alone)	3
Truncal vagotomy and gastroenterostomy	2
Truncal vagotomy and pyloroplasty	1
Partial gastrectomy	1
Miscellaneous (one each of; tracheostomy, feeding jejunostomy, gastric lavage only and insertion of A-V shunt for haemodialysis)	4

Gastric surgery
(may be multiple and includes coincidental procedures undertaken simultaneously)

There were 122 deaths related to gastric surgery other than that for peptic ulcer disease. Most were for the treatment of gastric cancer. In addition, many of the "open and shut" laparotomies listed under abdominal surgery were for inoperable malignancy thought to arise from the stomach. As the diagnosis was not always confirmed these cases have been included in the abdominal surgery list..

Palliative gastroenterostomy for obstructing carcinoma	29
Partial gastrectomy for carcinoma	27
Total gastrectomy for carcinoma	14
Feeding gastrostomy	9
Closure of gastric perforation	7
Laparotomy and biopsy only	7
Endoscopic feeding gastrostomy	6
Feeding jejunostomy	3
Laparotomy for bleeding from suture line	3
Transverse colectomy	2
Enteroenterostomy	2
Miscellaneous (one each of: excision of gastrocolic fistula, gastroscopy only, revision of gastroenterostomy, repair of duodenal tear, resuture of duodenal stump, cholecystectomy, splenectomy, distal pancreatectomy)	8

Hepatopancreaticobiliary surgery (including splenic surgery but excluding trauma) (may be multiple and includes coincidental procedures undertaken simultaneously)

There were 192 deaths related to surgery of the liver, biliary system, pancreas and spleen. Cases where trauma was involved have been listed separately.

Bypass surgery for malignant obstructive jaundice	42
Open cholecystectomy (all indications)	35
Pancreatic necrosectomy	18
Laparotomy only (with/without biopsy)	16
Exploration of common bile duct	10
Pancreaticoduodenectomy	9
Hepaticojejunostomy	7
Laparotomy for postoperative bleeding	8
Laparotomy and liver biopsy	7
Splenectomy for splenomegaly	6
Choledochoduodenostomy	5
Drainage of intra-abdominal abscess	5
Splenectomy for various haematological conditions	4
Revision of anastomosis	4
Distal pancreatectomy	4
Liver transplant	4
Removal of packs	3
Tracheostomy	3
Partial gastrectomy	2
Gastrostomy	2
Repair of liver lacerations caused by needle biopsy	2
Percutaneous stenting for obstructive jaundice	2
Resection of splenic artery aneurysm	2
Pancreatic biopsy	2
Laparoscopic cholecystectomy	2
Miscellaneous (including one each of: coeliac plexus block, cholecystostomy, dilatation of duodenal stricture, gallstone ileus, pancreaticocystgastrostomy, excision of choledochal cyst, gastrojejunostomy, oversewing of perforated duodenal ulcer, repair of incisional hernia, negative laparotomy, hepatic resection for metastases, laparoscopic liver biopsy, ligation of hepatic artery)	13

Abdominal surgery
(may be multiple and includes coincidental procedures undertaken simultaneously)

This group is large; there were 405 deaths following abdominal surgery (excluding colorectal disease and appendicectomies).

"Open and shut" laparotomy for widespread malignancy	103
Laparotomy for acute mesenteric ischaemia with/without small bowel resection	65
Laparotomy for adhesive obstruction with/without small bowel resection	39
Laparotomy for obstruction due to widespread malignancy with small bowel bypass or resection	38
Laparotomy for intra-abdominal bleeding (all causes except trauma)	19
Drainage of intra-abdominal abscess (all sites)	17
Exploratory laparotomy	15
Negative laparotomy	15
Diagnostic laparoscopy for ascites	13
Laparotomy for peritonitis of unknown cause	11
Insertion of peritoneo-venous shunt for ascites	10
Closure of small bowel fistula / perforation	8
Laparotomy for breakdown of small bowel anastomosis	6
Debridement for necrotising fasciitis including defunctioning ileostomy	5
Repair of caecal perforation	5
Laparotomy and biopsy of abdominal mass	4
Resuture of abdominal wound dehiscence	4
Laparotomy and small bowel resection (other than malignancy, adhesions and ischaemia)	3
Repair of duodenum	2
Revision of jejunostomy	2
Repair incisional hernia	2
Miscellaneous (one each of: laparotomy to remove foreign bodies, correction of ileocaecal volvulus, laparotomy for acute gastric dilatation, transverse colostomy, oversewing of bleeding duodenal ulcer, repair of perforated oesophagus, drainage of abdominal wall abscess, laparotomy for pancreatitis, repair of inguinal hernia in presence of intra-abdominal malignancy, excision biopsy)	10

Appendicectomy
(may be multiple and includes coincidental procedures undertaken simultaneously)

There were 10 deaths following an appendicectomy. The reasons for the procedure are given below.

Acute appendicitis (with/without drainage of paracolic or intra-abdominal abscess)	6
Negative laparotomy	3
Pseudo-obstruction (incidental appendicectomy)	1

Trauma
(may be multiple and includes coincidental procedures undertaken simultaneously)

There were 58 deaths related to general surgical procedures following trauma. Any coincidental orthopaedic procedures are not included in the list.

Exploratory laparotomy for bleeding (without specific organ damage)	20
Splenectomy	20
Exploratory laparotomy and thoracotomy for bleeding	12
Packing of liver tears	5
Hepatic lobectomy	4
Repair of liver tears	4
Repair of diaphragm	4
Delayed rupture of subcapsular splenic haematoma	3
Nephrectomy	2
Repair of mesenteric tears	2
Miscellaneous (one each of: insertion of chest drain, adrenalectomy, repair of carotid artery, repair of jugular vein)	4

Renal transplant

There were nine deaths associated with renal transplantation.

Cadaver renal transplant	4
Miscellaneous (one each of: laparotomy for bleeding, laparotomy for node biopsy, nephrectomy and aortic repair, tracheostomy, removal of pack)	5

Endoscopy
(may be multiple and includes coincidental procedures undertaken simultaneously)

There were 13 deaths following an endoscopy.

Oesophagogastroduodenoscopy	9
ERCP with/without sphincterotomy or stenting	3
Bronchoscopy	2

Miscellaneous
(may be multiple and includes coincidental procedures undertaken simultaneously)

There were 51 deaths where the final operation did not fall comfortably into the above groups.

Debridement for necrotising fasciitis	11
Biopsy of lymph nodes (various sites)	8
Thyroidectomy	4
Debridement of leg ulcers	4
Debridement of bed sores	3
Pelvic EUA for malignancy or suspected sepsis	3
Biopsy of subcutaneous deposit	3
Debridement of wound	2
Debulking of tumour	2
Miscellaneous (one each of: insertion of peritoneal dialysis catheter, insertion of Hickman line, avulsion of great toe nail, drainage of ischiorectal abscess, drainage of multiple abscesses, drainage of ascites, evacuation of haematoma abdominal wall, wide excision of skin tumour, thoracic duct cannulation, tracheostomy, adrenalectomy)	11

Audit

Of the 1149 deaths, 1001 cases were considered at an audit meeting. Thirty-three questionnaires did not contain any information about local audit.

There were 463 postmortem examinations done in this group (463/1149, 43%). Of these, 115 were hospital examinations and 348 were ordered by Coroners (see Pathology section).

Table S53 (q93)
Who completed the questionnaire?

Consultant	645
Associate specialist	8
Senior registrar	101
Registrar	254
Staff grade	9
Senior house officer	112
House officer	5
Other	3
Not answered	12
Total	**1149**

Patient profile

Table S54 (qs 5 and 6)
Age and sex of patient at final operation

Years	Male	Female	Total
6 to 10	3	1	4
11 to 20	13	14	27
21 to 30	17	8	25
31 to 40	31	22	53
41 to 50	71	44	115
51 to 60	160	101	261
61 to 70	405	259	664
Totals	**700**	**449**	**1149**

The sample included patients aged 6 to 70 years. The majority of patients presented were in the older age groups; 80% (925/1149) being over 50 years old. There were four children aged between 6 and 10 years who died. These were three cases of multiple trauma and one child with a delayed referral (question 23) for acute appendicitis.

Table S55 (q40)
ASA class (see glossary, Appendix C)

	Surgical questionnaires *n*=1149	Anaesthetic questionnaires *n*=837
ASA class 1	38	26
ASA class 2	239	142
ASA class 3	336	226
ASA class 4	358	292
ASA class 5	95	149
Not answered	83	2

Sixty-nine percent (789/1149) of these patients who died were judged by surgeons to be in ASA classes 3, 4 and 5 at the time of presentation.

Table S56 (q39)
Co-existing problems at time of final surgery

	n=1149
Respiratory	407
Cardiac	353
Gastrointestinal	274
Sepsis	202
Renal	193
Haematological	167
Neurological	108
Endocrine (including diabetes mellitus)	105
Vascular	96
Musculoskeletal	80
Alcohol-related problems	66
Psychiatric	27
Genetic abnormality	8
Drug addiction	3
Other	162
None	14
Not answered	172

NB this can be a multiple entry

There were many coexisting diseases present at the time of the final operation.

Table S57 (q12)
Initial admission intention for the final operation

Elective	252
Urgent	232
Emergency	664
Not answered	1
Total	**1149**

Seventy-eight percent (896/1149) of these cases were either urgent or emergency admissions. There were delays in referral in 86 cases (question 23); in retrospect (question 23A) these were divided between doctor-related and patient-related causes and in only one case did delay affect the outcome (question 24B). Lack of resources was not an issue (question 24A) and outpatient investigations, time spent on waiting lists and previous cancellations were not thought to have made any contribution to the deaths of these patients (questions 24A and B).

The surgical team

Table S58 (q1)
Specialty of consultant surgeon in charge at time of final operation

General surgery (with or without special interests)	1096
Cardiothoracic	11
Gynaecology	9
Orthopaedic	4
Otorhinolaryngology	2
Paediatric	1
Plastic	2
Transplantation	13
Urology	10
Vascular	1
Total	**1149**

Twenty-six percent (302/1149) of the patients were managed jointly between general surgeons and another specialty.

Table S59 (qs 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

		(Locums)
Consultant	1029	(37)
Associate specialist	5	(-)
Senior registrar	55	(2)
Registrar	55	(4)
Staff grade	2	(-)
Senior house officer	2	(-)
Not answered	1	
Total	**1149**	**(43)**

Table S60 (qs 49 and 52)
Grade of the most senior operating surgeon and the availability of a more senior surgeon

		(Locums)	Senior surgeon was immediately available in the operating room/suite
Consultant	710	(36)	n/a
Associate specialist	12	(1)	5
Senior registrar	152	(10)	45
Registrar	230	(21)	66
Staff grade	12	(-)	5
Senior house officer	23	(-)	9
Clinical assistant	4	(-)	-
Other	3	(1)	1
Not answered	3		
Total	**1149**	**(69)**	

Hospital type and resources available

Table S61 (q2)
Type of hospital in which the final operation took place

District General	835
University/teaching hospital	289
Surgical speciality hospital	10
Other acute/partly acute hospital	3
Non-NHS hospital	12
Total	**1149**

There were 105 patients who were transferred from other hospitals (question question 25); 46 of these were from within the same district or Trust (questions 27 and 28). Only two cases were referred to another hospital from a non-NHS hospital. There were minimal problems with deterioration of the patient's condition (question 30) during transfer (3/105, 2.8%).

Table S62 (q66)
Services available in the hospital in which the final operation took place

Theatre recovery area	1003
Adult ICU	1000
Adult HDU	290
Paediatric ICU/HDU	195
None of the above	12
Not answered	21

NB this can be a multiple entry

There were 146 cases when it seems that a recovery area was not available although the reasons for this are not stated.

In all, 526 patients were admitted to an ICU either immediately after surgery or subsequently when problems arose (questions 67 and 68). Forty-two patients could not be admitted to an ICU in the hospital where the surgery took place (question 69). In 12 cases admission was achieved by transfer to another hospital; in these cases the problem at the original hospital (question 69) was the lack of beds (six cases), the absence of an ICU (two cases) and was not specified in four cases. Admission to an ICU was delayed in three cases due to an initial lack of beds. In the remaining cases the reasons for non-admission to an ICU, despite the need, were given as non-availability of beds, lack of an ICU and lack of staff (question 69).

Day and time of surgery and type of operation

Table S63 (qs 46, 47 and 57)
Day of operation

		(Emergency operations)	(Out-of-hours 18.01 to 07.59 and weekends)
Monday	178	(45)	(51)
Tuesday	186	(41)	(51)
Wednesday	196	(45)	(50)
Thursday	206	(51)	(58)
Friday	179	(49)	(52)
Saturday	116	(47)	(116)
Sunday	88	(42)	(88)
Total	**1149**	**(320)**	**(466)**

Table S64 (qs 46 and 49)
Who operates and when?

n=1149

Grade of most senior operating surgeon	M	T	W	Th	F	Sa	Sun	Total
Consultant	112	122	126	130	106	67	47	710
Associate specialist	3	3	1	1	3	-	1	12
Senior registrar	19	22	30	26	22	17	16	152
Registrar	40	29	34	42	37	27	21	230
Staff grade	1	3	-	1	5	2	-	12
Senior house officer	2	4	5	4	4	2	2	23
Clinical assistant	-	1	-	1	1	-	1	4
Other	-	2	-	-	1	-	-	3
Not answered	1	-	-	1	-	1	-	3

During the weekdays, 262 operations were performed "out-of-hours" i.e. between 18.01 and 07.59 hrs. The time of operation was not stated on 77 questionnaires (question 47).

Table S65 (q47)
Time of start of operation (Monday to Friday inclusive)

Grade of the most senior operating surgeon	08.00 to 18.00	18.01 to 07.59 "Out of hours"	Not answered
Consultant	428	134	34
Associate specialist	10	1	-
Senior registrar	73	39	7
Registrar	92	74	16
Staff grade	7	3	-
Senior house officer	12	7	-
Clinical assistant	-	2	1
Other	1	2	-
Not answered	1	-	1

Table S66 (qs 42 and 57)

Preoperative precautions or therapeutic manoeuvres to ensure adequate physiological function/ classification of the final operation

	Emergency	Urgent	Scheduled	Elective	N/A
Total number of cases	**320**	**409**	**336**	**76**	**8**
Pulse rate recording	316	403	330	73	7
Blood pressure recording	316	404	331	72	7
Respiratory rate recording	273	344	254	53	5
Temperature	276	395	315	65	7
Central venous pressure measurement	171	140	34	15	4
Cardiac support drugs or anti-arrhythmic agents	67	84	29	9	1
Gastric aspiration	204	268	112	22	5
Intravenous fluids	298	373	231	30	7
Correction of hypovolaemia	261	284	106	16	5
Urinary catheterisation	262	292	119	32	5
Blood transfusion	167	96	64	11	3
Diuretics	32	45	31	10	-
Anticoagulants	21	35	25	10	1
Vitamin K	32	37	48	4	-
Antibiotics (pre- or intra-operative)	221	312	205	38	3
Bowel preparation	3	9	19	4	-
Chest physiotherapy	49	112	102	15	1
Oxygen therapy	206	181	51	15	2
Blood gas analysis	166	151	51	11	2
Pulse oximetry	156	152	62	14	3
Airway protection (e.g. in unconscious patients)	50	33	13	3	1
Tracheal intubation	106	69	30	10	2
Mechanical ventilation	96	71	25	8	2
Nutritional support	34	52	35	7	-
DVT prophylaxis	120	218	218	44	3
Others	12	13	13	7	-

N/A = not answered

NB this can be a multiple entry

In 34 cases there were delays in operating after admission due to non-clinical factors (question 58). These organisational delays included the lack of an available theatre (17), waiting for various investigation results (4), no bed in ICU (3), lack of an anaesthetist (1), shortage of theatre nurses (1), lack of a suitably experienced surgeon (1), patient not starved (1) and not specified (6).

Postoperative complications

Table S67 (q74)

Postoperative complications	*n*=1097*
Respiratory distress	292
Low cardiac output	248
Generalised sepsis	247
Renal failure	240
Cardiac arrest	166
Haemorrhage/postoperative bleeding requiring transfusion	148
Hepatic failure	98
Nutritional problems	63
Other organ failure	63
Anastomotic failure	55
DVT and/or pulmonary embolus	39
Persistent coma	37
Wound infection	35
Stroke or other neurological problems	33
Endocrine system failure	15
Problems with analgesia	15
Wound dehiscence	13
Pressure sores	9
Peripheral ischaemia	10
Urinary retention/catheter blockage	5
Upper respiratory obstruction	5
Ureteric injury/fistula	3
Urinary tract infection	3
Fat embolus	1
Other	104
Not specified	2

NB this can be a multiple entry

* 52 patients died in the theatre

Table S68 (qs 46 and 76)
Calendar days from operation to death (i.e. not 24-hour periods)

Same day	119
Next day	134
2 days	105
3 days	70
4 days	68
5 days	62
6 to 10 days	226
11 to 15 days	154
16 to 20 days	95
21 to 30 days	116
Total	**1149**

Venous thromboembolism and prophylaxis

There were 39 (3.7%) instances of thrombosis and pulmonary embolism. Some form of prophylaxis was used in 603 (52%) patients (question 42).

Table S69 (q42)
Use of thromboembolic prophylaxis

	n=603
Heparin (fractionated and unfractionated)	359
TED stockings	184
Intermittent compression (inflatable boots etc.)	39
Patient on warfarin/anticoagulation	6
Dextran	3
Active mobilisation	1
Tubigrip	1
Not specified	106

NB this can be a multiple entry

Gynaecology

NCEPOD wishes to thank the consultants in gynaecology who acted as advisors in the preparation of this section:

Mr A S Evans	(Wales)
Mr P Hilton	(Northern)
Mr C A J Macafee	(Trent)
Mr A D Noble	(Wessex)
Mr A C Silverstone	(North East Thames)

Key issues

- In this sample of deaths 74% of the patients were over 50 years of age and had complicated associated pathologies. Such patients need careful assessment and management , if necessary involving multidisciplinary teams, both before and after surgery.
- Careful thought is required when selecting cases for day surgery.
- Gynaecologists who are not trained in gastrointestinal surgery should involve a gastrointestinal surgeon when a bowel repair/resection may be required.
- Gynaecologists should request postmortem examinations.

Sample

There were 93 questionnaires returned to the Enquiry from 67 hospitals.

Table S70 (q54)
List of procedures

One patient died on induction of anaesthesia for a Wertheim's (radical) hysterectomy, for which unfortunately no anaesthetic questionnaire was returned.

For benign disease

Repair pelvic floor/prolapse	5
Dilatation and curettage/EUA	4
Hysteroscopy/laparoscopy	3
Bilateral or unilateral salpingo-oophorectomy	2
Total abdominal hysterectomy	2
Miscellaneous	4

For malignant disease

Laparotomy with/without biopsy	20
Total abdominal hysterectomy and bilateral salpingo-oophorectomy	18
Biopsy	9
Removal/incision of ovary(ies)	8
Sub-total abdominal hysterectomy	4
Bilateral or unilateral salpingo-oophorectomy	3
Laparoscopy	3
Debulking carcinoma	3
Miscellaneous	4

Why do patients die following laparoscopy/hysteroscopy? The three patients undergoing laparoscopy for malignant disease were all suffering from advanced ovarian carcinoma and, after the diagnostic laparoscopy, were managed by symptom control only. Brief case histories are given below for the three patients who were operated on for benign disease.

A 41-year-old obese diabetic woman had a hysteroscopy as a day case. She was admitted two days later with overwhelming streptococcal septicaemia. It appeared from the questionnaire that the surgeons were not aware of the presence of diabetes mellitus at the time of the hysteroscopy. There is no record of urinalysis being done.

A mildly hypertensive 42-year-old woman had a laparoscopy for the diagnosis and treatment of endometriosis. Three days after surgery she suffered a massive intracerebral haemorrhage and died.

A 62-year-old woman was known to have breast carcinoma and was undergoing treatment by an oncologist. A diagnostic hysteroscopy was done because of postmenopausal bleeding; no intrauterine pathology was found. Four days later she was readmitted after a myocardial infarct. She died six days after surgery.

It is important that laparoscopic procedures are relevant and are done by competent surgeons.

Audit

Respondents were asked whether or not the deceased patient's case was considered at an audit meeting. Sixty-nine cases were not discussed. The advisors felt that this was an unacceptably high figure for a specialty which mainly dealt with fit, healthy women and where death was unexpected. This low use of audit is in marked contrast to the behaviour of the same specialists when participating in the Confidential Enquiry into Maternal Deaths.

Patient profile

Seventy-four of the patients were over 50 years of age and 35 were in ASA classes 3 and 4. There were no moribund patients according to the answers in the questionnaires but the question concerning ASA status was not answered in 20 surgical questionnaires. Three gynaecologists did state that their patients were expected to die. Without the knowledge of the status of the 20 patients for whom information was not submitted, no comment can be made on the fitness of these patients to withstand anaesthesia and surgery. were advisors concluded that gynaecologists often fail to assess ill patients accurately, perhaps relying on their anaesthetic colleagues to do this.

A 61-year-old woman had grade III cervical intraepithelial neoplasia which had been incompletely excised. She was obese, hypertensive, an insulin dependent diabetic and blind as a result of a diabetic retinopathy. The surgeon, an experienced gynaecologist, classed her as ASA 3 and elected to perform a total abdominal hysterectomy with bilateral salpingo-oophorectomy. The anaesthetic was given by a consultant and the consultant gynaecologist operated. Surgical access was described as awful and there was considerable haemorrhage. Postoperatively the patient became shocked and the subsequent resuscitative attempts produced acute pulmonary oedema and a cardiac arrest. The patient was successfully resuscitated but arrested again and died on the sixth postoperative day. The postmortem report comments that death was due to a myocardial infarction.

The advisors felt that the surgery was inappropriate, given the degree of comorbidity, and that alternative forms of treatment could have been considered.

Complex cases need careful assessment; in their obstetric practice, obstetricians and gynaecological surgeons are used to dealing with fit, healthy women; however, when gynaecologists are preparing women for surgery they may need to think carefully about the complex cases and if necessary seek advice from other colleagues such as anaesthetists, physicians or general surgeons. Risks can be assessed using various established methods of stratification and if necessary advice from gynaecological and anaesthetic colleagues should be sought. In situations where gynaecologists are not working on a main hospital site, the patient should be transferred in order that adequate back-up services are available.

Table S71 (q12)
Initial admission intention for the final operation

	n=93
Elective	48
Urgent	21
Emergency	24

Cancellations and bed shortages did not contribute to the outcome in these cases.

Urgent and emergency admissions
There was a delay in *referral* in five cases; two were patient-related, two were doctor-related and one was both. The advisors did not feel that these delays were significant.

The gynaecological team

Table S72 (q1)
Specialty of consultant surgeon in charge at time of final operation

Gynaecology	85
Gynaecological oncology	4
General with special interest in gastroenterology	2
General with special interest in vascular surgery	1
General surgery	1
Total	**93**

The advisors were impressed with the fact that gynaecologists treated 89 of these patients and did not feel that there was any inappropriate specialty involved. In two cases a general surgeon collaborated with a gynaecologist at the time of surgery.

Table S73 (qs 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

		(Locums)
Consultant	84	(1)
Associate specialist	1	
Senior registrar	4	
Registrar	3	(1)
Senior house officer	1	

Consultants were involved in the decision-making for 84 patients. Despite this high amount of input there were occasional cases where consultants were not involved.

In the circumstances where consultants are not contacted by their juniors about difficult problems the consultants should review the arrangements within their department to ensure that advice is properly sought. Of course this need not be a criticism of the consultants themselves; if a trainee does not ask for help the consultant may be ignorant of the problem.

A 51-year-old woman presented with inter-menstrual bleeding; she was otherwise fit and well. An SHO saw her and arranged an EUA and biopsy on the suspicion of a cervical carcinoma. After a two-month delay, the operation was subsequently done by the SHO with a registrar anaesthetist. The preoperative records contain no evidence that an assessment of renal function was done despite the predictable complication of ureteric obstruction in the presence of a carcinoma of the uterine cervix. A carcinoma was confirmed and the patient died in renal failure seven days after surgery. No postmortem was done.

The authors were unable to find any record of consultant input in this case. The consultant gynaecologist who returned the surgical questionnaire claimed a lack of registrars in the department, but it seems to the authors that this is simply avoiding the issue of a lack of consultation about this case and ultimately this is the responsibility of the consultant. In addition to this criticism the advisors questioned whether there had been any discussion of ureteric stenting in order to allow improvement of renal function and, possibly, treatment of the cervical tumour.

Table S74 (qs 49 and 52)
Grade of most senior operating surgeon and the availability of a more senior surgeon

		(Locums)	Senior help was immediately available in the operating room/suite
Consultant	76	(1)	n/a
Associate specialist	2		1
Senior registrar	5		1
Registrar	7	(1)	7
Staff grade	1		-
Senior house officer	1		-
Clinical assistant	1	(1)	-
Total	**93**	**(3)**	

Eight-seven percent of cases were operated on by consultants or senior registrars. The support given to trainees in the form of senior assistance is impressive and to be applauded. The advisors emphasised the point that the support is not only for the good of the patient but also to train and protect the junior surgeon. Trainees in the specialty should not hesitate to ask for advice and practical help.

A locum registrar in general surgery, working in a DGH, operated on a 63-year-old woman with a suspected perforated peptic ulcer. She suffered from severe rheumatoid arthritis. Anaesthesia was administered by a clinical assistant. At surgery a ruptured ovarian cyst was found and the registrar queried whether this was malignant. A gynaecological registrar was called to theatre and a total abdominal hysterectomy and bilateral salpingo-oophorectomy was done. Neither of the juniors called for senior help. The patient died 24 hours later. No postmortem examination was done on the basis that the diagnosis was known. However no histological report was available at this time. The cyst was subsequently diagnosed as a benign ovarian cystadenoma. The case was not discussed at an audit meeting.

The advisors criticised the management of this case on the basis that no consultant gynaecologist or surgeon was involved. The diagnosis of ovarian malignancy was not confirmed; a postmortem examination was essential.

Hospital type and resources available

Table S75 (q2)
Type of hospital

District general hospital	68
University/teaching hospital	23
Surgical specialty hospital	1
Independent hospital	1
Total	**93**

Table S76 (q66)
Services available in hospital

Theatre recovery area	88
Adult ICU	76
Adult HDU	37
Not answered	4

NB this can be a multiple entry

There were five cases where a recovery area was not available although the reasons were not stated. In all, 27 patients required admission to an ICU and were treated there. There were no cases where a lack of services was reported to have affected the outcome.

Time of surgery and type of operation

Table S77 (q46a)
Day of operation

Monday	21
Tuesday	14
Wednesday	19
Thursday	19
Friday	17
Saturday	2
Sunday	1
Total	**93**

Five of the weekday cases were performed "out-of-hours" (18.01 to 07.59). The time of operation was not stated on eight questionnaires.

Table S78 (q57)
Classification of operation

Emergency	4
Urgent	16
Scheduled	58
Elective	15
Total	**93**

Three surgeons reported delays in organising surgery due to non-clinical factors. These included long waiting lists, delay in organising staging investigations and a case where there was confusion concerning the diagnosis as the pre-operative investigations had been misfiled.

Table S79 (q42)

Preoperative precautions or therapeutic manoeuvres to ensure adequate physiological function/classification of operation

	Emergency	Urgent	Scheduled	Elective
Total number of cases	**4**	**16**	**58**	**15**
Pulse rate recording	4	16	54	14
Blood pressure recording	4	16	54	14
Respiratory rate recording	4	15	38	10
Temperature	4	16	52	14
Central venous pressure measurement	-	1	1	-
Cardiac support drugs or anti-arrhythmic agents	1	2	1	1
Gastric aspiration	2	3	2	-
Intravenous fluids	4	10	27	3
Correction of hypovolaemia	2	4	5	-
Urinary catheterisation	3	8	22	3
Blood transfusion	1	2	3	-
Diuretics	-	4	3	-
Anticoagulants	-	3	9	-
Vitamin K	-	-	-	-
Antibiotics (pre- or intra-operative)	3	7	32	4
Bowel preparation	-	1	1	-
Chest physiotherapy	-	4	5	-
Oxygen therapy	3	4	5	1
Blood gas analysis	1	1	2	-
Pulse oximetry	2	4	6	1
Airway protection (e.g. in unconscious patients)	-	1	1	-
Tracheal intubation	1	2	7	3
Mechanical ventilation	2	2	8	3
Nutritional support	-	1	2	-
DVT prophylaxis	-	5	25	6
Others	-	3	4	1

NB this can be a multiple entry

Table S80 (q39)

Co-existing problems at time of final surgery

Respiratory	17
Cardiac	16
Gastrointestinal	16
Haematological	10
Renal	8
Vascular	8
Musculoskeletal	6
Endocrine (including diabetes mellitus)	4
Sepsis	3
Neurological	2
Psychiatric	2
Alcohol-related problems	1
Other	11

Intraoperative problems

There were unanticipated intraoperative problems in two cases; both involved unexpected and profuse pelvic bleedin

A 55-year-old woman was treated for stress incontinence. She was obese and hypertensive and had undergone a previous hysterectomy. A vaginal vault repair and sacral colpopexy was planned but at operation there was massive intraoperative bleeding from a sacral vein and then from an injured internal iliac artery (in all the blood loss was 11 litres). A vascular surgeon was summoned and the bleeding was controlled but not before several periods of hypotension forced surgery to stop whilst the anaesthetist corrected the hypovolaemia. The patient suffered an intraoperative stroke and was transferred to an intensive care unit at the local DGH. Brain stem death occurred and she died 48 hours after transfer. The consultant gynaecologist stated that the stroke could have occurred at any time and that it was difficult to connect the patient's death with the operation. The coroner thought otherwise.

A consultant gynaecologist operated on a 57-year-old woman with a carcinoma of the uterine cervix. The anaestheti was a staff grade (joined later by a consultant). An epidural combined with general anaesthesia was used for the first operation. A radical abdominal hysterectomy, bilateral salpingo-oophorectomy and pelvic node dissection was done with difficulty due to dense peritoneal adhesions. There was profuse pelvic bleeding and the operation lasted seven hours. One hour after the surgery, the patient was returned to theatre because of continued bleeding. After this procedure the haemorrhage was controlled but by this time the patient had experienced profound hypotension. The patient was managed in ICU for five days. After 24 hours she was able to breathe spontaneously but was noted to be paraplegic. The epidural catheter was removed on the third day with a "covering" platelet infusion. An MRI scan 48 hours after surgery confirmed a spinal cord infarction, presumably as a result of the hypotension. Pneumonia developed and the patient died nine days after surgery. No postmortem examination was done.

There were several cases when an intestinal resection or repair was needed. Problems with the intestinal surgery rather than the gynaecological procedures often caused complications. Gynaecologists who are not trained in gastrointestinal surgery should involve a general surgeon with appropriate expertise when a bowel repair/resection is required.

An experienced consultant gynaecologist in a DGH did a laparotomy on a 47-year-old woman with an abdominal mass. A series of investigations, including sigmoidoscopy by a physician, had been negative. At laparotomy a left tubo-ovarian abscess was found although no cause was stated. A left salpingo-oophorectomy was done. The patient recovered and left hospital only to return to the A & E department 12 days later following a cardiac arrest. She died in the A & E department. Postmortem examination was said to show a massive carcinoma of the rectum which had been missed at the original laparotomy but six months after the postmortem the official report had not reached the clinicians.

The advisors queried whether a gynaecologist was an appropriate specialist to perform a diagnostic laparotomy unless he was prepared to deal with all eventualities or had a general surgical colleague close at hand.

Postoperative complications

Table S81 (q74)
Postoperative complications

	n=92*
Renal failure	17
Stroke/neurological problems	14
Venous thromboembolism	12
Respiratory problems	10
Cardiac problems	10
Generalised sepsis	6
Haemorrhage/postoperative bleeding	5
Nutritional problems	3
Wound dehiscence	3
Miscellaneous	17

NB this can be a multiple entry

* one patient died in the anaesthetic room

Venous thromboembolism and prophylaxis

Gynaecological procedures were the second most common cause of a fatal pulmonary embolism according to the postmortem examinations analysed in the 1991-92 NCEPOD report[4]. In this series pulmonary embolism was mentioned as the cause of death in 14 cases and 36/93 patients received some form of prophylaxis against venous thromboembolism. The methods used are given below.

Table S82 (q42)
Use of thromboembolic prophylaxis

	n=36
Subcutaneous heparin	16
Low molecular weight heparin	2
Patient on warfarin	2
TED stockings	15
Active mobilisation	1
Not specified	4

NB this can be a multiple entry

Despite the previously reported role of pulmonary emboli in deaths after gynaecological surgery[20], there were 30 cases where the gynaecologist reported that it was not usual practice to use prophylaxis. Surgeons are referred to the recent confidential letter from the co-chairmen of the working party on venous thrombosis.[21]

Neurosurgery

NCEPOD wishes to thank the consultants in neurosurgery who acted as advisors in the preparation of this section:

Mr M Briggs	(Oxford)
Mr G Brocklehurst	(Yorkshire)
Mr A D Hockley	(West Midlands)

Key issues

- Eighty-nine percent of the patients who died were emergency admissions.
- All units receiving patients with multiple injuries, including head injuries, must have access to CT scanning and a radiological and neurosurgical consultation/opinion.
- Neurosurgery should not be undertaken without adequate ICU/HDU facilities.

Sample

There were 236 questionnaires returned to the Enquiry from 39 hospitals.

Table S83 (q54)
List of procedures

Evacuation/aspiration of haematoma	80
Clipping/wrapping of aneurysm	27
Excision of cerebral tumour	24
Stereotactic biopsy	16
Drainage CSF / ventricular drainage procedure	16
Craniotomy	15
Lobectomy	10
Revision/removal/insertion V-P shunt	10
Insertion pressure monitoring	6
Drainage/aspiration of abscess	5
Cervical and lumbar spinal procedures	5
Craniectomy	3
Evacuation/resection contused brain	3
Excision acoustic neuroma	2
Re-opening of craniotomy	2
Miscellaneous (one each of: decompression subdural space, posterior fossa decompression/partial cerebellectomy, hypophysectomy, EC-IC bypass, maxillotomy/debulking chondrosarcoma, removal of reservoir, scalp and cranial repair, skull base repair with graft, debridement of wound, skin incision only, tracheostomy (previous craniotomy)	11

NB this can be a multiple entry and includes coincidental procedures

The above list of procedures reflects the situation as it was in 1992/93; since then practice has changed and stereotactic equipment, allowing minimally invasive stereotactic biopsies of space occupying lesions, is widely available. This procedure now has a low morbidity and mortality and may provide histological evidence so that a more major procedure may be avoided.

Audit

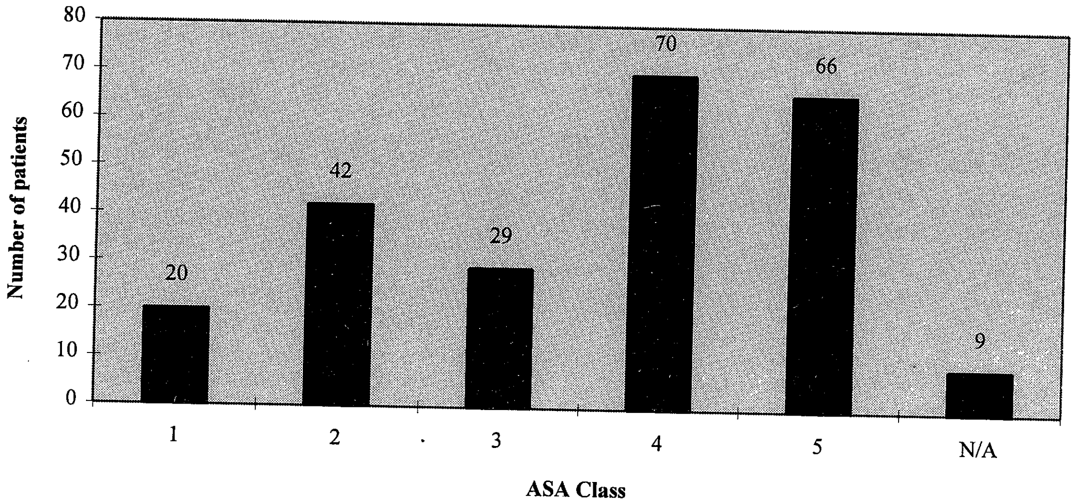
Sixty-four percent of the deaths were discussed at audit meetings and 140/236 (59%) were submitted to postmortem examination. It is also common practice to examine whole fixed brains at regular meetings with neuropathologists.

Patient profile

Table S84 (qs 5 and 6)
Age and sex of patient at final operation

Years	Male	Female	Total
6 to 10	1	2	3
11 to 20	4	4	8
21 to 30	22	8	30
31 to 40	15	13	28
41 to 50	18	24	42
51 to 60	37	24	61
61 to 70	36	28	64
Total	**133**	**103**	**236**

Figure S5 (q40)
ASA Class (see glossary, Appendix C)



(N/A = not answered by the respondent)

Table S85 (q41)
Anticipated risk of death related to the proposed operation

Not expected	20
Small but significant risk	64
Definite risk	109
Expected	39
Not answered	4
Total	**236**

Neurosurgeons often operate on poor risk cases with life-threatening conditions.

Table S86 (q12)
Initial admission intention for the last operation performed

Elective	25
Urgent	56
Emergency	155
Total	**236**

The above table demonstrates the heavy load of urgent and emergency admissions (211/236, 89%) dealt with by neurosurgeons. Outpatient investigations, long waiting lists and cancelled admissions had no effect on outcome. There were seven cases where the neurosurgeons reported that delays were due to lack of resources.

Over half the patients (155/236, 66%) were transferred from another hospital, eleven of whom (11/155, 7%) deteriorated. NCEPOD emphasises the safety of the current practice: *seek advice, stabilise and transfer* (provided a safe mode of transport and appropriately trained medical supervision are provided for the journey as discussed in the Anaesthesia section page 58).

Of the 211 urgent or emergency admissions, 166 subsequently had urgent or emergency surgery; this suggests that the majority of these admissions were appropriate.

The neurosurgical team

Table S87 (q1)
Specialty of consultant surgeon in charge at time of final operation

Neurosurgery	234
General	1
Orthopaedic	1
Total	**236**

Patients in the UK should have access to a neurosurgeon when needed. In particular, all patients with multiple injuries should receive a neurological assessment and, if there is evidence of a head injury, a CT scan should be obtained and then there should be consultation with a neurosurgeon. Modern technology allows the transmission of images to aid consultation and discussions concerning transfer. Obtaining a neurological opinion will help with the accurate diagnosis and appropriate management of neurological problems, which include head injuries and the recognition of brain death. Such consultation should enable the instigation of appropriate treatment.

The two cases dealt with by non-neurosurgeons were for acute subdural haemorrhage when a neurosurgeon was not quickly available. The advisors considered this emergency treatment to be appropriate but advised subsequent transfer in case delayed intracranial haemorrhage should occur.

Whilst general, trauma and orthopaedic surgeons who provide in-patient care for head injured patients should be able to do a burr hole having been appropriately taught, operative intervention and treatment should sensibly and optimally be carried out by neurosurgeons. The concept of "pepper-pot" burr holes as a diagnostic procedure by inappropriately trained surgeons is not acceptable within the UK.

Table S88 (qs 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

Consultant	227
Senior registrar	6
Registrar	3
Total	**236**

In neurosurgical practice in this sample the majority of decisions concerning the management of patients' care were made by consultants. However, when proper consultation did not take place or when advice was not followed a surgical mishap occurred.

A 47-year-old man was admitted to a neurosurgical unit with a Glasgow Coma Score of <7 following a subarachnoid haemorrhage. Angiography demonstrated the aneurysm. The registrar on call contacted a consultant neurosurgeon who advised that the clot should be evacuated but that no other procedure should be attempted. The registrar operated, tried to clip the aneurysm and vasospasm occurred. Cerebral infarction followed and the patient died four days after admission.

The neurosurgical registrar was experienced and the surgery was performed competently. Should the consultant concerned have attended to personally operate on this sick young patient who presented a difficult problem, and avoided this over-aggressive treatment?

The decision not to operate is a consultant decision. Should surgery proceed unless it is possible to predict a reasonable outcome, not just a surviving patient? Clearly, if a patient is brain dead, then surgery is contraindicated.

Table S89 (q49)
Grade of most senior operating surgeon and the availability of a more senior surgeon

		Senior surgeon was immediately available in the operating room/suite
Consultant	96	n/a
Associate specialist	4	-
Senior registrar	46	8
Registrar	85	27
Clinical fellow	1	1
Senior house officer	1	1
Clinical assistant	1	1
Not answered	2	-
Total	**236**	

Table S90
Procedures performed by registrars when a more senior surgeon was <u>not</u> immediately available

Evacuation of haematoma	34
Insertion of external ventricular drain/ICP monitor	10
Burr hole biopsy	3
VP shunt	3
Lobectomy	3
Stereotatic biopsys	2
Drainage of abscess	1
Clipping of aneurysm	1
Scalp and cranial repair	1
Total	**58**

Eleven of these patients had suffered a head injury. Eighty-nine percent of these patients who died were emergencies. The general public might not agree that 37% (88/236) of the cases should have been operated on by surgical grades below that of consultant and senior registrar. It is the authors' opinion that the staffing on neurosurgical units should ensure that most patients and especially emergencies can be treated by specialist consultants (see Anaesthesia section, page 49).

Preoperative preparation for surgery

Table S91 (q39)
Co-existing problems at the time of the final surgery

Cardiac	36
Alcohol-related problems	16
Endocrine (including diabetes mellitus)	16
Gastrointestinal	10
Haematological	9
Musculoskeletal	9
Psychiatric	9
Renal	6
Vascular	6
Sepsis	6
Drug addiction	4
Other	14

Table S92 (qs 42 and 57)

Preoperative precautions or therapeutic manoeuvres to ensure adequate physiological function/classification of operation

	Emergency	Urgent	Scheduled	Elective	N/A
Total number of cases	**141**	**33**	**50**	**10**	**2**
Pulse rate recording	137	33	50	10	2
Blood pressure recording	138	33	50	10	2
Respiratory rate recording	122	30	40	10	2
Temperature	119	32	48	10	2
Central venous pressure measurement	29	2	4	4	-
Cardiac support drugs or antia-rrhythmic agents	11	1	4	1	-
Gastric aspiration	59	11	2	1	1
Intravenous fluids	123	28	27	7	2
Correction of hypovolaemia	34	10	8	1	-
Urinary catheterisation	100	14	11	4	1
Blood transfusion	17	3	1	1	-
Diuretics	20	4	5	-	-
Anticoagulants	3	1	-	-	-
Vitamin K	4	-	-	-	-
Antibiotics (pre- or intra-operative)	52	17	16	4	1
Bowel preparation	-	-	-	-	-
Chest physiotherapy	25	9	11	11	-
Oxygen therapy	87	15	13	1	1
Blood gas analysis	90	17	10	3	1
Pulse oximetry	106	17	16	4	1
Airway protection (e.g. in unconscious patients)	62	7	3	-	1
Tracheal intubation	90	9	4	3	1
Mechanical ventilation	94	9	3	3	1
Nutritional support	3	2	1	-	-
DVT prophylaxis	19	9	16	4	1
Others	7	2	9	1	2

N/A = not answered

NB this can be a multiple entry

Hospital resources

Table S93 (q66)
Services available in hospital

Theatre recovery area	169
Adult ICU	213
Adult HDU	124
Paediatric ICU/HDU	69
None of the above	1
Not answered	1

NB this can be a multiple entry

The hospital which was reported to have no services does have an HDU; this is not a separate entity but part of a neurosurgical ward. Should this be described as an HDU?[22]

In seven cases there was a delay in an emergency/urgent admission. Three cases were delayed due to a lack of resources, one case was delayed because the surgical staff were committed elsewhere and in four cases the delay was multifactorial.

Delay was identified as the possible cause of a poor outcome in only one patient.

A 54-year-old man was admitted to a University hospital neurosurgery unit with a head injury. Initially there were no beds in the neurosurgery unit and then it was realised that the CT scanner was being serviced. There was, therefore, a delay in diagnosis. Finally a scan showed a traumatic intracerebellar haematoma and surgery was planned. The neurosurgical registrar and senior registrar were operating on another patient so a further delay occurred until a senior registrar commenced operating five hours after the decision to operate had been taken. The patient died 16 days after surgery with pneumonia and hydrocephalus.

The clinical coordinators considered that the involvement of the neurosurgical consultant surgeon was inadequate in this case. The delays in this case were unacceptable. The resources available in this neurosurgery unit at the time of the patient's admission were inadequate.

Four patients died in the theatre or recovery ward. Of the surviving patients, 152 (64%) required admission to an ICU and a further 47 (20%) were admitted to an HDU. An additional 12 (5%) patients required ICU/HDU admission after an initial period on a postoperative ward. Thus in this series a total of 89% of all neurosurgical patients required an admission to ICU/HDU. This demonstrates the heavy use neurosurgery makes of these essential services and confirms the need for an adequate supply of suitable facilities to support this specialty.

There were six cases where it was not possible to admit the patient to an ICU/HDU. The reasons given were:

Lack of bed	4
No neurosurgical HDU	1
Not specified	1

Day and time of surgery

Table S94 (q46a)
Day of operation

Monday	35
Tuesday`	41
Wednesday	39
Thursday	35
Friday	37
Saturday	17
Sunday	32
Total	**236**

During the week, 67 (36%) cases were operated on "out of hours", i.e. 18.01 to 07.59 hours. The time was not stated on seven questionnaires. Given the high numbers of emergency/urgent cases, it appears that surgery was done when appropriate. Nine cases were delayed for non-clinical reasons such as delays in transfer, lack of theatre space or lack of another specialist , e.g. a maxillofacial surgeon. There were also five cases where personnel shortages were apparent; these involved surgeons on two occasions, anaesthetists on two occasions and one case where a specialised neurosurgical theatre nurse was unavailable. These delays were not considered critical but one surgeon wrote in painting a bleak picture of the unit in which he worked.

A 47-year-old woman was admitted to a neurosurgical unit in a DGH. She had a Schwannoma (a benign tumour of nerve sheaths) of a cervical nerve root and an infected ventriculoperitoneal shunt. She was very ill but surgery had to be delayed due to a lack of an HDU bed, no immediate access to theatre on a 24-hour basis, no dedicated neurosurgical theatre nurses and a lack of monitoring equipment. Surgery took place 15 days after the decision had been made and the patient died of meningitis 14 days after surgery.

Units with resources of this level should not be undertaking this type of surgery.

Postoperative complications

Table S95 (q74)
Postoperative complications

	n=233*
Neurological complications	133
Cardiac arrest/failure	26
Respiratory distress	23
Haemorrhage/postoperative bleeding requiring transfusion	16
Other organ failure	16
DVT and/or pulmonary embolus	8
Generalised sepsis	5
Renal failure	4
Endocrine system failure	3
Wound infection	3
Wound dehiscence	1
Hepatic failure	1
Other	21

NB this can be a multiple entry

* three patients died in the theatre or recovery room

Table S96 (qs 46 and 76)
Calendar days from operation to death (i.e. not 24-hour periods)

Same day	15
Next day	36
2 days	40
3 days	29
4 days	14
5 days	19
6 to 10 days	45
11 to 15 days	16
16 to 20 days	8
21 to 30 days	14
Total	**236**

There were eight deaths associated with pulmonary emboli. Only 49 patients received any prophylaxis; the methods used were:

TED stockings	39
Subcutaneous heparin	5
Active mobilisation	3
Inflatable boots/compression leggings	1
Not specified	3

In 140 cases the surgeons stated that it was not their policy to give thromboembolic prophylaxis. The advisors were sympathetic and pointed out that, in neurosurgery, prophylaxis is often only given after surgery. However patients who are at risk can be identified[23] and the advisors recommended the use of stockings for medium risk patients and low molecular weight heparin when the risk of embolism is high. Whilst the use of prophylaxis was unacceptably low we note that this was for deaths during 1992/93 and it is probable that the appropriate risk factors are now being applied and much more is being done.

Ophthalmic Surgery

NCEPOD wishes to thank the consultants in ophthalmic surgery who acted as advisors in the preparation of this section:

Mrs C M Lane	(Wales)
Mr J Sandford-Smith	(Trent)

Sample

There were six questionnaires returned for deaths following ophthalmic surgery. These were from six different hospitals.

Table S97 (q54)
List of procedures

Cataract extraction and intraocular lens implant	2
Cataract extraction	1
Drainage of tuberculous orbital abscess	1
Laser iridectomy (glaucoma)	1
Enucleation for extensive choroidal malignant melanoma	1

In view of the rarity of deaths following surgery in this specialty, brief summaries of the cases are given below.

Two patients undergoing cataract extraction died as a result of cardiac disease.

An obese 66-year-old man (ASA class unknown) died six days after a cataract extraction at a teaching hospital. He was in the CCU at the time following a myocardial infarct during surgery. This patient was known to have ischaemic heart disease and a local anaesthetic had been advised by the anaesthetist. However, from the responses given in the questionnaires, it appeared to the advisors that the anaesthetist had been persuaded by the surgeon to give a general anaesthetic. No postmortem examination was done.

A 68-year-old man (ASA class 2) underwent a right cataract extraction under local anaesthesia and died on the ward 36 hours later. He was known to have aortic stenosis. No postmortem was done.

One patient died of the complications of tuberculosis.

A 59-year-old man (ASA class 4) died two weeks after the drainage of a tuberculous orbital abscess. The proven cause of death was pulmonary oedema and the nephrotic syndrome secondary to tuberculosis.

Three patients died as a consequence of malignancy.

An otherwise fit 58-year-old woman (ASA class 1) had an extensive choroidal melanoma with extraocular extension. She had initially refused surgery. She died within 24 hours of an enucleation. There was poor communication between the surgeons and the coroner's office but the surgeon was able to give the confirmed cause of death as being a deep venous thrombosis and pulmonary embolism.

A 61-year-old woman (ASA class 4) with carcinomatosis died two days after a laser iridectomy (done under local anaesthesia) for glaucoma. Death was unrelated to the surgery.

A 58-year-old woman (ASA class 3) had metastatic breast cancer. Her quality of life was poor due to a cataract and so a cataract extraction and lens implantation was done under local anaesthesia. She died of carcinomatosis eight days later.

The advisors noted that five of the six deaths were not discussed at an audit or mortality/morbidity meeting and commented that this was an omission that should be corrected.

The surgical team

Table S98 (qs 49 and 52)
Grade of most senior operating surgeon

		Senior surgeon was immediately available in the operating room/suite
Consultant	3	-
Senior registrar	1	-
Senior house officer	2	1

The senior house officer working alone was involved in a laser iridectomy for glaucoma, done under local anaesthetic.

No pre-operative precautions (of any description) were taken to prevent thromboembolic complications in any case. In all cases this was said to be usual policy. There was one death from a pulmonary embolus. It has been traditional to avoid anticoagulation (even in the low doses used for prophylaxis) in ocular surgery or where local anaesthesia was in use; this is to avoid complications such as orbital haematomas and intraocular bleeding. However there is evidence that these complications are not as common as feared and that most ophthalmic surgical procedures can be safely performed on anticoagulated patients.[24] It should also be recognised that there is more to prophylaxis than anticoagulants, such as the use of appropriate graduated compression stockings, positioning on the table etc. In addition, most intraocular procedures are relatively short and are increasingly being done as day cases; a situation where it is difficult to administer an effective prophylactic regime using anticoagulants. Perhaps the specialty should review the overall approach and attitude to thromboembolic prophylaxis.

Postoperative complications reported included respiratory distress, renal failure, pulmonary embolus, ischaemic heart disease and pancytopaenia. Causes of death were given as viral encephalitis, carcinomatosis, myocardial infarction (in two cases) and pulmonary embolus. In one case the surgeon failed to state the cause of death in the questionnaire.

The advisors commented that cardiac problems in the perioperative period are common. Whilst it should not cause cancellation of surgery, cardiac abnormalities are a cause of death and do need to be identified and properly assessed prior to elective surgery. Guidance should be sought from anaesthetists or cardiologists.

Oral/Maxillofacial Surgery

NCEPOD would like to thank the consultants in oral/maxillofacial surgery who acted as advisors in the preparation of this section:

Mr B S Avery	(Northern)
Mr G H Irvine	(South Western)

Sample

There were 12 questionnaires returned to the Enquiry from 11 different hospitals.

Eleven of the procedures were performed by oral/maxillofacial surgeons, and one by a head and neck surgeon.

Table S99 (q54)
List of procedures

These may be multiple for individual patients. The clinical details are given to explain the nature of the problems encountered in this specialty.

1. Dental clearance for severe periodontal disease in man with cerebral palsy, aged 18
2. Drainage of submasseteric and submandibular abscesses in man, aged 27
3. Dental extractions for carious teeth in man with severe mental and physical disabilities, aged 29
4. EUA, drainage of dental abscess and extraction for dental caries in man with brain damage following RTA, aged 34
5. Extended maxillectomy and repair with latissimus dorsi flap for recurrent oral tumour in woman, aged 52
6. Bilateral neck dissections for squamous carcinoma of tongue with metastases and invasion of internal jugular vein in woman, aged 56
7. Drainage of infratemporal abscess and debulking of inoperable tumour in infratemporal fossa in man, aged 57
8. Biopsy of inoperable oral squamous cell carcinoma, man aged 62
9. Resection of oral squamous carcinoma, resection of mandible and functional neck dissection. Reconstruction with radial forearm flap and microvascular anastomosis. Man, aged 62
10. Dental clearance for periodontal disease in man, aged 64
11. Radical neck dissection, resection of mandible and recurrent squamous cell carcinoma of floor of mouth in man, aged 65
12. Dental extraction for periodontal disease in severely demented man, aged 68

Seven (58%) of the deaths were considered at a local audit meeting.

Table S100 (q40)
ASA Class (see glossary, Appendix C)

ASA Class 2	3
ASA Class 3	6
ASA Class 4	2
Not answered	1

Table S101 (q12)
Initial admission intention for the last operation performed

Elective	7
Urgent	2
Emergency	3

There was a delay in referral in one of the emergency cases (the 27-year-old man with a submasseteric abscess). The patient had been referred by a general dental practitioner and a routine appointment had been arranged; the condition deteriorated and an emergency admission arranged by a general medical practitioner. The patients were all admitted to appropriate surgical wards.

Table S102
Resources available in the hospital

Theatre recovery area	12
Adult ICU	10
Adult HDU	2

Five patients were admitted to the ICU and one to the HDU immediately postoperatively. Two were admitted at a later stage due to deterioration on the general ward. The ICU services available were said to be adequate in all cases. However, three patients were admitted to ICU solely because of a lack of experienced specialist nurses on the general wards. This particularly relates to the care of the patient's airway following head and neck surgery and was highlighted in a previous report by the Enquiry.[4]

Table S103 (qs 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

		(Locum)
Consultant	11	(1)
Associate specialist	1	

Table S104 (qs 49 and 52)
Grade of most senior operating surgeon and the availability of a more senior surgeon

		Senior surgeon was immediately available in the operating room/suite
Consultant	7	-
Associate specialist	1	1
Senior registrar	1	1
Registrar	2	1
Senior house officer	1	-

The SHO operating alone performed a dental extraction and stated that the consultant was in the out-patient department of the hospital.

Respiratory problems were the most common postoperative complication. Management of the airway and prevention of postoperative chest infections is critical in these patients.

An overweight 27-year-old man developed a submasseteric and submandibular abscess following dental infection involving the lower left second and third molars. He was admitted as an emergency and surgery was planned. There was oedema around the airway and it was necessary to extend the neck to facilitate surgery. The endotracheal tube became dislodged whilst positioning the patient; this was immediately recognised and corrected but repositioning the tube was difficult. After surgery he was admitted to ICU and the lungs were ventilated to preserve the airway. However, when the oedema subsided, he developed an adult respiratory distress syndrome, pneumomediastinum, pneumopericardium and septicaemia. Five days postoperatively there was an acute gastrointestinal haemorrhage from which he died. The reporting surgeon and anaesthetist commented that the patient's notes had disappeared for two and a half months and that the notes from the ICU had never been retrieved.

Orthopaedic Surgery

NCEPOD wishes to thank the consultants in orthopaedic surgery who acted as advisors in the preparation of this section:

Mr G Deane	(Oxford)
Mr D Harris	(West Midlands)
Mr J P Hollingdale	(North West Thames)
Professor R C Mulholland	(Trent)
Mr J L Plewes	(West Midlands)

Key issues

- Senior orthopaedic surgeons were frequently involved in the management of patients.
- The proper use of operating theatre trauma lists and the availability of appropriately experienced staff to utilise these lists is good practice and must be encouraged. These lists together with the appropriately experienced staff should be available seven days a week. In some instances there was clear under-provision of these resources.
- No unit without an ICU should be responsible for the reception of major trauma cases.
- The use of thromboembolic prophylaxis in orthopaedic surgery is an unresolved problem.

Sample

There were 232 questionnaires returned to the Enquiry from 127 hospitals.

Table S105 (q54)

List of procedures

These may be multiple for individual patients: trauma often caused multiple injuries.

Elective joint replacement

Primary hip replacement	23
Knee replacement	5
Revision of total hip replacement	3
Bilateral knee replacements	2
Elbow replacement	1

Surgery for fractured neck of femur

Open reduction and internal fixation	44
Hemiarthroplasty	28
Total hip replacement	2
Open reduction of dislocated prosthesis	1
Reduction of fracture only	1
Removal of infected DHS	1

Surgery for metastatic disease

Internal fixation of pathological fracture	26
Hemiarthroplasty of hip joint	5
Open bone biopsy	4
Spinal cord decompression	4
Above knee amputation	2
Miscellaneous (forequarter amputation, hindquarter amputation, bone graft and debulking of a tumour)	4

Surgery for trauma

Open reduction and internal fixation of fractures (simple or compound)	33
Debridement of wounds	8
Fixation of pelvic fractures	5
Below knee amputation	2
Repair of ruptured muscle	2
Manipulation under anaesthesia	2
Miscellaneous (suture of laceration, insertion of skull traction callipers and change of plaster)	3

Miscellaneous 24

(Decompression of spinal stenosis [3], exploration of wound [3], spinal laminectomy [2], drainage of wound abscess [2] and one each of excision of radial head, aspiration of joint, bunion surgery, excision of nail bed, change of dressing, spinal osteotomy, removal of screws, talar fusion, arthroscopic medial menisectomy, spinal decompression for infection, desloughing of pressure sore, insertion of bone graft, bilateral excision of femoral heads , anterior disc excision for discitis)

Audit

One-hundred-and-forty-nine deaths (149/232, 64.2%) were considered at an audit meeting. All deaths should be discussed at audit or mortality meetings; unless all cases are routinely audited, important lessons may be overlooked.

There were 14 hospital postmortem examinations and 122 examinations under the auspices of the Coroner. Many cases were discussed with the Coroner or the Coroner's officer and a postmortem examination was thought to be unnecessary. A copy of the hospital postmortem examination report was received by the surgeon in 12 (86%) cases whereas 94 (77%) reports of a Coroner's postmortem examination were received. Thus information to assist audit was available for the majority of cases but unless the clinicians receive the postmortem report, much valuable information is overlooked. There is room for improvement in communication between the orthopaedic surgeon and the pathologist.

Missing notes continue to cause problems for surgeons and anaesthetists who attempt to complete retrospective audit such as returns to NCEPOD.

A 52-year-old woman was transferred from a neighbouring hospital to another DGH. She had multiple injuries sustained in a head on collision (RTA) and the crush syndrome. She developed renal failure and died. Neither the initial receiving surgeon nor the surgeon at the second hospital were notified of the postmortem examination and neither received a copy of the final report. The notes took ***one year*** *to reach the surgeon who completed the questionnaire and, when the notes were found, they were incomplete in that there was no anaesthetic record.*

Patient profile

Table S106 (qs 5 and 6)
Age and sex of patient at final operation

Years	Male	Female	Total
11 to 20	3	2	5
21 to 30	3	4	7
31 to 40	6	1	7
41 to 50	11	5	16
51 to 60	18	15	33
61 to 70	74	90	164
Total	**115**	**117**	**232**

Table S107 (q40)
ASA Class (see glossary, Appendix C)

		%
ASA Class 1	29	*12.5*
ASA Class 2	61	*26.3*
ASA Class 3	61	*26.3*
ASA Class 4	54	*23.3*
ASA Class 5	8	*3.4*
Not answered	19	
Total	**232**	

In 84 (36%) cases, surgeons estimated that there was a significant risk of death. It is worth noting that 53% of deaths occurred in patients who were in ASA classes 3, 4 and 5. The converse of this is that 90 of these patients who died were in ASA classes 1 and 2; 46 of these 90 patients were undergoing elective surgery whilst the remainder were emergencies or urgent cases (see table S118).

Table S108 (q12)
Initial admission intention for the last operation performed

Elective	48
Urgent	53
Emergency	129
Not answered	2
Total	**232**

Emergency/urgent admissions accounted for 78.4% of all admissions. This level of non-elective activity inevitably puts pressure on beds and plans for elective work, especially as many of these patients were in unfavourable ASA classes with an expected high morbidity and mortality.

Table S109 (q39)
Co-existing problems at time of final surgery

Respiratory	83
Cardiac	61
Musculoskeletal	46
Neurological	36
Endocrine (including diabetes mellitus)	28
Haematological	27
Gastrointestinal	25
Renal	18
Psychiatric	18
Vascular	12
Sepsis	9
Alcohol-related problems	7
Drug addiction	1
Genetic abnormality	0
Other	38
Not answered	35

NB this can be a multiple entry

Table S110 (qs 42 and 57)

Preoperative precautions or therapeutic manoeuvres to ensure adequate physiological function/classification of operation

	Emergency	Urgent	Scheduled	Elective	N/A
Total number of cases	**13**	**121**	**58**	**39**	**1**
Pulse rate recording	13	115	54	38	1
Blood pressure recording	13	116	53	38	1
Respiratory rate recording	12	84	36	25	1
Temperature	9	109	51	36	1
Central venous pressure measurement	4	12	2	-	-
Cardiac support drugs or anti-arrhythmic agents	4	14	7	4	-
Gastric aspiration	4	7	2	-	-
Intravenous fluids	12	85	31	7	-
Correction of hypovolaemia	10	38	13	2	-
Urinary catheterisation	10	42	10	-	-
Blood transfusion	9	21	5	3	-
Diuretics	2	20	8	1	-
Anticoagulants	-	17	7	11	-
Vitamin K	-	1	-	-	-
Antibiotics (pre- or intra-operative)	10	89	39	24	-
Bowel preparation	-	-	3	-	-
Chest physiotherapy	1	27	11	8	-
Oxygen therapy	9	31	6	3	-
Blood gas analysis	9	19	3	1	-
Pulse oximetry	8	27	7	6	-
Airway protection (e.g. in unconscious patients)	4	7	2	2	-
Tracheal intubation	9	16	5	6	-
Mechanical ventilation	8	13	2	5	-
Nutritional support	1	7	4	-	-
DVT prophylaxis	2	57	22	25	-
Others	1	8	3	4	-

N/A = not answered

NB this can be a multiple entry

Transfers

Forty-two (18%) patients were transferred from another hospital. Of these 23 were transferred from another hospital within the same District. These data are difficult to interpret. Where patients are being moved to a hospital with proper facilities for orthopaedic care, transfer is sensible and has little deleterious effect on the patient's general condition. There is scope for local planning to be revised in order to concentrate beds on one site. There was no evidence of deterioration during these transfers and the advisors felt that it was entirely proper to move the patients to a hospital where the appropriate services were provided. However it is not acceptable to transfer patients to a unit which, whilst providing beds for orthopaedic practice, does not provide ICU/HDU support. Transfer should also be timely and appropriate.

A 42-year-old man suffered multiple injuries which included a fractured pelvis. There was considerable pelvic venous bleeding. After several days' delay he was transferred from a DGH to a university hospital. At this time there had been no attempt to fix the pelvic fractures and the pelvic bleeding continued. Because of the patient's poor condition after transfer (ASA 4), nine days passed before the pelvic fractures were stabilised. Five days later the patient died from multiple organ failure.

Should the pelvis have been stabilised earlier, perhaps before the transfer took place? If the initial hospital could not treat this patient appropriately, should that hospital be admitting trauma cases? Any hospital which accepts trauma cases should have a pelvic fixator available.

Table S111 (q2)
Type of hospital in which the final operation took place

District general hospital	160
University/teaching hospital	62
Surgical specialty hospital	7
Non-NHS hospital	3
Total	**232**

The orthopaedic team

Table S112 (q1)
Specialty of consultant surgeon in charge at time of final operation

Orthopaedic	225
General with special interest in orthopaedic surgery and trauma	2
Spinal injuries	2
Accident and emergency	1
Trauma	1
Neurosurgery	1
Total	**232**

The spectrum of surgical specialties involved in these cases undergoing orthopaedic procedures is fitting for the casemix involved.

Table S113 (qs 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

		(Locums)
Consultant	199	(4)
Associate specialist	8	
Senior registrar	7	
Registrar	17	(3)
Not answered	1	
Total	**232**	**(7)**

Consultants, senior registrars and associate specialists are all capable of providing experienced advice and patient management. A senior member of the orthopaedic staff made the decision to operate or was consulted prior to intervention in 92.2% of cases. This is an improvement on previous NCEPOD reports.

Table S114 (qs49 and 52)
The grade of the most senior operating surgeon and the availability of a more senior surgeon

		(Locums)	%	Senior surgeon was immediately available in the operating room/suite
Consultant	96	(5)	*41.4*	-
Associate specialist	12		*5.2*	6
Senior registrar	36	(4)	*15.5*	12
Registrar	66	(7)	*28.4*	24
Staff grade	9		*3.9*	6
Senior house officer	9		*3.9*	2
Clinical assistant	3		*1.3*	-
Not answered	1		*3.9*	-
Total	**232**	**(16)**		

Consultants, senior registrars and associate specialists operated on a total of 144 (62%) patients. Seven cases were operated on by unsupervised basic surgical trainees (SHOs).

Table S115 (qs 49 and 54)
Operations by unsupervised senior house officers

Internal fixation for fractured neck of femur	2
Open reduction and fixation of trochanteric fracture of femur	1
Intramedullary nailing of pathological fracture of femur	1
Open reduction and internal fixation of bimalleolar fracture of ankle	1
Repair of laceration of foot	1
Incision and drainage of abscess	1

It is recognised that the experience of SHOs varies and in many cases the title of SHO is synonymous with registrar. The question remains as to whether these experienced SHOs should be occupying posts which are primarily intended for basic training.

A woman of 61 years of age had a fractured femoral neck. She was hypertensive with a history of previous cerebrovascular problems. A clinical assistant, with the DA, anaesthetised and an orthopaedic SHO did an open reduction and internal fixation. The patient died three days later following a stroke.

Irrespective of outcome, were the grades of either the anaesthetist or the surgeon appropriate in this case?

Registrars were directly supervised in only 24 (36%) instances.

Table S116 (qs 49 and 54)
Operations by unsupervised registrars

Surgery for fractured neck of femur	
Internal fixation	13
Hemiarthroplasty	13
Open reduction of dislocated prosthesis	2
Surgery for metastatic disease	
Internal fixation of pathological fracture	1
Hemiarthroplasty of hip joint	1
Surgery for trauma	
Open reduction and internal fixation of fractures (closed or open)	6
Debridement of wounds	1
Repair of ruptured muscle	1
Manipulation under anaesthesia	1
Insertion of skull traction callipers	1
Miscellaneous	
Bilateral bunion surgery	1
Change of dressing (last of a series of multiple procedures)	1
Total	**42**

Consultants or senior registrars should always supervise orthopaedic trainees and delegate appropriately. Consultants should be available, in the building, during "Trauma" lists to provide instant support and teaching as and when indicated. One of the benefits of a designated trauma list is that a consultant will be available to offer supervision and support for the junior staff. Similarly consultants who are on-call should also be available to offer supervision and support.

Hospital resources

Table S117 (q66)
Services available in the hospital

Theatre recovery area	214
Adult ICU	180
Adult HDU	66
Paediatric ICU/HDU	42
None of the above	1
Not answered	4

NB this can be a multiple entry

Four patients died in theatre. Of the remaining patients, 46 were admitted directly to an ICU or HDU after surgery and an additional 25 patients were admitted to an ICU/HDU after an initial period on a routine ward.

There were six (2.6%) cases where dissatisfaction was expressed with the provision of services. The problems were a lack of provision of ICU/HDU facilities in four cases, and a lack of beds (one case). No unit without an ICU/HDU on site should be responsible for the reception of trauma cases. It is probable that a greater provision of ICU/HDU beds will be needed for the ever increasing emergency/urgent workload.

Following a major road accident a 26-year-old man was admitted to a unit with no ICU facilities. The following day (18 hours later) an orthopaedic registrar performed an internal fixation of a fractured femur, external fixation of an ankle fracture and debridement of multiple wounds and abrasions. This operation took 3.5 hours. The patient developed renal failure, was transferred to another hospital and died.

The advisors remarked that the initial site was an inappropriate hospital to admit such a case of major trauma. During the 18-hour delay this man should have been referred elsewhere. The operation, done by a registrar, took a long time. Was the grade of surgeon appropriate?

A 19-year-old woman was involved in a road traffic accident. She suffered multiple injuries including a skull fracture, bilateral femoral fractures and a tibial fracture. She was adequately resuscitated, had a CT scan of the brain and then underwent surgery by a consultant orthopaedic surgeon. She was then admitted to an HDU as there was no ICU at the hospital. Three days later she developed a fat embolus and adult respiratory distress syndrome and was transferred to another hospital with an ICU. The patient died two days later. No information as to the cause of death was forthcoming from the second hospital.

The question of a hospital without an ICU admitting trauma cases should never arise; any hospital which is in such a position should urgently review its policy.

Table S118 (q57)
Classification of the final operation

		%
Emergency	13	*5.6*
Urgent	121	*52.2*
Scheduled	58	*25.0*
Elective	39	*16.8*
Not answered	1	
Total	**232**	

An emergency/urgent activity of 134/232 (57.8%) is considerable. More work should be done on scheduled trauma lists. However, this probably reflects the use of trauma lists and an increase in scheduled/elective work. The proper utilisation of trauma lists is an example of good practice in orthopaedic surgery and needs to be encouraged.

Time of surgery

Table S119 (q46)
Day of operation

Monday	33
Tuesday	47
Wednesday	30
Thursday	49
Friday	37
Saturday	20
Sunday	16
Total	**232**

Twenty (10%) cases were done on weekdays between 18.01 and 07.59 i.e. “out-of-hours”.

Adequate provision of scheduled trauma lists will enable more cases to be treated during the working day.

Thirty-six operations were performed at weekends, these were: internal fixation of femoral neck fractures (13), internal fixation of fractures of the femoral shaft (5), hemiarthroplasty for fractures of the femoral neck (3), internal fixation of fractures of the tibia (3), internal fixation of pathological fractures (3), repair of ruptured quadriceps muscle (2), external fixation for fractured pelvis (2), drainage of wound, internal fixation of ankle fracture, debridement of a wound, change of dressing and a total hip replacement. Some of these cases were not true emergencies or urgent cases and shold have been accommodated on weekday lists. Nonetheless, there should be separate provision for trauma during the weekend as well as during weekdays.

In addition there were non-clinical delays in 19 cases. In 15 of these the lack of theatre space or trauma lists was directly responsible.

Unexpected operative problems

There were 30 instances of unexpected difficulties during surgery.

Table S120 (q61)
Operative problems

Technical problems related to nature of fracture, fragmentation of bone, difficulties with reduction etc.	10
Uncontrollable bleeding	10
Prostheses or instrumentation inadequate or unavailable	6
Miscellaneous	4

These unexpected difficulties were **not** related to inexperience; in 20 cases the operator was a consultant, associate specialist or senior registrar. Of the remaining cases, eight were operated on by a registrar and two by a staff grade. The difficulties encountered with complex fractures and bleeding are not surprising given the nature of the trauma involved. However the non-availability of instrumentation is a matter for concern. Broken instruments e.g. power drills, and the lack of replacements together with a failure to provide a full range of acceptable prostheses is inexcusable. This is a matter which concerned the advisors and which theatre managers need to address in collaboration with the orthopaedic specialists.

Table S121 (q74)
Postoperative complications

	*n**=228
Respiratory distress	60
DVT and/or pulmonary embolus	44
Cardiac arrest	41
Low cardiac output	29
Haemorrhage/postoperative bleeding requiring transfusion	27
Renal failure	22
Neurological problems	21
Other organ failure	17
Generalised sepsis	12
Hepatic failure	9
Urinary retention/catheter blockage	7
Wound infection	6
Wound dehiscence	5
Fat embolus	5
Upper respiratory obstruction	4
Nutritional problems	4
Orthopaedic prosthetic complication	3
Problems with analgesia	2
Pressure sores	2
Other	20

* excludes patients who died in theatre

NB this can be a multiple entry

Respiratory complications, pulmonary emboli and sudden cardiac problems were the most common complications noted. However as a cause of death (taking postmortem examination into account) pulmonary embolus was recorded more often (55/232, 23.7%); this is much higher than the incidence after general surgical procedures (58/1149, 5%).

Table S122 (qs 40 and 81)
Causes of death of ASA 1 and 2 patients were recorded as;

Pulmonary embolus/DVT	41
Cardiac failure	24
Bronchopneumonia/ARDS	5
Septicaemia	3
Respiratory failure	3
Carcinomatosis	3
Renal failure	3
CVA	2
Brain stem infarct	1
Multisystem failure	1
Gastrointestinal haemorrhage	1
Asphyxia (inhalation of gastric contents)	1
Laceration of inferior vena cava	1
Not answered	1
Total	**90**

Table S123 (qs 46 and 76)
Calendar days between operation and death (i.e. not 24-hour periods)

Same day	12
Next day	17
2 days	14
3 days	8
4 days	17
5 days	15
6 to 10 days	57
11 to 15 days	40
16 to 20 days	22
21 to 30 days	30
Total	**232**

Most patients died in a general orthopaedic ward (144/232, 62%) or the ICU/HDU (49/232, 15.2%).

Interestingly NCEPOD was informed of nine patients who died at home; the cause of death in these cases was pulmonary embolus (plus an unexplained fatal arrhythmia which might have been secondary to a pulmonary embolus), a myocardial infarct, one case of carcinomatosis and one case in which no cause of death was notified to the Enquiry. NCEPOD is concerned about the number of pulmonary emboli which may have occurred at home but acknowledge that the data are incomplete and the size of the problem unknown. We do know that the natural course of venous thromboembolism is one of recurrence, more commonly in the ipsilateral leg or with pulmonary embolism. Without treatment the risk is in the order of 22% in the first month after discharge from hospital. Therefore patients with reversible risks for venous thromboembolism (such as surgery or temporary immobilisation) who require treatment for an established venous thrombosis, which has occurred during or after surgery, should have oral anticoagulants for four to six weeks.[25] The whole problem of thromboprophylaxis and pulmonary embolus in orthopaedic practice is vexed, the incidence of pulmonary embolus is unknown and the prevention of it by pharmacologic means fraught with difficulty.

Pulmonary embolus

Prior to surgery 106 (45.7%) patients received some form of prophylaxis against thromboembolic phenomena. The methods used are listed below.

Table S124 (q42)
Methods of thromboembolic prophylaxis

	n=106
Subcutaneous heparin (fractionated/unfractionated)	63
TED stockings	33
Inflatable boots/compression leggings	4
Leg elevation	3
Ibuprofen	1
Patient on warfarin	1
Not specified	11

NB this can be a multiple entry

Pulmonary emboli were cited as a cause of death in 55 cases. Joint replacement was the most common procedure associated with pulmonary embolus. Thirty-five emboli occurred in patients who had surgery either on the day of or the day after admission i.e. the patients were not waiting long periods before surgery. However there was a group with fatal pulmonary emboli who had waited more than a week for surgery; there were six patients in this group, four of whom were being treated for fractures, one for metastatic disease and one patient had a joint replacement. With regard to the time of occurrence of the embolus, 20 occurred at six to ten days postoperatively, 14 at 11 to 15 days and seven at 16 to 20 days.

There were five patients who developed a pulmonary embolus on the first or second postoperative day; three patients after a joint replacement and two after treatment of trauma other than fractures of the femoral neck.

A 70-year-old man was admitted urgently with ruptured quadriceps muscles. He was assessed as ASA 2. The following day he had appropriate surgery with subcutaneous heparin thromboembolic prophylactic cover. He died on the first postoperative day. The cause of death, confirmed at postmortem examination, was a pulmonary embolus.

A 67-year-old man was admitted as an emergency with a trimalleollar fracture of the left ankle. He was a known hypertensive with ischaemic heart disease and diabetes mellitus. He was classed as ASA 2. Low molecular weight heparin (Clexane) was given as thromboembolic prophylaxis. A registrar operated, taking two hours to do an open reduction and internal fixation on a weekday list. The patient died on the second postoperative day from a confirmed pulmonary embolus.

Thromboembolic disease continues to be a major cause of postoperative morbidity and mortality in orthopaedic surgery and at present there is no consensus on the use and preferred methods of prophylaxis against pulmonary emboli in this specialty. For some high risk patients a prophylactic vena cava filter might be suitable.[26]

Table S125 (qs 49 and 54)
Who operates on fractures of the femoral neck (and when)?

Grade of most senior operating surgeon	All cases	Weekday 08.00-18.00	Weekday 18.01-07.59	Weekday time not stated	Weekend
Consultant	12	11	0	1	0
Associate specialist	6	5	0	0	1
Senior registrar	17	11	1	0	5
Registrar	35	19	3	5	8
Staff grade	2	2	0	0	0
Senior house officer	5	4	0	1	0
Total	**77**	**52**	**4**	**7**	**14**

Few cases were done "out-of hours" and the burden of the operating was carried by senior registrars and registrars.

Table S126 (q54, and anaesthetic questionnaire)
Who anaesthetises patients with fractures of the femoral neck (and when)?

Grade of most senior anaesthetist	All cases	Weekday 08.00-18.00	Weekday 18.01-07.59	Weekday time not stated	Weekend
Consultant	15	13	0	2	0
Associate specialist	3	3	0	0	0
Senior registrar	3	2	0	0	1
Registrar	11	8	1	0	2
Staff grade	5	4	0	1	0
Senior house officer	16	9	2	0	5
Clinical assistant	4	4	0	0	0
General practitioner	1	0	0	1	0
Anaesthetic questionnaire not returned	19	9	1	3	6
Total	**77**	**52**	**4**	**7**	**14**

From the information available, there were 16 instances where senior house officers were the most senior anaesthetist for these patients who are often the most elderly and frail patients in orthopaedic practice. Consultants delivered anaesthesia to a similar number of patients and could not be criticised for any lack of involvement. However, the orthopaedic surgeons advising the Enquiry did question the suitability of an SHO anaesthetist for patients needing surgery for a fracture of the femoral neck. Dedicated daytime trauma lists and the allocation of suitably experienced staff would obviate such unsuitable practices.

Pathological fractures

There were 45 deaths following surgery for pathological fractures secondary to metastatic disease. The indication for surgery was often pain relief and referrals were appropriate following discussion of the patients' needs between other specialists e.g. an oncologist and surgeon. Under these circumstances intervention was acceptable despite the poor outcome, particularly in cases of metastatic disease secondary to carcinoma of the bronchus. The practice of open biopsy of a metastasis, followed by a delayed procedure for fixation, often precipitated a pathological fracture. The optimum treatment should be a needle biopsy and immediate fixation.

A 64-year-old man was treated in a DGH for a pathological fracture of the proximal femur. He was a known case of bronchial carcinoma with multiple metastases. There were bone and lymphatic secondaries. He had a superior vena cava obstruction and was anticoagulated with warfarin. He was classed as ASA 4. At the time of presentation the patient was taking oral slow-release morphine, anti-inflammatory drugs and sedatives. A senior registrar (working with consultant supervision) nailed the femur within 24 hours of admission. The patient died on the tenth postoperative day. The cause of death was bronchopneumonia.

Why was this operation done? The patient was already receiving what amounted to symptom control as part of terminal care. Surgery was probably for pain relief and to facilitate nursing care. Interestingly this patient was not discussed at an audit meeting.

A 26-year-old man underwent a de-bulking procedure for a pelvic chondrosarcoma which was producing urinary obstruction. The operation was difficult and there was a 4 litre blood loss. Bleeding continued postoperatively, requiring a packing procedure. Overall the blood loss was 50 units. The packs were removed on the sixth day. A tracheostomy was done on the twelfth day. The patient died two days later with septicaemia, renal failure, adult respiratory distress syndrome and disseminated intravascular coagulopathy.

Why was an orthopaedic surgeon operating alone on this patient with a pelvic tumour and intrapelvic soft tissue invasion and ureteric obstruction?

Otorhinolaryngological Surgery

NCEPOD wishes to thank the consultants in otorhinolaryngological surgery who acted as advisors in the preparation of this section:

Mr P Adlington	(Wessex)
Mr A G Beeden	(North West Thames)
Mr P Ellis	(East Anglia)
Mr J N Thomas	(South East Thames)

Key issue

- Adequate local competence and facilities should govern whether or not radical surgery, in particular for head and neck malignancy, is performed in a given situation.

Sample

Forty-two questionnaires were received from 37 hospitals.

Audit

Thirty-one of the cases were considered at an audit meeting. This contrasts very favourably with the figure published in the 1991/92 NCEPOD Report[4] of 32/63. Several of the deaths reported here were cases where an otorhinolaryngological (ENT) surgeon was only peripherally involved, e.g. to do a tracheostomy in a general surgical case, and would not have been expected to audit the death. Thus the percentage of cases covered by an audit within the specialty is probably higher than given here.

Table S127 (q54)
List of procedures

For benign disease	
Radical mastoidectomy and meatoplasty	2
Procedures for epistaxis	2
Cricopharyngeal myotomy/Teflon injection	1
Teflon injection of vocal cord	1
Repair of laceration of neck	2
Excision of uvula	2
Tracheostomy	1
Died after induction of anaesthesia	1
Tympanoplasty	1
EUA pharynx	1
For malignant disease	
EUA and biopsy larynx/pharynx	6
Repair of ruptured carotid artery +/- myocutaneous flap following radical neck surgery	4
Radical neck dissection and reconstruction	3
Tracheostomy only	2
Decompression of orbit	2
Miscellaneous	11
(one each of: debulking of tracheal tumour, debulking of laryngeal tumour, evacuation of haematoma following block dissection neck, repair of pharyngeal fistula following laryngectomy, radical neck dissection and pharngo-oesophagectomy, pharyngolaryngo-oesophagectomy, myocutaneous flap to repair pharyngeal fistula following radiotherapy, excision of parotid tumour and ligation of common carotid artery, laryngectomy and block dissection of neck with reconstruction, needle biopsy mass in neck, excision of submandibular salivary gland)	

NB this can be a multiple entry

Patient profile

Thirty-five of the patients were over 50 years of age and 24 were in ASA classes 3, 4 and 5. Cardiorespiratory disease was the main associated pathology. None of the elective admissions were thought by the advisors to be inappropriate, there were no previous cancellations and the only delay in arranging an admission was due to a patient's indecision.

Ear, nose and throat surgery is an area where close liaison between surgeon and anaesthetist is needed. The experience and skills of the anaesthetist in both assessing fitness for anaesthesia/surgery and during the conduct of the procedure can be crucial to a successful outcome.

A 45-year-old man suffered from a chronic discharging ear due to chronic suppurative otitis media. He also had diabetes mellitus and there had been two previous myocardial infarcts. The surgeon did a modified radical mastoidectomy but found that the disease was more extensive than expected. The patient suffered another myocardial infarct on the day of surgery and died.

This case was not without risk. The risk/benefit equation should have been discussed between anaesthetist and surgeon. In addition, therapeutic alternatives were available and these should have been considered and discussed with the patient.

The surgical team

Table S128 (q1)
Specialty of consultant surgeon in charge at time of final operation

Otorhinolaryngology	40
General with special interest in breast disease	1
Head and neck surgery	1

There was one case under the care of a general surgeon where a patient with pancreatitis and a bleeding disorder required suturing of the soft palate to stop bleeding. This procedure was incidental and in no way related to the patient's death. The advisors commented on the obvious intraoperative difficulties encountered and felt that help from an expert in ENT surgery should have been sought by the general surgeons involved.

Table S129 (q33)
Care was undertaken on a formal shared basis with another specialty in ten cases:

General surgery	1
Physician	2
Radiotherapy	2
Haematology	1
Multiple specialties	1
Plastic surgery	2
Oral surgery	1

Table S130 (qs 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

Consultant	40
Senior registrar	1
Registrar	1

From the above table it can be seen that consultants were involved in decision-making in the majority of cases. This is very high and reflects the staffing arrangements of many ENT departments where consultants work with minimal assistance from trainees; this produces a system where most day-to-day decisions are taken by consultants. In such an environment it is most likely that a major problem would involve discussion with a consultant.

Table S131 (qs 49 and 52)
Grade of most senior operating surgeon and the availability of a more senior surgeon

		(Locums)	Senior surgeon was immediately available in the operating room/suite
Consultant	32		-
Registrar	4		3
Senior registrar	5	(1)	2
Not answered	1		-

Consultants or senior registrars performed 88% of all operations and more senior help was available for trainees in five out of nine cases.

Hospital type and resources available

Table S132 (q2)
Type of hospital

District general hospital	21
University/teaching hospital	17
Surgical specialty hospital	1
Independent hospital	3

The advisors considered that the spread of deaths amongst the various hospital types was a fair reflection of the workload distribution in general.

Table S133 (q66)
Services available in hospital

Theatre recovery area	42
Adult ICU	37
Adult HDU	15
Paediatric ICU/HDU	9

NB this can be a multiple entry

There were adequate services to support major ENT surgery in all of these hospitals . Local services and the clinical competence of both anaesthetist and surgeon should always be taken into consideration before embarking on a major procedure. The outcome may be jeopardised if services are lacking or clinicians work outside their areas of competence. Surgeons should be encouraged to consult widely with one another and refer when necessary so that optimal timely care can be delivered.

A surgeon operated on an extensive carcinoma involving the larynx and pharynx of a 57-year-old woman. Irradiation had been given pre-operatively. The surgeon did a pharyngectomy but was convinced that he could not clear the disease. The patient was transferred to a neighbouring hospital where another surgeon operated with a general surgeon. This was 17 days after the original surgery. An oesophagectomy and gastric "pull-up" was done for reconstruction. The operation was technically difficult due to the previous surgery and the patient died the same day from massive intrathoracic bleeding.

Would the outcome have been different if the extent of disease had been recognised pre-operatively and the surgery done in one stage at an appropriate centre?

Table S134 (q57)
Classification of operation

Emergency	10
Urgent	6
Scheduled	16
Elective	10
Total	

One surgeon reported a delay. This was because there was no surgeon within two miles of the hospital when a patient started to bleed from the site of a mini-tracheostomy.

Table S135 (qs 42 and 57)

Preoperative precautions or therapeutic manoeuvres to ensure adequate physiological function/classification of operation

	Emergency	Urgent	Scheduled	Elective
Total number of cases	**10**	**6**	**16**	**10**
Pulse rate recording	10	6	16	10
Blood pressure recording	10	6	16	10
Respiratory rate recording	7	5	12	3
Temperature	9	5	15	9
Central venous pressure measurement	4	-	1	-
Cardiac support drugs or anti-arrhythmic agents	2	-	-	-
Gastric aspiration	2	-	1	1
Intravenous fluids	8	5	5	2
Correction of hypovolaemia	6	1	-	-
Urinary catheterisation	4	-	-	-
Blood transfusion	6	1	1	-
Diuretics	-	-	-	1
Anticoagulants	-	-	1	-
Vitamin K	1	-	-	-
Antibiotics (pre- or intra-operative)	6	4	7	2
Bowel preparation	-	-	-	-
Chest physiotherapy	3	-	4	-
Oxygen therapy	5	3	2	-
Blood gas analysis	4	1	1	-
Pulse oximetry	6	4	4	1
Airway protection (e.g. in unconscious patients)	1	-	1	-
Tracheal intubation	3	1	1	-
Mechanical ventilation	4	1	-	-
Nutritional support	2	1	4	-
DVT prophylaxis	2	-	2	1
Others	2	2	1	2

N/A = not answered

NB this can be a multiple entry

Table S136 (q74)
Postoperative complications

	n*=41
Haemorrhage/postoperative bleeding requiring transfusion	7
Respiratory distress	7
Cardiac arrest	7
Pulmonary embolus	4
Low cardiac output	5
Nutritional problems	4
Stroke or other neurological problems	3
Wound infection	3
Persistent coma	3
Generalised sepsis	2
Wound dehiscence	2
Other	8

NB this can be a multiple entry

* one patient died in the operating theatre

Most of the cases of haemorrhage were due to carotid artery rupture following radical dissections in the neck. The advisors pointed out that this problem tended to occur early within the 30 days period of the study but that many deaths after radical surgery in this specialty occurred later and thus would not be counted.

Venous thromboembolism and prophylaxis

Many ENT surgeons are reluctant to use pharmacological prophylaxis when the operations are in areas where bleeding could have disastrous consequences. This is the explanation for the fact that only one patient out of the series received pharmacological agents. More alarming is the low use of any form of prophylaxis (table S135) despite the fact that most of these patients were undergoing major surgery (table S127). Any operation lasting more than one hour or where there is a past history of a thromboembolic complication were indications that something should be done to prevent either a deep venous thrombosis or a pulmonary embolus. There is no evidence that there is serious consideration of this problem within the specialty and 23 surgeons said that it was their usual policy not to use prophylaxis of any kind. Much of this surgery is of short duration in and around the airway where bleeding could have serious repercussions.

Table S137 (q42)
Use of thromboembolic prophylaxis

TED stockings	4
Subcutaneous heparin	1
Compression boots/leggings	1

NB this can be a multiple entry.

None of the four patients who had pulmonary emboli were given any prophylaxis. The operations were: a biopsy of a laryngeal carcinoma, a tracheostomy for a laryngeal tumour, a tracheostomy and a tonsillectomy/uvulectomy. As three of these procedures lasted less than one hour there can be little criticism of the lack of prophylaxis.

Plastic Surgery

NCEPOD wishes to thank the consultants in plastic surgery who acted as advisors in the preparation of this section:

Mr J D Frame	(North East Thames)
Mr P J Sykes	(Wales)

Sample

There were 31 questionnaires returned from 18 hospitals.

Table S138 (q54)
List of procedures
These may be multiple entries for individual patients.

Burns surgery	
Debridement of burns and skin grafting	11
Amputation of arm or fingers (burns)	3
Debridement of burns	3
Grafting for burns	1
Change of dressing	1
Soft tissue excision	
Wide excision of necrotising fasciitis	2
Skin graft to thigh and scrotum	1
Desloughing of bedsore	1
Head and neck malignancy	
Bilateral block dissection of neck and reconstruction	1
Excision of mandible and orbital contents, block dissection neck and reconstruction	1
Hemiglossectomy, block dissection of neck and reconstruction	1
Tracheostomy	2
Reconstructive surgery	
Rectus abdominis flap for sternal disruption	1
Repair of flexor tendons and median nerve	1
Skin lesions	
Excision of lesion on toe	1
Excision of skin cancers	2

Why did the patient with a lesion on the toe die? The case history is as follows:

The patient was a 59-year-old epileptic man with a growth on his second toe following trauma. The lesion was excised and a skin graft used to cover the resultant defect. Histology showed a benign reactive myofibroblastic proliferation. The patient was slow to mobilise and on the tenth postoperative day he died following a massive pulmonary embolism, which was confirmed at postmortem examination. No prophylaxis against thromboembolic problems had been used.

Hospitalisation and immobilisation, skin grafts and medication are known to be associated with venous thromboembolism.

Audit

Surgeons were asked whether or not the deceased patient's case was considered at an audit meeting. Twenty-two cases were discussed, seven were not and surgeons did not reply to this question in two cases.

Of the 19 cases of burns, 13 were considered at an audit/quality control meeting. Amongst the plastic surgical cases 9/12 were considered at an audit/quality control meeting.

Patient profile

Table S139 (qs 5 and 6)
Age and sex of patient at final operation

Years	Male	Female	Total
11 to 20	1	-	1
21 to 30	5	2	7
31 to 40	5	-	5
41 to 50	4	-	4
51 to 60	2	2	4
61 to 70	6	4	10
Total	**23**	**8**	**31**

All patients aged 40 years or less were burns cases; two patients in the 41 to 50 age group were burns patients. One patient in the 51 to 60 age group and three in 61 to 70 age group were burns patients.

Table S140 (q40)
ASA Class (see glossary, Appendix C)

	Burns	Non-burns
ASA Class 1	-	-
ASA Class 2	3	3
ASA Class 3	2	2
ASA Class 4	11	5
ASA Class 5	3	-
Not answered	-	2
Total	**19**	**12**

The above tables show a wide age distribution; 23 cases were in ASA classes 3 to 5 and 13 cases were at high risk or expected to die. The most common co-existing problems at the time of the final operation before death were respiratory (18) renal failure (13) sepsis (12) and cardiac problems (12). So, although this group are younger than those treated by some other specialties, they nevertheless present the plastic surgeon with challenging problems.

Admission details

Table S141 (q2)
Type of hospital in which the final operation took place

	Burns	Non-burns
University/teaching hospital	5	5
District General hospital	5	4
Surgical specialty hospital	4	1
Regional burns unit	2	-
Non-NHS hospital	3	2

Twenty-six patients were emergency or urgent admissions. This includes all the burns cases and seven of the cases for plastic surgery (non-burns). Where elective admissions took place there were no delays but four of the emergency/urgent admissions suffered lengthy delays. Twelve of the admissions involved referral and transfer from another hospital (eight of these were burns cases and four basic plastic surgical cases), nine of which came from the same region. Two patients deteriorated during transfer but there was no case where a delay or transfer was thought to have affected the outcome.

Table S142 (q66)
Services available in the hospital in which the final operation took place

Theatre recovery area	27
Adult ICU	29
Adult HDU	18
Paediatric ICU/HDU	12

NB this can be a multiple entry

There were adequate services available for the 17 cases which required ICU admission.

The surgical team

Table S143 (q1)
Specialty of consultant surgeon in charge at time of final operation

	n=31
Plastic/burns surgery	29
General with special interest in breast disease	1
Orthopaedic	1

The advisors commented that this spread of specialties was appropriate for the cases treated.

Table S144 (qs 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

		(Locum)
Consultant	29	
Senior registrar	2	(1)

Table S145 (q49)
Grade of most senior operating surgeon and the availability of a more senior surgeon

Grade of surgeon		(Locum)	Senior surgeon was immediately available in the operating room/suite
Consultant	23		-
Senior registrar	2	(1)	-
Registrar	4		2
Staff grade	1		1
Senior house officer	1		1

In both cases when a basic trainee or staff grade were operating a senior colleague was on hand.

Time of surgery and type of operation

Table S146 (q46a)
Day of operation

Monday	11
Tuesday	6
Wednesday	4
Thursday	1
Friday	8
Sunday	1
Total	**31**

Table S147 (q57)
Classification of operation

	Burns	Non-burns
Emergency	4	0
Urgent	5	3
Scheduled	9	8
Elective	0	1
Not answered	1	0
Total	**19**	**12**

There were no delays due to non-clinical factors.

Postoperative complications

Table S148 (q74)
Postoperative complications

	Burns *n*=14*	Non-burns *n*=8*
Renal failure	7	5
Generalised sepsis	8	3
Low cardiac output	6	4
Cardiac arrest	5	3
Respiratory distress	5	2
Haemorrhage/postoperative bleeding requiring transfusion	5	-
Wound infection	2	1
Wound dehiscence	-	1
Other organ failure	2	1
Nutritional problems	1	-
Hepatic failure	-	2
Peripheral ischaemia	1	1
Upper respiratory obstruction	1	-
Persistant coma	1	-
DVT and/or PE	-	1
Pressure sores	-	1
Urinary retention/catheter blockage	1	-
Other	2	-

NB this can be a multiple entry

* excludes patients who died in theatre

Urology

NCEPOD wishes to thank the consultants in urology who acted as advisors in the preparation of this section:

Mr M Heal	(Mersey)
Mr J D Jenkins	(Wessex)
Mr M R G Robinson	(Yorkshire)
Mr M G Royle	(South West Thames)
Mr M E Watson	(North Western)

Key issues

- Urology is a consultant-based specialty with consultant involvement in 94% of the patients who died and were reported to the Enquiry.
- Centralisation and subspecialism are occurring within urological practice.
- Myocardial infarction, sepsis, haemorrhage and venous thromboembolism remain the major specific postoperative complications leading to death in urology.

Sample

There were 164 questionnaires received concerning deaths following urological procedures. These questionnaires came from 104 different hospitals.

Table S149 (q54)
List of procedures

Transurethral resection of prostate (benign or malignant)	31
Diagnostic cystoscopy (rigid)	21
Transurethral resection of bladder tumour	20
Nephrectomy (all causes)	19
Insertion of ureteric stent (7 malignant, 6 benign)	13
Total cystectomy and ileal conduit	10
Cystoscopy and bladder washout	6
Urinary diversion (without cystectomy)	6
Bilateral orchidectomy	3
Laparotomy and packing for bleeding	3
Laparotomy and biopsy of mass	3
Needle biopsy of prostate	2
Flexible cystoscopy	2
Hysterectomy	2
Urethrotomy	2
Insertion of haemodialysis shunt	2
Bilateral ureterolysis	2
Laparotomy and suprapubic catheter	2
Nephrostomy	2
Miscellaneous	26

(one each of: nephroureterectomy, splenectomy, prostatic stent, bladder neck incision, removal of infected PTFE shunt, removal of packs, exploratory laparotomy, EUA bladder, cystolithotrity, laparotomy and tumour debulking, circumcision, urethrectomy, retropubic prostatectomy, transvesical prostatectomy, thoracic laminectomy, closure of vesicovaginal fistula, perineal urethrostomy, left hemicolectomy, ureteroscopy, radical penectomy and node clearance, radical orchidectomy, renal artery bypass, drainage of perineal abscess, excision of genitalia, transplant nephrectomy, operation on neuropathic bladder).

NB this can be a multiple entry and coincidental procedures are also included

Audit

Table S150 (q91)
Death considered at a local audit/quality control meeting

Yes	118
No	36
Not answered	10
Total	**164**

Twenty-two per cent of the deaths were not considered at an audit meeting. The advisors thought that this was unacceptable and that all deaths should be subjected to discussion at an audit or morbidity/mortality meeting. Audit is part of standard-setting and quality assurance; the advisors noticed several recurrent problems during the review of these cases, the incidence of which could have been reduced or avoided entirely by the application of structured local audit.

Patient profile

Table S151 (qs 5 and 6)
Age and sex of patient at final operation

Age (years)	Male	Female	Total
21-30	3	1	4
31-40	6	2	8
41-50	9	3	12
51-60	14	10	24
61-70	87	29	116
Total	**119**	**45**	**164**

There were four deaths in patients aged less than 30 years. These deaths were due to trauma, malignancy, transplant rejection and failed urinary diversion.

Seventy patients were ASA class 1 to 2, 78 were in classes 3 to 4 and six cases were in ASA class 5 (i.e. moribund). The information on ASA class was unavailable in 10 cases. There were many varied co-existing medical problems prior to surgery, the majority of which were acceptable for the casemix represented by this group of patients.

Table S152 (q39)
Co-existing problems at time of final surgery

Cardiac	59
Renal	44
Respiratory	41
Haematological	21
Gastrointestinal	20
Vascular	20
Neurological	18
Musculoskeletal	14
Endocrine (including diabetes mellitus)	11
Sepsis	10
Psychiatric	7
Other	26

NB this can be a multiple entry

Seven (4%) patients suffered from psychiatric disorders. On one occasion the diagnosis of psychiatric illness was inappropriately used to deny a patient a bed in an intensive care unit.

A 63-year-old schizophrenic man presented with an acute abdominal problem which was misdiagnosed as peritonitis and a laparotomy was performed. He was, in fact, in acute urinary retention with superadded urinary infection; the passage of a urethral catheter failed and a suprapubic catheter was inserted. In view of his poor general condition and septicaemia the surgeon requested admission to ICU. This was refused by the anaesthetists (who failed to return a questionnaire on this case); the surgeon stated that the patient was denied a bed in the intensive care unit because of the history of schizophrenia. Death was due to overwhelming sepsis.

In the opinion of the advisors, the outcome might have been different had this patient been offered treatment in an intensive care unit. Mental illness should be no bar to admission to an intensive care unit if it is otherwise indicated (see Anaesthesia section, page 62).

Table S153 (q12)
Initial admission intention for the final operation

Elective	74
Urgent	25
Emergency	65
Total	**164**

This preponderance of emergency/urgent admissions is not unexpected. Only one admission was cancelled due to a lack of resources; this was a patient awaiting a transplant and, whilst the advisors felt that cancellations were not good practice, cancellations are often understandable in this area of clinical practice. There was no evidence that delays due to long waiting lists or outpatient investigations altered the outcome for patients.

Transfers

Twenty (12%) patients were transferred from another centre. Of these 13 were transferred from within the same Health District and the remaining cases came from within the same Region. The types of referring hospital and the reasons for transfer are given below.

Table S154
Type of referring hospital

District general hospital	8
University/teaching hospital	3
Surgical specialty hospital	1
Other acute/partly acute	1
Community hospital	4
Independent hospital	1
Psychiatric hospital	1
Hospice	1
Total	**20**

Reasons for transfer

These were related to the lack of urological facilities or support services, such as haemofiltration, at the referring unit. Indications for transfer included:

- Renal failure
- Bleeding and subsequent complications
- Lack of urological facilities at the referring hospital (e.g. a geriatric or psychiatric hospital)
- Medical problems requiring investigation and/or treatment
- Referral to a Regional transplant unit
- Lithotripsy
- Urological complications after unrelated surgery e.g. gynaecology

There were no major problems directly related to the transfer of patients. Most Districts and/or Trusts appear to be providing a centralised urological service with a concentration of services. Patients are transferred to the unit were they can be appropriately treated and their pre- and post-operative care more closely supervised. These arrangements provide for the best possible outcome and are for the good of the patient.

The surgical team

Table S155 (q1)
Specialty of consultant surgeon in charge at time of final operation

Urology	124
General with an interest in urology	24
General	4
General with an interest in gastroenterology	4
General with an interest in vascular surgery	2
General with an interest in endocrine surgery	2
General with an interest in transplantation	1
Transplantation	2
Gynaecology	1
Total	**164**

One-hundred-and-forty-eight cases were dealt with by specialist urologists or general surgeons with a major commitment to urology. The rest of the patients were treated by surgeons who were not practising in urology. Is this appropriate? It is likely that this practice will fade away: the numbers of non-urological surgeons doing the occasional urological case have fallen since the 1990 NCEPOD (13.7% compared with 7.4% in the above table).

Table S156 (questions 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

		(Locum)
Consultant	156*	(8)
Senior registrar	4	
Associate specialist	2	
Registrar	1	
Not answered	1	

* Specialty of consultants -	Urology	119
	General/urology	23
	Other	14

Urology is clearly a consultant-based specialty with considerable involvement of consultants during the pre-operative phase of the patients' care (95% were consulted prior to surgery). This figure remains unchanged when compared with the 1990 NCEPOD report.[3]

Table S157 (q49)
The grade of the most senior operating surgeon and the availability of a more senior surgeon

		(Locums)	Senior surgeon was immediately available in the operating room/suite
Consultant *	121	(10)	n/a
Associate specialist	3		1
Senior registrar	16	(1)	13
Registrar	14		8
Staff grade	2		2
Senior house officer	5		3
Not answered	3		-
Total	**164**	**(11)**	

* In one case two consultants operated in order to assist one another in a complex case.

Consultants performed 74% of all operations and more senior help was available for non-consultants in 63% of cases. There were cases when basic urological trainees (senior house officers) were operating alone without help near at hand. This is inappropriate.

A 68-year-old man was under the care of a general surgeon with an interest in urology at a University Hospital. The patient suffered from an advanced bladder cancer and ureteric obstruction. An examination under anaesthesia and cystoscopy were done by a senior house officer in order to assess the possibility of relieving the ureteric obstruction. No senior help was available.

The advisors questioned whether this basic trainee in the specialty would have been able to make the assessment required of him/her. The patient was terminally ill and died seven days later, an event unrelated to the final procedure. Registrars will also sometimes find themselves out of their depth and it should be emphasised to junior surgeons that there is no shame in calling for help. In fact the recognition of difficulty and the need for more expert help is an indication of maturity in surgery and should be encouraged amongst trainees.

Hospital type and resources available

Table S158 (q2)
Type of hospital in which the final operation took place

District general hospital	116
University/teaching hospital	43
Surgical specialty hospital	2
Other acute/partly acute	2
Independent	1
Total	**164**

The District General Hospital (DGH) carries the burden of urology but there are many more DGHs compared to, say, University hospitals. The Enquiry is also unable to compare the workload and casemix of these institutions; it may be that the University hospitals have a higher percentage of complex and major cases than the DGHs.

Table S159 (q66)
Services available in the hospital

Theatre recovery area	151
Adult intensive care unit (ICU)	133
Adult high dependency unit (HDU)	36
None of the above	2
Total	**164**

NB this can be a multiple entry

The fact that two patients died in hospitals which were stated as providing no services at all would be unacceptable. However, further investigation revealed that the information given in the questionnaire was incorrect. The provision of erroneous information is likely to produce misleading conclusions. We would encourage consultants to carefully check the information submitted.

It seemed to the advisors that 13 patients, who subsequently died, had urological procedures in units which, at the time of the final operation, could not offer the patient the opportunity to recover in a suitable area.[27] All hospitals providing specialised surgery, such as urology, ought to offer a recovery room facility with trained anaesthetic and nursing cover available 24 hours a day.

The stance of previous NCEPOD reports has been that all patients undergoing major surgery should have the ability to enter an ICU/HDU if necessary. The incidence of complications overall and the rate of deaths due to ischaemic heart disease and its complications would support the continued application of this tenet. The panel of advisors stated that an ICU/HDU was needed for both anaesthetic and urological complications. Careful selection of cases and discussion between anaesthetist and surgeon are required to obtain the best outcome for individual patients.

Time of surgery and type of operation

Table S160 (q46a)
Day of operation

Monday	28
Tuesday	29
Wednesday	35
Thursday	39
Friday	28
Saturday	1
Sunday	4
Total	**164**

Twelve of the above cases were performed "out-of-hours" but this includes the five cases done during a weekend. So, only seven cases were done between the hours of 18.01 and 07.59 despite the fact that 37 cases were deemed to be emergencies or urgent (see table below).

Table S161 (q57)
Classification of final operation

Emergency	8
Urgent	29
Scheduled	87
Elective	38
Not answered	2
Total	**164**

Table S162 (qs 42 and 57)

Preoperative precautions or therapeutic manoeuvres to ensure adequate physiological function/classification of operation

	Emergency	Urgent	Scheduled	Elective	N/A
Total number of cases	**8**	**29**	**87**	**38**	**2**
Pulse rate recording	8	28	85	37	2
Blood pressure recording	8	28	85	38	2
Respiratory rate recording	7	21	69	28	1
Temperature	8	28	82	35	2
Central venous pressure measurement	6	4	3	2	-
Cardiac support drugs or anti-arrhythmic agents	3	5	12	5	-
Gastric aspiration	4	3	7	1	-
Intravenous fluids	8	21	34	13	1
Correction of hypovolaemia	6	8	11	3	-
Urinary catheterisation	7	19	35	16	-
Blood transfusion	4	8	17	4	-
Diuretics	3	2	10	3	-
Anticoagulants	-	4	6	5	-
Vitamin K	-	3	3	1	-
Antibiotics (pre- or intra-operative)	7	15	35	16	-
Bowel preparation	-	1	7	3	-
Chest physiotherapy	1	4	18	9	-
Oxygen therapy	4	7	7	5	-
Blood gas analysis	2	6	7	2	-
Pulse oximetry	5	7	14	7	-
Airway protection (e.g. in unconscious patients)	2	1	2	-	-
Tracheal intubation	2	2	5	3	-
Mechanical ventilation	2	2	4	1	-
Nutritional support	-	5	5	-	-
DVT prophylaxis	3	9	39	13	-
Others	-	4	4	-	-

N/A = not answered

NB this can be a multiple entry

In eight instances surgeons reported delays before an operation could commence. The main reason was the lack of an available theatre.

A general surgeon was presented with a 54-year-old man who was bleeding heavily after a ruptured right renal carcinoma. The patient was taking warfarin because of atrial fibrillation and also suffered from chronic obstructive airways disease. There was a considerable delay in vacating a theatre (there was no emergency theatre available) by which time the patient was exsanguinating. Anaesthesia and surgery were done swiftly and skilfully and, despite the haemorrhage and disseminated tumour, the patient survived for 10 days before suffering a fatal pulmonary embolus.

The outcome is unlikely to have been different for this particular patient however expeditiously he was treated but the incident highlights the difficulties, reported to the Enquiry by all specialties, surrounding access to operating theatres for patients requiring emergency surgery. If there is a genuine emergency and no emergency theatre is available then an appropriate operating list should be interrupted to provide access to a theatre for the emergency.

Use of regional/local anaesthesia administered by the surgeon

There were six cases where the surgeon was both the operator and the "anaesthetist" using local anaesthesia. The procedures included three cystoscopies (two of which were using a flexible instrument), a cystoscopy and insertion of urethral stent, the insertion of a haemodialysis shunt and a bilateral orchidectomy. The advisors made no comment on the appropriateness of these procedures but noted that all the subsequent deaths were due to advancing pathology or co-existent disease and that none were due to either the anaesthetic or operative techniques used.

Postoperative complications

Table S163 (q74)
Complications

	*n**=159
Cardiac arrest	24
Respiratory distress	19
Renal failure	19
Cardiac failure	18
Haemorrhage/postoperative bleeding	12
Stroke/neurological problems	9
Urinary tract infection	9
Generalised sepsis	9
Urinary retention/catheter blockage	8
Venous thromboembolus	8
Other organ failure	6
Nutritional problems	4
Persistent coma	2
Problems with analgesia	2
Miscellaneous	17

NB this can be a multiple entry

* five patients died in the operating theatre

The advisors were concerned that 19 patients died following transurethral resection for benign prostatic hypertrophy. The details of these particular cases are as follows;

Age	ASA Class	Cause of death	Associated problems
48	4	Carcinomatosis	Bronchial carcinoma
59	2	Myocardial infarction	
63	3	Cerebrovascular accident	Previous CVAs, hypertension and aortic aneurysm
63	5	Carcinomatosis	Carcinoma oesophagus
64	2	Myocardial infarction	Parkinson's disease
65	1	Myocardial infarction	Septicaemia
65	1	Renal failure	Diabetes mellitus
66	2	Myocardial infarction	Two previous MIs
66	3	Myocardial infarction	
66	3	Myocardial infarction	
67	2	Myocardial infarction	
68	2	Pulmonary embolus	Obesity
68	4	Not answered	
69	2	Myocardial infarction	Previous MIs
70	1	TUR syndrome	
70	2	Myocardial infarction	TUR syndrome
70	2	Carcinomatosis	Colonic carcinoma
70	2	Pulmonary embolus	Polycythaemia
70	2	Myocardial infarction	

Ten (56%) of these patients died following an acute myocardial infarction. All the cases were reviewed and discussed by the advisors. They considered that all the operations were justified in view of the patients' symptoms and that the care was appropriately delivered. Of the two patients who died, aged 68 and 70 years, following a pulmonary embolus, one had received heparin prophylaxis (patient with polycythaemia rubra vera) and the other patient (with obesity as a risk factor) had not.

Venous thromboembolism and prophylaxis

The 1991/92 NCEPOD Report[4] emphasised the need for urologists to increase the use of prophylactic measures against venous thromboembolism. In this series 64 (39%) patients received some form of prophylactic cover, which is double the usage reported previously (albeit in a different population). The methods used are shown below.

Table S164 (q42)
Use of thromboembolic prophylaxis

	n=64
Subcutaneous heparin (all types)	29
Anti-embolus stockings	28
Warfarin	4
Intermittent calf compression	6

NB this can be a multiple entry

Despite the increased use of prophylaxis the incidence of fatal pulmonary emboli is unchanged with 8/159 (5%) reported in 1990 and 8/164 (5%) in the current series. This is an interesting observation and suggests that pulmonary emboli remain a problem, but caution should be exercised in interpreting these figures as the groups of patients are not strictly comparable.

It should be noted that of the 12 cases where haemorrhage was reported as a postoperative complication, heparin had only been administered prophylactically to two patients. One patient, who was receiving subcutaneous heparin, bled after a transurethral resection of a bladder tumour, the other patient who received prophylactic heparin bled after a nephrectomy. In all, eight patients bled following a transurethral procedure, three after nephrectomies and one after the insertion of bilateral percutaneous nephrostomies. The advisors reiterated the comments made in the 1991/92 Report[4] that the ideal time to achieve haemostasis is at the first operation. Life-threatening haemorrhage in the postoperative period requires an expeditious return to the operating theatre.

Infection

The advisors commented that the emphasis on prophylaxis might be more profitably shifted to focus on the prevention of sepsis in urological surgery which appears to be a bigger problem than venous thromboembolism. They suggested that a nationwide audit of sepsis rates in urological surgery would be timely.

Postoperative use of intensive care (ICU) and high dependency units (HDU)

Thirty-one patients were admitted to either an ICU (26) or an HDU (5) immediately after their urological surgery. An additional 13 patients were admitted to the ICU after an initial period on a surgical ward.

There were 37 deaths in an ICU/HDU and seven patients died following transfer out of an ICU once the futility of further treatment had been recognised.

Surgeons reported that, in eight cases, they were unable to transfer a patient to an ICU/HDU despite the clinical need. Reasons included the non-availability of an appropriate bed (4), the absence of an ICU service at the hospital in question (2) and a difference of opinion between the surgeon and the ICU staff as to the need for intensive therapy (1). The advisors felt that there were examples of suboptimal care amongst this group.

A man aged 68 was being treated for a carcinoma of the bladder. The planned operation was a total cystectomy and ileal conduit; it was recognised that this would be a salvage procedure after failed irradiation and chemotherapy. The patient was classed as ASA 3. Preoperatively a cardiac assessment was done and a pulmonary artery catheter inserted to monitor cardiac function. Due to a low cardiac output after surgery, it was intended to admit the patient to the ICU. However, no bed was available for the first 24 hours. By this time acute renal failure was evident and the patient died on the second postoperative day following a myocardial infarction. A postmortem examination confirmed the cause of death and also an unsuspected carcinoma of the left renal pelvis.

If the tumour in the left kidney had been diagnosed preoperatively then surgery would not have been indicated. Be that as it may, the surgeon was not aware of this and the cystectomy was appropriately done. After taking such care to prepare the patient for surgery it is less than satisfactory that the postoperative care was not delivered to the same standard (through no fault of the surgeon in charge).

Difficult decisions

Surgery to relieve symptoms in the presence of terminal malignancy requires good judgement, a perception of risk and discussions with the patient and relatives about the quality of life. Surgeon and anaesthetist should then agree the indications for surgery whilst acknowledging the risks. These decisions should be made at consultant or senior registrar level and the anaesthetist and surgeon involved should then personally supervise the anaesthesia and surgery.

There were many examples of good practice amongst urologists in this difficult area. However, the advisors did point out that there are misconceptions when treating multiple pulmonary metastases from renal adenocarcinomas.

Vascular Surgery

NCEPOD wishes to thank the consultants in vascular surgery who acted as advisors in the preparation of this section:

Mr R N Baird	(South Western)
Professor K G Burnand	(South East Thames)
Mr J Collin	(Oxford)
Mr J M D Galloway	(Yorkshire)
Mr D C Wilkins	(South Western)

Key issues

- Ruptured abdominal aortic aneurysms continue to be an important cause of death and contribute towards a heavy "out-of-hours" workload for surgeons "on-call" for vascular surgery.
- Vascular surgery imposes a high demand on ICU/HDU services.

Sample

517 questionnaires were received from 198 hospitals.

Patient profile

Table S165 (qs5 and 6)
Age and sex of patient at final operation

Years	Male	Female	Total
6 to 10	-	-	-
11 to 20	-	-	-
21 to 30	1	1	2
31 to 40	3	2	5
41 to 50	13	7	20
51 to 60	55	20	75
61 to 70	324	91	415
Total	**396**	**121**	**517**

Four-hundred-and-ninety (95%) of the patients were between 51 and 70 years of age and 390 (75%) were in ASA classes 3, 4 and 5. Surgeons stated (question 41) that 50 patients were expected to die and that an additional 337 patients were in a high risk category. The most commonly recognised co-existing diseases were cardiac problems (61%) and respiratory diseases (28%). This information should be interpreted in combination with the range of procedures performed and, in particular, the high numbers of ruptured abdominal aortic aneurysms.

Table S166 (q39)
Co-existing problems at time of final surgery

Cardiac	315
Respiratory	146
Renal	95
Endocrine (including diabetes mellitus)	76
Sepsis	56
Neurological	55
Haematological	49
Gastrointestinal	47
Musculoskeletal	23
Psychiatric	12
Alcohol-related problems	8
Drug addiction	3
Genetic abnormality	1
Other	48

NB this can be a multiple entry

Admission details

Table S167 (q12)
Initial admission intention for the final operation

Elective	99
Urgent	70
Emergency	348
Total	**517**

The table above demonstrates the heavy load of emergency/urgent work in vascular surgery.

Table S168 (qs 12 and 54)
Elective admissions - final operation taken

Reconstruction for occlusive aortic disease	22
Repair of aortic aneurysm	19
Lower limb revascularisation	17
Amputation (lower limb)	17
Carotid surgery	5
Miscellaneous	19
Total	**99**

Table S169 (q54)
List of procedures (elective and emergency)
(These may be multiple for individual patients)

Aneurysm surgery	
Repair of ruptured abdominal aortic aneurysm	187
Elective surgery for abdominal aortic aneurysm	46
Repair of ruptured iliac aneurysm	1
Repair of femoral aneurysm	1
Reconstruction for occlusive aortic disease	
Aortobifemoral bypass	15
Axillobifemoral bypass	12
Axillofemoral bypass	3
Femorofemoral bypass	3
Aortic endarterectomy/thrombectomy	3
Lower limb revascularisation	
Femoral embolectomy (may be bilateral)	27
Femoropopliteal bypass (all techniques)	14
Graft thrombectomy (various sites)	9
Femorodistal bypass	5
Embolectomy for saddle embolus	4
Thrombectomy of peripheral artery	4
Exploration of popliteal artery	3
Iliofemoral bypass	3
Iliofemoropopliteal bypass	1
Iliac angioplasty	1
Lower limb amputations	
Amputation (all levels)	117
Carotid surgery	
Carotid endarterectomy	6
Exploration of carotid artery (trauma)	1
Internal carotid artery bypass	1
Others	
Debridement and/or fasciotomy	14
Closure of aortoduodenal fistula	10
Brachial embolectomy	4
Evacuation of haematoma (various sites)	4
Insertion of A-V shunt	3
Removal of infected aortic graft	3
Varicose vein surgery	2
Creation of A-V fistula	2
Miscellaneous	13

The most common operation was the repair of a ruptured abdominal aortic aneurysm demonstrating that this is a disease that also affects people in the 60 to 70 age group.

There were 40 cases within those admitted as urgent or emergency cases where delay in referral was said to have occurred. These delays were divided equally between those due to a delayed medical referral and those where the patient delayed presenting for medical help.

In 47 (9.2%) cases there was a transfer from another hospital. The reasons given included a lack of ICU beds or the absence of a surgeon with vascular expertise. Referrals were not necessarily to the nearest hospital but to the most appropriate centre. Of the 47 patients who were transferred, 34% deteriorated during the transfer (See page 57 Anaesthesia section).

The surgical team

Table S170 (q1)
Special interest of consultant surgeon in charge at time of final operation

General with a special interest in vascular surgery	345
General with a special interest in gastroenterology	74
General surgery	48
Vascular surgery	20
General with a special interest in urology	9
General with a special interest in breast surgery	6
General with a special interest in transplantation	4
Orthopaedic	4
General with a special interest in endocrinology	3
Transplantation	3
General with a special interest in trauma	1
Total	**517**

Seventy-two percent of the patients with vascular disease, or who required vascular procedures, were operated on by surgeons whose special interest was in vascular or transplant surgery. Occasionally two consultants operated together.

Surgeons whose vascular skills are not routinely tested may have difficulties with complex cases.

Table S171 (qs 34 and 35)
The most senior grade of surgeon involved in decision-making prior to surgery

		(Locums)
Consultant	487	(16)
Associate specialist	2	
Senior registrar	17	(1)
Registrar	10	(1)
Senior house officer	1	
Total	**517**	

This table shows that consultants were heavily involved in the management of most (94%) patients.

Table S172 (qs 49 and 52)

Grade of the most senior operating surgeon and the availability of a more senior surgeon

Grade of surgeon		(Locums)	Senior surgeon was immediately available in the operating room/suite
Consultant	356		n/a
Associate specialist	2		1
Senior registrar	76	(6)	17
Registrar	72	(3)	18
Staff grade	2		1
Senior house officer	9		4
Total	**517**	**(9)**	

Consultants and associate specialists were personally involved in the surgery of 358 (69%) patients. If senior registrars are included, then senior surgical staff operated on 84% of the patients.

The nine cases performed by senior house officers were five above-knee amputations, two debridements of amputation stumps, the debridement of a sacral pressure sore and the insertion of an A-V shunt into a leg. These were reasonable procedures in 1992/93 for experienced senior house officers to perform and 4/9 (44%) were supervised with senior help providing close support. The senior house officers were attached to teams with special interests in vascular surgery (6/9, 67%), transplantation (1/9), gastroenterology (1/9) and colorectal surgery (1/9). Case selection and supervision are important in order to provide reasonable training; however, technically demanding procedures must not be delegated.

Table S173 (qs 49 and 57)

Grade of operating surgeon/classification of operation

	Emergency	Urgent	Scheduled	Elective	Not answered
Consultant	197	78	45	32	4
Associate specialist	1	-	-	1	-
Senior registrar	44	20	9	3	-
Registrar	16	37	18	1	-
Staff grade	-	2	-	-	-
Senior house officer	2	6	1	-	-
Total	**260**	**143**	**73**	**37**	**4**

There were a few instances where the grade of anaesthetist and surgeon were thought to be inappropriate. For instance, the advisors commented that it was unreasonable to put trainees in difficult positions such as expecting them to cope with revisional surgery after a previous repair of an abdominal aortic aneurysm.

Table S174 (qs 42 and 57)

Preoperative precautions or therapeutic manoeuvres to ensure adequate physiological function/classification of operation

	Emergency	Urgent	Scheduled	Elective	N/A
Total number of cases	**260**	**143**	**73**	**37**	**4**
Pulse rate recording	252	140	72	37	4
Blood pressure recording	252	140	72	37	4
Respiratory rate recording	197	120	62	25	2
Temperature	172	135	71	36	3
Central venous pressure measurement	117	28	13	7	1
Cardiac support drugs or anti-arrhythmic agents	69	44	21	9	1
Gastric aspiration	77	24	6	3	1
Intravenous fluids	222	98	45	11	2
Correction of hypovolaemia	162	42	14	4	2
Urinary catheterisation	198	71	35	18	3
Blood transfusion	119	18	12	5	2
Diuretics	17	25	18	9	-
Anticoagulants	15	29	11	2	-
Vitamin K	3	1	-	-	-
Antibiotics (pre- or intra-operative)	135	106	56	29	-
Bowel preparation	4	-	3	-	-
Chest physiotherapy	24	39	24	10	-
Oxygen therapy	163	52	23	3	3
Blood gas analysis	84	45	23	3	1
Pulse oximetry	114	42	23	3	3
Airway protection (e.g. in unconscious patients)	23	8	4	2	-
Tracheal intubation	60	17	14	2	1
Mechanical ventilation	49	15	10	3	1
Nutritional support	4	6	2	1	-
DVT prophylaxis	47	74	36	18	2
Others	8	7	6	3	-

N/A = not answered

NB this can be a multiple entry

Hospital type and resources available

Table S175 (q2)
Type of hospital in which the final operation took place

District General hospital	371
University/teaching hospital	139
Surgical specialty hospital	3
Community hospital	1
Independent hospital	3
Total	**517**

Table S176 (q66)
Services available in the hospital in which the final operation took place

Theatre recovery area	423
Adult ICU	446
Adult HDU	115
None of the above	12
Not answered	17

NB this can be a multiple entry

Ten of the patients could not be admitted to the ICU in the hospital where the surgery took place because of a lack of beds. In all, 246 patients were treated in an ICU during the postoperative period of whom 213 required mechanical ventilation of the lungs. This specialty imposes a considerable workload on ICU services. Centres receiving vascular emergencies need to have an adequate provision of usable ICU or HDU beds in order to cope with the heavy unpredictable demand. The advisors commented that some patients, where there was clearly no hope of recovery, were kept in ICU too long. This is not a criticism of the role of ICU or intensivists, but highlights the need for a multi-disciplinary discussion about the patient management within the context of an ICU. Once the futility of the situation was recognised, and after appropriate discussion, the patients in question could have been moved to a surgical ward (see Anaesthesia section page 87).

Time of surgery

Table S177 (q46a)
Day of operation

Monday	73
Tuesday	94
Wednesday	96
Thursday	81
Friday	76
Saturday	56
Sunday	41
Total	**517**

Of the 420 operations done between Monday and Friday, 146 (35%) were done "out-of-hours" i.e. commenced between 18.01 and 07.59. The time of surgery on Saturdays was between 08.00 and 13.00 in 34/56 cases.

Table S178 (q74)
Postoperative complications

	n=422*
Renal failure	134
Cardiac failure	132
Myocardial infarction	102
Respiratory distress	98
Haemorrhage	77
Generalised sepsis	44
Peripheral ischaemia	37
Multiple organ failure	35
Stroke or other neurological problems	33
DVT and pulmonary embolus	25
Wound infection	22
Hepatic failure	16
Wound dehiscence	10
Persistent coma	10
Nutritional problems	8
Pressure sores	7
Miscellaneous	58

NB this can be a multiple entry

* 95 patients died in theatre

Thromboembolic disease

Thromboembolic prophylaxis was given to 177 patients. In many vascular cases such prophylaxis is inappropriate.

Table S179 (q42)
Method of DVT prophylaxis

	n=177
Subcutaneous heparin	107
Low molecular weight heparin	8
Aspirin	2
Dextran	1
Patient on warfarin	7
TED stockings	19
Intermittent calf compression	3
Not specified	37

NB this can be a multiple entry

Table S180 (q42)
Use of DVT prophylaxis

		DVT prophylaxis used			DVT prophylaxis not used		
	Total	PE	No PE	Total	PE	No PE	Total
Elective	**37**	4	14	18	3	16	19
Scheduled	**73**	1	35	36	3	4	37
Urgent	**143**	8	66	74	5	64	69
Emergency	**260**	0	47	47	0	213	213
Not answered	4	1	1	2	0	2	2
Total	**517**	**14**	**163**	**177**	**11**	**329**	**340**

In total there were 14/177 (7.9%) pulmonary emboli in patients where prophylaxis was given compared to 11/340 (3.2%) when prophylaxis was not used. Was the DVT prophylaxis used effective in preventing pulmonary emboli? The table above might suggest that it was not; it gives the figures for the occurrence of pulmonary emboli in elective, urgent and emergency operations and shows whether prophylaxis was used.

Postmortem examinations and audit

Postmortem examinations were done on 224 (43%) patients. Of these, 169 (75%) were done at the request of a Coroner and 55 (25%) were done as hospital examinations. Four-hundred-and-fifty-four cases (88%) were considered at an audit meeting.

Ruptured abdominal aortic aneurysms

Ruptured abdominal aortic aneurysms continue to feature as a major source of postoperative deaths because they are common, often technically difficult and are known to have a 100% mortality if not operated upon. The clinical impression is that the time taken from the onset of symptoms until the application of an aortic clamp is crucial to the outcome for the patient. However, the authors are unaware of any published data which precisely quantify the increased risk of perioperative morbidity and mortality associated with delay. Wherever possible surgery should be done at the receiving hospital provided that hospital also has appropriate services for the postoperative management of the patient. In this enquiry the management of ruptured aneurysms appeared timely with no apparent delays in the provision of care for these critically ill patients. Consultant surgeons or senior registrars operated on 96.2% of the cases. The advisors pointed out that patients with ruptured abdominal aortic aneurysms should not be over-resuscitated before the proximal clamp was applied to the neck of the aneurysm. It was also felt that in the difficult case, delay in diagnosis might be avoided if diagnostic abdominal ultrasound scanning were available in the Accident & Emergency department. It is important that this investigation should be reserved only for patients where there is diagnostic difficulty and that time-wasting whilst obtaining such an ultrasound should not interfere with the clinical need for immediate intervention.

Table S181 (q1)
Who operated on these patients (ruptured abdominal aortic aneurysms)?

Specialty of consultant surgeon

General/vascular	101
General/gastroenterology	44
General	29
General/other	7
Vascular surgery	2
General/urology	2
General/endocrinology	2
Total	

Table S182 (qs 34, 35 and 49)
Grade of the most senior surgeon consulted and operating on these ruptured aortic aneurysms

	n=187			
	Consulted	(Locums)	Operating surgeon	(Locums)
Consultant	170	(8)	143	(6)
Associate specialist	1		1	
Senior registrar	14	(1)	37	(3)
Registrar	2		6	

Table S183 (anaesthetic questionnaire)
Grade of the most senior anaesthetist (ruptured aortic aneurysms)

	n=141*
Consultant	93
Associate specialist	3
Senior registrar	25
Registrar	10
Staff grade	7
Clinical assistant	2
Senior house officer	1

* number of cases for which both questionnaires were returned.

In 86% of cases the grade of anaesthetist involved was a consultant, senior registrar or associate specialist. For surgeons the figure was 97% with the remaining cases being treated by a registrar (only 6/187, of whom none were locums).

The incidence of aortic aneurysms is increasing and despite the excellent care detailed above there is still a considerable mortality following surgery for ruptured abdominal aortic aneurysms because these cases present difficult technical problems and the patients are often *in extremis* on presentation. Whether or not the early detection of asymptomatic abdominal aortic aneurysms by screening, and subsequent early surgery, will reduce the incidence and mortality of ruptured aortic abdominal aneurysms is currently being debated within vascular surgical circles, but is outside the remit of this enquiry.

Table S184 (qs 47 and 49)
When did the patients with ruptured abdominal aortic aneurysms have surgery and who treated them?

n=187

Grade of surgeon	08.00-17.59 hours	18.00-07.59 hours
Consultant	69	74
Associate specialist	1	-
Senior registrar	20	15
Registrar	5	1

(The time was not stated in two cases)

n=141

Grade of anaesthetist	08.00-17.59 hours	18.00-07.59 hours
Consultant	53	40
Associate specialist	2	1
Senior registrar	11	13
Registrar	5	5
Staff grade	4	3
Senior house officer	-	1
Clinical assistant	-	2

Consultant anaesthetists were involved in 62% (40/65) of ruptured aortic aneurysms which occurred out-of-hours. The inclusion of senior registrars and associate specialists brings the figure of senior anaesthetists to 83% (54/65). These patients are seriously ill and those who survive surgery present challenging pathophysiological problems to intensivists and anaesthetists. It is therefore surprising that senior anaesthetists were not involved in a higher percentage of cases. It is acknowledged, however, that consultant anaesthetists when on call cover not only surgery but many other specialties and may not always be available to attend. There is a case for the better deployment of those fully trained anaesthetists who are able to provide senior anaesthetic expertise for complex cases such as ruptured abdominal aortic aneurysms (see Anaesthesia section, page 48).

Carotid endarterectomy

The number of deaths in our sample was small. Because of the design of this enquiry we are unable to comment on the incidence of adverse outcomes other than death.

Varicose vein surgery

There were two deaths in obese patients with varicose veins, both from pulmonary emboli. Early mobilisation should be encouraged, with added measures for those at increased risk such as obese patients, those with prolonged bilateral operations and those who have a history of a previous deep vein thrombosis or pulmonary embolus. It is most important to warn obese patients of the risk of varicose vein surgery.

Pathology

Pathology

NCEPOD wishes to thank the consultant pathologists who acted as advisors to the Enquiry and prepared the section on pathology:

Dr B J Addis	(Wessex)	Professor D A Levison	(South East Thames)
Dr H Bharucha	(Northern Ireland)	Dr A W Popple	(Northern)
Dr N R B Cary	(East Anglia)	Dr J M Theaker	(Wessex)
Dr D Cotton	(Trent)	Professor P G Toner, *Chairman*	(Northern Ireland)
Dr P S Haselton	(North Western)		

Key issues

- The number of postmortems performed remains too low.
- Poor communications persist in some cases between surgeons and pathologists.
- The overall quality of both Coroners' and hospital postmortems is generally satisfactory, but would be improved by the wider observance of the Royal College of Pathologists' "Guidelines for Postmortem Reports".
- Pre-printed formats for postmortem reports are undesirable because they arbitrarily limit the space available for description and interpretation.
- The OPCS cause of death format is incorrectly used by some clinicians and pathologists. Improved guidance from the Royal Colleges is recommended.
- A concise, jargon-free explanation of the principal findings (clinico-pathological correlation) should be a part of every postmortem report.
- Value judgements on surgical or anaesthetic technique should be avoided in postmortem reports.
- Contacts between the Royal College of Pathologists and the Coroners' Society of England and Wales should be developed to address issues of common interest.

Review process and sample

The members of the advisory group of consultant pathologists represented academic, district general and forensic pathology practice. The group met on 10 occasions and reviewed 883 postmortem reports (tables P8 to P21) of which 654 were Coroners' and 229 were hospital examinations. In 592 cases where the surgical questionnaire indicated that a postmortem examination had been carried out, a copy of the report was not submitted to the NCEPOD office. It is disappointing that the view should be so incomplete. Consultant surgeons should ensure that the full report is made available to the Enquiry in all cases where a postmortem has been carried out. The postmortem data from 3288 surgical questionnaires were also reviewed (tables P1 to P7).

Deaths reportable to the Coroner

Within the sample of 3288 deaths, 56% were reported to the Coroner and 61% of these reported cases resulted in a Coroner's postmortem. Failure to identify reportable deaths has been a theme in previous NCEPOD reports).[4] All doctors should be aware of those deaths that require referral to the Coroner. Pathologists should make themselves available to provide guidance in individual cases.

Any case should be referred to the Coroner if the medical practitioner cannot readily certify death as being due to natural causes within the terms of regulation 41 of the "Registration of Birth and Deaths Regulations 1987". The following are some of the major categories:

- ◊ There is any element of suspicious circumstances or a history of violence.
- ◊ The death may be linked to an unnatural event.
- ◊ The death may be due to industrial disease or related in any way to the deceased's occupation.
- ◊ The death is linked with an abortion.
- ◊ The death occurred during an operation or before full recovery from the effects of anaesthesia, or was in any way related to the anaesthesia.
- ◊ The death was related to a medical procedure or treatment.
- ◊ The actions of the deceased may have contributed to his or her own death, for example by suicide, self-neglect or drug abuse.
- ◊ The death occurred in police or prison custody.
- ◊ The deceased was detained under the Mental Health Act.
- ◊ The death occurred within 24 hours of admission to hospital (not statutory, but desirable).

If doubt persists, discussion with the Coroner is always advisable.

Coroners' postmortems

In the course of its work, the group identified several issues concerning interactions between Coroners and pathologists, which could have a bearing on postmortem practice. Some Coroners prefer to confine postmortem reports to pre-printed formats, may be reluctant to sanction further scientific studies which are perceived as not essential to establish the cause of death, may restrict the circulation of the postmortem report to the exclusion of the clinician concerned, may refuse to accept cases of sudden or unexpected death, when these would appear to be best treated as Coroners' cases and may on occasion request postmortems from medical practitioners who do not hold an appropriate pathology qualification. Problems also exist in relation to the retention of tissues for teaching and research. It was recognised that some of these issues are determined by statute, while others lie wholly within the Coroner's wide discretion.

The group was fortunate to secure a meeting with Mr Burgess, Secretary to the Coroners' Society of England and Wales, to discuss these and other issues. It was agreed that it would be in the interests of all concerned for the Royal College of Pathologists to develop its contacts with the Coroners' Society and seek, through regular meetings, to establish a continuing dialogue on matters of mutual concern.

Postmortem requests

Table P1 (questions 83 and 83A)
If a Coroners' postmortem was not performed (or questions 82/82A were not answered), was a hospital postmortem requested?

Yes	696
No	1318
Not answered	141
Total	**2155**

If yes, was a postmortem performed?

Yes	341
No	353
Not answered	2
Total	**696**

Table P2 (q83)
If a postmortem was not requested, why not?

No reason given	309
Diagnosis already made/cause of death clear	722
Against patient's/relatives' religion	4
Distressed relatives	20
Not available/difficult to obtain	6
Another specialty looking after patient	29
Body removed to another hospital/death at another hospital	7
Cause of death unrelated to surgery	1
Considered unnecessary/inappropriate	96
Coroner indicated that it was not necessary	45
Death at home	11
Not known	54
Should have been requested	8
No relatives	2
Independent hospital	1
Organs donated for transplant	2
Patient was HIV positive	1
Total	**1318**

Table P3 (questions 82 and 83)
Number of postmortem examinations performed

Coroners'	1134
Hospital	341
Total	**1475**

Table P4 (q83A)
If a hospital postmortem was requested, and not performed, why not?

Relatives refused permission	333
Religious background of the patient	2
Hepatitis risk to staff	2
No reason stated	2
Not considered necessary by pathologist	2
Not known	2
Not answered	10
Total	**355**

A hospital postmortem was requested in only 34.6% of cases (excluding questionnaires where the question was not answered). The most commonly given reason for not requesting a postmortem was that the diagnosis was already made, or the cause of death was clear. Many published studies, however, have shown that in a very substantial proportion of cases, significant discrepancies are found between the antemortem clinical diagnosis and the postmortem findings, even in cases where the clinicians concerned are confident of their diagnosis.[28,29,30]

A joint recommendation from the Royal Colleges of Surgeons, Physicians and Pathologists entitled "Autopsy and Audit"[31] has emphasised the importance of increasing the number of autopsy requests. Surgeons and anaesthetists should be aware that an antemortem diagnosis confirmed by postmortem examination is of positive value in terms of education and audit, assists in determining the general reliability of cause of death statistics and contributes in many other ways to teaching, training, research and the quality of professional practice. This issue is addressed more fully below.

Permission for a hospital postmortem was refused in almost 50% of cases where a request was made. It is well recognised that certain areas of clinical specialisation, such as paediatrics, cardiothoracic surgery and neurosurgery, regularly seek and attain very high hospital postmortem rates. This suggest that a positive attitude towards the postmortem on the part of the clinician can influence relatives in favour of granting permission. Often the responsibility of requesting permission falls to the most junior doctors. It is recommended that more senior doctors should be involved in the process.

All doctors who may be required to seek permissions should be aware of the many uses of the postmortem, which go well beyond the simple determination of the cause of death. These include the following;

Uses of the postmortem

1. To assess the accuracy of clinical diagnosis.
2. To assist in the audit of clinical care.
3. To enhance the accuracy of death certification.
4. To improve the quality of the Registrar General's cause of death statistics, with implications for national health policy.
5. To assist in medical undergraduate teaching.
6. To assist in general postgraduate medical and surgical training.
7. To assist in the training of professional pathologists.
8. To obtain tissue for transplantation.
9. To advance medical research in the clinical, pathological and basic medical sciences.
10. To validate and monitor new and established diagnostic procedures.
11. To monitor the effectiveness and side effects of new medical and surgical therapies.
12. To assist in counselling the bereaved, especially the parents of children stillborn, or dying of conditions which might have a genetic basis.
13. To identify genetically determined conditions which may affect relatives of the deceased, who could be identified by kindred screening and offered early diagnosis and treatment for pre-symptomatic disease.
14. To detect deaths due to unnatural causes.
15. To assist the police and judiciary in criminal investigations.
16. To assist the courts in legal actions for compensation for industrial injury or negligence.

By the judicious selection and positive presentation of arguments based on these uses, it is likely that a much higher postmortem rate could routinely be obtained.

In summary, only 16.9% of cases where a hospital postmortem could have been carried out (excluding 143 questionnaires in which the questions were not answered) actually came to postmortem. This figure is disappointingly low.

Communication between pathologists and surgeons

Table P5 (q84)
Was the surgical team informed of the date and time of the postmortem?

Yes	720
No	599
Not answered	156
Total	**1475**

Table P6 (q85)
If the surgical team was informed of the time and date, which members of the surgical team attended the postmortem?

House officer	91
Senior house officer	112
Registrar	127
Staff grade	4
Senior registrar	44
Associate specialist	5
Consultant	107
None of the above	282
Not answered	28
Total	**720**

NB this can be a multiple entry

There is an apparent failure on the part of both pathologist and surgeon to obtain the full benefit of clinico-pathological correlation which can be drawn from the postmortem. If clinicians are unaware of the time of the postmortem they cannot be expected to attend. Pathology departments should organise themselves to overcome this problem.

Even when surgeons were informed of the timing, 39.1% failed to attend. It is recognised that other clinical commitments may make attendance at postmortems difficult, although every effort should be made to have at least one member of the clinical team present to discuss the case with the pathologist.

There are, however, cases where it is deemed necessary for the postmortem to be carried out by an "independent" pathologist, or where there is a need for some special pathology expertise not locally available, which sometimes results in the body being transported to a public mortuary, or to another hospital, inconveniently distant from the surgical unit involved. This practice clearly limits the possibility of effective communication between pathologist and clinicians and should be discouraged unless it is unavoidable. The increasing availability of video recording and telecommunication facilities should be exploited to compensate for any unavoidable physical separation of pathologists and surgeons.

Table P7 (q86)
Did the consultant surgeon and his/her team receive a copy of the postmortem report?

Yes	1166
No	261
Not answered	48
Total	**1475**

In 18.3% of these cases (excluding questionnaires in which the question was not answered), the surgeon failed to receive a written report. This also suggests poor communication between pathologists and surgeons. While valuable personal and telephone contact may well have been made in many of these cases, it is vitally important that a written record be produced, communicated and filed in an appropriate location for every postmortem report. In particular, care should be taken to ensure that a copy of the postmortem is filed as part of the clinical case record of the deceased. In Coroners' cases, the postmortem should routinely be made available to the surgeon and anaesthetist. No interest is served, and the quality of future clinical care may be impaired, by restriction of circulation to the exclusion of the clinicians concerned.

Review of postmortem reports

The review group began its work by considering the check-list used by the 1991/92 group in its assessment of postmortem reports. In the interests of continuity, the broad layout and content of this check-list was retained, although a number of minor amendments were made. The format of the check-list used in the present review is reproduced in Appendix F.

The "Guidelines for Postmortem Reports"[32] produced by the Royal College of Pathologists could be expected to have begun to influence postmortem standards after publication in August 1993. This fell after the period covered by this review, but before the pathologists' deliberations. The group was aware of being influenced in its judgements by these guidelines.

The Royal College Guidelines should serve for all postmortems, whether hospital, Coroners' or forensic cases. They state that a postmortem report should normally include the following components:-

- ◊ Demographic details
- ◊ History
- ◊ External examination
- ◊ Internal examination
- ◊ Histology report
- ◊ Summary of finding
- ◊ Commentary/conclusions
- ◊ Cause of death (OPCS format).

The check-list used by the group was designed to address these and other more detailed aspects of the postmortems under examination.

Table P8
Is the report typewritten?

Yes	877
No	6

Only six reports were not typewritten. While handwritten reports are strongly discouraged, it was recognised that in exceptional circumstances they were no doubt unavoidable. Only one of the six handwritten reports was considered to be of an unacceptable standard in terms of its content.

Table P9
Is a clinical history provided?

Yes	690
No	193

The presence of a clinical history at least implies that the pathologist has had access to and has made use of the clinical details of the case. Reference in the postmortem report to correspondence, or more particularly to operation notes which are not available with, or summarised, in the report, is not acceptable.

The general standard of clinical histories was satisfactory, only 1.4% being considered unacceptable. One area of concern was the frequent lack of relevant details of anaesthetic management; such information should always be available to the pathologist prior to the autopsy.

Pre-printed report formats were not infrequently found to restrict the space available for the clinical history and other important sections of the report. The group strongly discourages the continued use of such proformas, which are widely prevalent in Coroners' postmortems. The extension of the use of pre-formatted report frameworks on word processors is to be encouraged, as this permits flexibility in space allocation, while retaining the benefits of a standard layout.

The descriptions of external appearances were generally good, but 2.7% were regarded as unacceptably brief and inadequately detailed. The measurement of scars and incisions remains a problem. These were fully documented in only 56.4% of cases.

The gross descriptions of the internal organs were generally satisfactory, but 2.3% were considered unacceptable. In 10.7% of cases the skull and brain were not examined, without clear evidence that a request had been made for a limited postmortem examination. The weighing of six organs, paired organs counting as one, was the norm. While some members of the panel had reservations about the practical value of weighing multiple organs in all cases, as recommended by the College Guidelines, all were agreed that weighing no organs at all, as in 11.2% of cases, was unacceptable.

Table P10
Is the gross examination appropriate to the clinical problems?

Yes	804
No	79

While it was difficult for the group to assess this retrospectively, it was considered important that the pathologist's report should provide detailed information of interest to the surgeon, even though not immediately pertinent to the cause of death. The operation site should always be described in detail. The principal findings however, may be quite unrelated to the perceived clinical problem. This underlines the importance of the postmortem, even in cases where the surgeon believes that the cause of death is already known.

Table P11
Samples were taken for;

Histology	221
Microbiology	16
Toxicology	9
Other	16
None of these investigations	636
Total	**883**

NB this can be a multiple entry

Table P12

Is a histological report included with the postmortem report?

Yes	157
No	726

If yes, the histological report is:

Unacceptably brief, obscure, not relevant to clinical need in this case	2
Poor	21
Satisfactory	79
Good	43
Fully detailed, informative, relevant to clinical need	12

Histology reports frequently become separated from the macroscopic reports. The extent to which this had occurred was difficult to assess with any accuracy, but it was often apparent, from internal evidence, that tissue had been taken for histology, but was not formally described. It is recognised that the filing of postmortem reports with the clinical records of the deceased often presents problems, especially if a significant period of time has elapsed since death. It is recommended for NCEPOD purposes that surgeons make every effort to ensure that the full postmortem report is submitted to the Enquiry, referring if necessary to the pathologist concerned.

Pathologists should record in their postmortem reports whether histology is, or is not, being performed, noting this specifically at the end of the gross examination report and ideally listing the organs and tissues sampled. Pathologists should also make every effort to produce their histological reports quickly, so that they are included along with the macroscopic reports. A histology report submitted separately, long after the postmortem, is of little value or interest to the surgeon.

Table P13

A thorough postmortem in this case would have called for;

		Sample not taken
Histology	658	451
Microbiology	82	75
Toxicology	9	7

NB this can be a multiple entry

Table P14

When absent, does the lack of histology detract significantly from the value of this report?

Yes	334
No	392
Total	**726**

The Royal College of Pathologists' guidelines call for histology in all postmortems. The group acknowledged the value of this general recommendation, especially in securing a vital resource of normal and abnormal tissues and related clinical and pathological data, for research based on retrospective studies. Having said this, the group recognised that in many of the cases studied, histology would not have been expected to offer further insight into the particular clinical problem under consideration. In 46% of cases, however, it was considered that the lack of histology materially detracted from the direct diagnostic value of the postmortem. The general failure of pathologists to undertake relevant microbiological and toxicological studies is regrettable. The postmortem is a scientific investigation which is often incomplete without evidence from such additional tests.

It is recognised that the case mix in the present sample, limited to perioperative deaths, cannot be taken as representative of postmortem practice in general.

Table P15

Is a summary of lesions present?

Yes	236
No	647

Table P16

When present, does the summary correspond accurately to the text report?

Yes	208
No	28

Summaries of lesions are of value to surgeons, particularly in complex and detailed postmortems. They also assist pathologists in teaching, training and research, by permitting the coding and subsequent identification of specific pathological findings and thus the retrieval of often rare material for retrospective study. When present, these summaries generally corresponded accurately to the text.

Table P17
Is an OPCS format cause of death present (see glossary, appendix C)?

Yes	724
No	159

If yes, does it correspond accurately to the text report?

Yes	578
No	146

Does it follow OPCS formatting rules?

Yes	577
No	147

OPCS causes of death are generally required by Coroners and are often used in hospital postmortem reports. Quite frequently, they do not correspond accurately to the associated text or conform to OPCS formatting rules. This is detrimental to the overall quality of reports and has particular relevance to the quality and reliability of the Registrar General's cause of death statistics, which are drawn from death certificates. It would be helpful for the Royal Colleges to institute an educational programme in this area.

The group noted not infrequently that the OPCS cause of death made no reference to the previous surgical procedure, with the result that the recorded findings were sometimes misleading or even incomprehensible. The group wondered whether inaccurate or incomplete OPCS formats might on occasion reflect pressure on pathologists, whether from Coroners or from surgeons, out of concern for the sensitivities of families of the deceased in certain types of cases.

Table P18
Is a clinico-pathological correlation present?

Yes	377
No	506

If yes, the clinico-pathological correlation is:

Unacceptably brief, obscure, uninformative	3
Poor	53
Satisfactory	169
Good	117
Clear, concise, fully informative, accurate	35

The clinico-pathological correlation remains a common deficiency in postmortem reports. When present, 15% were of an unacceptable or poor standard. Clinico-pathological correlations are somewhat more common in postmortems for Coroners who encourage a jargon-free summary of the medical findings and of the cause of death, particularly when an inquest may be required. Pathologists should recognise that many clinicians, including junior staff and medical students, are likely also to benefit from such a presentation of the key pathological findings and conclusions.

Value judgements on surgical technique

Early in its deliberations, the group was made aware of sensitivities on the part of surgical teams to the expression by pathologists, in postmortem reports, of what are perceived by the clinicians as value judgements on their surgical technique. The pathologist must accurately describe surgical wounds and must offer a proper professional interpretation of these findings, which may materially relate to the cause of death, as in the case of breakdown of a suture line in a bowel anastomosis, or the uncovering of an abscess at the site of surgery. It is equally necessary for intact sutures and clean wounds to be so described, to indicate that these had no bearing on the cause of death.

The group was aware that Coroners often expected the pathologist to make clear statements on the surgical procedure in the postmortem report. There is, however, a fine line between factually describing an operative site and offering gratuitously patronising comments on the surgical technique. Pathologists should be sensitive to the risk of giving offence where none is intended.

Overall evaluation of the postmortem

Table P19
The overall evaluation of the postmortem was:

Unacceptable, laying the pathologist open to serious professional criticism	27
Poor	220
Satisfactory	378
Good	226
Excellent; an exemplary report, meeting the highest standards of practice	32
Total	**883**

The number of reports identified as unacceptable overall was commendably low at 27 (3%), but the combined total of "unacceptable" and "poor" reports, at 247 (28%), was disappointing.

In this overall evaluation, there was little apparent difference between Coroners' and hospital cases, although significant variations did occur in some of the individual elements of the review. For example, no organ weights were recorded in 13% of Coroners' cases and in 6% of hospital cases; a summary of lesions was present in 18% of Coroners'cases and in 57% of hospital cases; an OPCS format was present in 90% of Coroners' cases and in 59% of hospital cases; and a histopathology report was present in 15% of Coroners' cases and in 27% of hospital cases.

Direct comparisons should not be drawn between these figures and the findings of previous NCEPOD postmortem reviews, since this report is the first to take full account of the Royal College of Pathologists' guidelines for the postmortem. It is hoped that these Guidelines will have a progressively beneficial effect on the quality of both Coroners' and hospital postmortem practice, as they are increasingly incorporated by both "providers" and "purchasers" of postmortems into standards for internal and external audit.

Clinical relevance

Table P20 (surgical questionnaire)

Was the pathological information given useful, i.e. did it contribute additional information to the understanding of the patient's illness? If not, why not?

Yes	920
No	381
Not answered	174
Total	**1475**

The phrasing of this question in the surgical questionnaire unintentionally encourages a limited view of the "usefulness" of postmortem findings. It is apparent from the responses to this question that a postmortem which confirms the clinical diagnosis is still regarded by many surgeons as not "useful". On the contrary, however, clinicians should welcome such findings as a positive affirmation of their diagnostic skills and as a necessary and significant contribution to the audit of clinical care. The only postmortem which is not "useful" is one in which the pathologist has failed to meet basic standards of competence and quality.

Table P21

When the history, antemortem clinical diagnosis and cause of death were compared with the postmortem findings, they showed:

A discrepancy in the cause of death or in a major diagnosis, which if known, would have affected treatment, outcome or prognosis	67
A discrepancy in the cause of death or in a major diagnosis, which if known, would not have affected treatment, outcome or prognosis	88
Confirmation of essential clinical findings	689
A failure to explain some important aspect of the clinical problem	
a) despite a satisfactory autopsy	37
b) as a result of an unsatisfactory autopsy	72
Total	**883**

NB this can be a multiple entry

A proper assessment of the medical value of a postmortem is difficult to make at second hand, but the format of the NCEPOD questionnaires made it possible for the group to carry out a reasonably robust, if somewhat subjective evaluation, based on the identification of diagnostic discrepancies, a classification of which can be found in Hill and Anderson.[33]

The number of perceived clinically significant discrepancies between the antemortem and postmortem diagnosis was 67 (7.6%). This is quite low by comparison with general studies of postmortem practice, but more significant when considered in the context of perioperative deaths, in which there is generally a high level of confidence in the antemortem diagnosis. When these are added to discrepancies perceived as not bearing directly on treatment, outcome or prognosis, which totalled 88 (10%), an overall major discrepancy rate of 17% was obtained, in line with many previous studies. The assessment protocol, moreover, did not separately identify the significant number of cases in which the clinician could not offer a reliable cause of death and in which, therefore, the postmortem was indispensable for certification.

These figures should serve as further reinforcement of the already well-established facts that the most accurate data on the cause of death are obtained through postmortem examinations and that antemortem assessments are in error in a significant proportion of cases, even when the surgeon is confident of the clinical diagnosis. Having said this , it is important to recognise that even after a properly conducted postmortem, doubt remained about some important aspect of the clinical problem in 4% of the cases. This group of cases presents a challenge to pathologists and clinicians for the future.

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Appendices

National Confidential Enquiry Into Perioperative Deaths

35-43 LINCOLN'S INN FIELDS, LONDON WC2A 3PN : Tel: 01-831 6430

December 1988

PROTOCOL

This protocol is derived from the CEPOD report* published in December 1987.

1 AIMS

The National Confidential Enquiry into Perioperative Deaths (NCEPOD) is to enquire into clinical practice and to identify remediable factors in the practice of anaesthesia and surgery.

The NCEPOD will investigate deaths which occur in hospital within 30 days of any surgical or gynaecological operation. This will include all procedures carried out by surgeons, whether in the presence or absence of an anaesthetist. Procedures involving local anaesthetics, as well as day cases, are included.

All NHS hospitals within the Regional or Special Health Authorities of England, Wales, Northern Ireland, Guernsey, Jersey and the Isle of Man are to be included in the Enquiry, as well as hospitals managed by the Ministry of Defence, and by the British United Provident Association.

All Consultants (surgeons, gynaecologists and anaesthetists) will be involved in the assessment programme.

2 STEERING GROUP

The Enquiry is overseen by a steering group consisting of the following members:

Chairman	Professor D Campbell	CBE FFARCS FRCS
Vice Chairman	Mr J A P Marston	FRCS
Secretary	Mr H B Devlin	FRCS
Treasurer	Dr M M Burrows	FFARCS
	Professor J P Blandy	FRCS
	Dr N P Halliday	MB BS
	Dr A C Hunt	FRCPath
	Professor A G Johnson	FRCS
	Dr J N Lunn	FFARCS
	Professor R Owen	FRCS
	Professor M Rosen	FFARCS
	Mr S C Simmons	FRCOG
	Professor E D Alberman	FFCM

3 ANNUAL SAMPLE

A sample of all deaths reported will be investigated each year. The **dead cases** sampled will each be compared with similar patients, matched for sex, age, and mode of admission, who underwent similar operations and survived (**survivor cases**). Details of these patients will be obtained from consultants in another NHS Region.

Additionally, details of a large sample of patients undergoing surgery will be sought from all consultants (surgeons, gynaecologists and anaesthetists) each year. These **index cases** will provide a background against which the sample of dead cases and survivor cases will be compared.

Normally, consultants will be asked for details of **one** index case per year. This will depend, however, on the sample of dead cases being studied each year and the discipline of the consultant concerned.

Data will be collected by means of structured **questionnaires**, designed by the specialist groups and approved by the Steering Group.

It is anticipated that all consultants will provide information regarding all **dead** cases in the year's sample, any **survivor** case requested and one **index** case relevant to the sample.

The dead cases will be compared with the survivor cases and both samples with the index case sample. The specialist groups will advise on the sampling and conclusions to be drawn.

4 ANNUAL PROGRAMME

Groups of specialist doctors, formed as a result of nominations from specialist societies and associations and approved by the Steering Group will advise the clinical coordinators during each year's programme. Each year a sample of deaths and survivors will be considered by NCEPOD in a rolling programme to provide an ongoing audit of clinical practice.

5 EXCLUDED CASES

The NCEPOD will **not** consider deaths after:

i) Diagnostic procedures carried out by physicians or other non-surgeons;

ii) Therapeutic procedures carried out by physicians or other non-surgeons;

iii) Radiological procedures performed solely by a radiologist without a surgeon present;

iv) Obstetric operations or delivery;

v) Dental surgery other than that taking place in the hospitals listed in Section 1 above.

6 LITIGATION

The Department of Health has confirmed that it will support the total confidentiality of the NCEPOD.

The Data Protection Act does **not** apply to the information collected on the dead patients since there is no provision for third party access to the data. We intend to request information already in the patient's notes for the **index** and **survivor** cases and no assessment of these cases will be carried out. The information will be collated in an anonymous form and will not be stored as identifiable data.

Extract from Data Protection Act 1984 Section 33(6)

> "Personal data held only for –
> (a) preparing statistics; or
> (b) carrying out research,
> are exempt from the subject access provisions; but it shall be a condition of that exemption that the data are not used or disclosed for any other purpose and that the resulting statistics or the results of the research are not made available in a form which identifies the data subjects or any of them."

The Secretary of State has confirmed that the same support will be provided for the NCEPOD as is already given for the Confidential Enquiry into Maternal Deaths. The Secretary of State is satisfied that disclosure of documents about individual cases prepared for these enquiries would be against the public interest. The courts have always had regard to the overriding public interest as grounds for refusal of requests for disclosure of documents, and Section 35 of the Supreme Court Act 1981, which provides that the Court shall not make an order, under Sections 33 or 34 of that Act, for disclosure "if it considers that compliance with the Order, if made, would be likely to be injurious to the public interests" has provided additional support for such opposition. The Department has been assured that if it should be necessary, the claim for public interest immunity would be pressed vigorously by the Crown.

The Department in addition states that in its opinion a fruitful outcome to this Enquiry will be a major achievement by the medical profession in the field of medical audit/quality assurance. Therefore, the information on the dead patients sent to the National CEPOD is protected from subpoena. However, if any participant takes a photocopy of the form, that photocopy becomes his or her property (the original form remains the property of the NCEPOD) and is open to subpoena by the courts and the NCEPOD cannot protect that copy. It is therefore essential that NO PHOTOCOPIES ARE MADE OF PART OR ALL OF COMPLETED NCEPOD QUESTIONNAIRES. Participants may take copies of the BLANK form but please **DO NOT** keep records other than the patient's notes.

7 LOCAL REPORTING

Arrangements will be made in each district for cases to be reported to the NCEPOD office. An appropriate local reporter will be appointed after discussion with the consultants in each district. The local reporter **must** be a consultant. A pathologist or community physician is recommended. Appropriate delegation of day-to-day duties is, of course, permissible. It is necessary for the local reporter to have a nominated deputy.

The Royal College of Pathologists and the Faculty of Community Medicine are participating in the programme and their members are encouraged to assist data collection.

The reporter's role will be to ensure that **all** deaths in hospital within 30 days of an operation are reported to the NCEPOD office.

The reporter will be asked to provide demographic data **only** on the dead patient, and the names of the consultants in charge. No further information will be sought from the local reporter.

Each hospital has arrangements for the storage of death certificates and other information. We expect each local reporter to organise his/her own method to inform us of all perioperative deaths in hospital. To enable an adequate system to be established we suggest the support of the DMO and the DGM is sought. Printed advice about this task can be obtained from the NCEPOD office.

8 QUESTIONNAIRES

The questionnaires have been developed by the specialist groups to obtain details of particular surgical and anaesthetic procedures. All personal identification of patients and medical staff will be removed before entry of a particular case into the computer.

It is our recommendation that consultants ask their junior staff to complete the questionnaire from the patient's notes. Once the form is completed the consultant and his junior should review it together and it should be returned to the NCEPOD office. It is hoped that this joint completion will act as a training process by reviewing the case on a one-to-one basis. This method could be used to develop a framework of local review of clinical practice. Trainees and consultants may write in total confidentiality to the NCEPOD office under separate cover if they wish.

Consultants *(surgeons and anaesthetists)* will also be asked to complete a small number of questionnaires on patients who have survived surgery. These cases will provide the benchmarks for assessment.

The information you give to us is important. It must be complete and accurate if valid conclusions are to be drawn.

If further information is required we may request the patient's notes be provided.

9 FEEDBACK

The Enquiry recognises the importance of adequate feedback to individual consultants and to the profession as a whole. However, feedback must avoid any likelihood of legal or professional jeopardy to the individual consultant. Therefore the Enquiry will publish an annual report which will present aggregated data but will not allow identification of individual consultants. There will be no assessments provided on individual cases.

10 ACCREDITATION

All the Colleges and Faculties stress the importance of clinical audit for both monitoring clinical standards and as a discipline in the training of junior doctors. NCEPOD is a national audit system. The Colleges and Faculties require audit as a precondition for accreditation for training.

11 PARTICIPANTS

The annual report will include the names of all consultants who have contributed all the index, survivor and dead cases requested for the data base.

12 CLINICAL COORDINATORS

The coordinators appointed by the Steering Group may be contacted by telephone.

Dr J N Lunn	0222 763601 (direct)
Mr H B Devlin	0642 603571 (direct)

Assistant to the Coordinators;

Mr R W Hoile	0634 400677 (direct)

or via the National CEPOD office.

13 FURTHER INFORMATION

Please contact Ms Anne Campling, Administrator, on 01-831 6430 if you require any further information, or write to;

NCEPOD
35-43 Lincoln's Inn Fields
London
WC2A 3PN

*Buck N., Devlin H. B., Lunn J. N. Report of the Confidential Enquiry into Perioperative Deaths. Nuffield Provincial Hospitals Trust and The King Edward's Hospital Fund for London. London 1987.

Appendix B - Abbreviations

ASA	American Society of Anesthesiologists
BP	Blood pressure
CT	Computerised tomography
CVP	Central venous pressure
DA	Diploma in Anaesthetics
DGH	District General Hospital
DVT	Deep vein thrombosis
ECG	Electrocardiogram
EUA	Examination under anaesthesia
FRCA	Fellow of the Royal College of Anaesthetists
FFARCS	Fellow of the Faculty of Anaesthetists of the Royal College of Anaesthetists
FFA (SA)	Fellow of the Faculty of Anaesthetists (South Africa)
FCAnaes	Fellow of the College of Anaesthetists
FFARCSI	Fellow of the Faculty of Anaesthetists of the Royal College of Surgeons in Ireland
FFARACS	Fellow of the Faculty of Anaesthetists of the Royal Australasian College of Surgeons
HDU	High Dependency Unit
ICU	Intensive Care Unit
ODA	Operating Department Assistant
OPCS	Office of Population Censuses and Surveys
NSAID	Non-steroidal anti-inflammatory drug
SHO	Senior house officer

Appendix C - Glossary

ADMISSION

Elective - at a time agreed between the patient and the surgical service.

Urgent - within 48 hours of referral/consultation.

Emergency - immediately following referral/consultation, when admission is unpredictable and at short notice because of clinical need.

AMERICAN SOCIETY OF ANESTHESIOLOGISTS (ASA) CLASSIFICATION OF PHYSICAL STATUS

Class 1

The patient has no organic, physiological, biochemical or psychiatric disturbance. The pathological process for which operation is to be performed is localised and does not entail a systemic disturbance. Examples: a fit patient with inguinal hernia, fibroid uterus in an otherwise healthy woman.

Class 2

Mild to moderate systemic disturbance caused either by the condition to be treated surgically or by other pathophysiological processes. Examples: non- or only slightly limiting organic heart disease, mild diabetes, essential hypertension, or anaemia. Some might choose to list the extremes of age here, either the neonate or the octogenerian, even though no discernible systemic disease is present. Extreme obesity an chronic bronchitis may be included in this category.

Class 3

Severe systemic disturbance or disease from whatever cause, even though it may not be possible to define the degree of disability with finality. Examples: severely limiting organic heart disease, severe diabetes with vascular complications, moderate to severe degrees of pulmonary insufficiency, angina pectoris or healed myocardial infarction.

Class 4

Severe systemic disorders that are already life threatening, not always correctable by operation. Examples: patients with organic heart disease showing marked signs of cardiac insufficiency, persistent angina, or active myocarditis, advanced degrees of pulmonary, hepatic, renal or endocrine insufficiency.

Class 5

The moribund patient who has little chance of survival but is submitted to operation in desperation. Examples: burst abdominal aneurysm with profound shock, major cerebral trauma with rapidly increasing intracranial pressure, massive pulmonary embolus. Most of these patients require operation as a resuscitative measure with little if any anaesthesia.

CAUSE OF DEATH - OFFICE OF POPULATION CENSUSES AND SURVEYS FORMAT

The condition thought to be the "Underlying Cause of Death" should appear in the lowest completed line of Part I.

I (a) Disease or condition directly leading to death*

(b) Other disease or condition, if any, leading to I (a)

(c) Other disease or condition, if any, leading to I (b)

II Other significant conditions CONTRIBUTING TO DEATH but not related to the disease or condition causing it.

* This does not mean the mode of dying, such as heart failure, asphyxia, asthenia, etc.: it means the disease, injury or complication which caused death.

(NCEPOD) CLASSIFICATION OF OPERATIONS

Emergency

Immediate life-saving operation, resuscitation simultaneous with surgical treatment (e.g. trauma, ruptured aortic aneurysm). Operation usually within one hour.

Urgent

Operation as soon as possible after resuscitation (e.g. irreducible hernia, intussuception, oesophageal atresia, intestinal obstruction, major fractures). Operation within 24 hours.

Scheduled

An early operation but not immediately life-saving (e.g. malignancy). Operation usually within three weeks.

Elective

Operation at a time to suit both patient and surgeon (e.g. cholecystectomy, joint replacement).

DAY CASE

A patient who is admitted for investigation or operation on a planned non-resident basis (i.e. no overnight stay).

GLASGOW COMA SCALE

Eye opening	**Pts**	**Verbal response**	**Pts**	**Motor response to pain (best limb)**	**Pt**
Spontaneous	4	Orientated verbal response	5	Obeys commands	5
Eye opening to speech	3	Confused verbal response	4	Localisation	4
Eye opening to pain	2	Inappropriate words	3	Flexion normal/abnormal	3
None	1	Incomprehensible sounds	2	Extension	2
		No verbal response	1	No motor response	1

RECOVERY AND SPECIAL CARE AREAS

(Definitions used by the Association of Anaesthetists of Great Britain and Ireland)

High dependency unit

A high dependency unit (HDU) is an area for patients who require more intensive observation and/or nursing care than would normally be expected on a general ward. Patients who require mechanical ventilation or invasive monitoring would not be admitted to this area.

Intensive care unit

An intensive care unit (ICU) is an area to which patients are admitted for treatment of actual or impending organ failure who may require technological support (including mechanical ventilation of the lungs and/or invasive monitoring).

Recovery area

A recovery area is an area to which patients are admitted from an operating room, where they remain until consciousness is regained and ventilation and circulation are stable.

STANDARDS, GUIDELINES AND PROTOCOLS

A **Standard of Practice** is the level of modern good practice to which all clinicians aspire.

A **Clinical Guideline** is a nationally agreed set of evidence based principles to guide endeavours to achieve the standard.

A **Protocol** is a locally derived plan to direct trainees and aid all practitioners to achieve the standard within the limits established in the guideline.

The differences between these terms are intentional but *legally* there may be no distinction to be made.

National Confidential Enquiry into Perioperative Deaths
35-43 Lincoln's Inn Fields, London, WC2A 3PN

SURGICAL QUESTIONNAIRE (DEATHS) 1992/93

QUESTIONNAIRE No. S

DO NOT PHOTOCOPY ANY PART OF THIS QUESTIONNAIRE

QUESTIONNAIRE COMPLETION

The questionnaire should be completed with reference to the last operation before the death of the patient specified by the NCEPOD office. If you feel that this was not the **main** operation in the period before the patient's death, you may give additional information. See question 56.

The whole questionnaire will be shredded when data collection is complete. The information will be filed anonymously.

Neither the questions nor the choices for answers are intended to suggest standards of practice.

Please enclose a copy of all the relevant surgical operation notes, the post mortem reports and the post mortem request form if available. Any identification will be removed in the NCEPOD office.

Many of the questions can be answered by "yes" or "no". **Please insert a tick (✓) in the appropriate box.**

Where multiple choices are given, please insert the tick(s) in the appropriate box(es).

Where more details are requested for an answer, please write in **BLOCK CAPITALS.**

If you wish to alter an answer, please "white" out the incorrect answer. Please do not write in amendments, which can not be accepted by the computer.

Consultants or junior staff may write to the NCEPOD office under separate cover, quoting the questionnaire number, offering any additional details which may be relevant to the understanding of the case. All original copies of correspondence will be confidential (but **do not** retain copies of your correspondence).

In case of difficulty, please contact the NCEPOD office on:

071-831-6430

HAVE YOU ENCLOSED COPIES OF THE OPERATION AND POST MORTEM NOTES?

1. Specialty of Consultant Surgeon in charge at time of final operation before death (any additional special interests may be entered under "other" below).

		1	
a	General		a
b	General with special interest in Paediatric Surgery		b
c	General with special interest in Urology		c
d	General with special interest in Vascular Surgery		d
e	General with special interest in Gastroenterology		e
f	General with special interest in Endocrinology		f
g	General with special interest in ______		g
h	Accident and Emergency		h
i	Cardiac – Paediatric		i
j	Cardiac – Adult		j
k	Cardiac – Mixed		k
l	Thoracic		l
m	Gynaecology		m
n	Neurosurgery		n
o	Ophthalmology		o
p	Oral/Maxillofacial		p
q	Orthopaedic		q
r	Otorhinolaryngology		r
s	Paediatric		s
t	Plastic		t
u	Transplantation		u
v	Urology		v
w	Other (Please specify) ______		w

2. In which type of hospital did the last operation take place? 2

a District General Hospital ☐ a

b University/Teaching Hospital ☐ b

c Surgical Specialty Hospital ☐ c

d Other Acute/Partly Acute Hospital ☐ d

e Community Hospital ☐ e

f Defence Medical Services Hospital ☐ f

g Independent Hospital ☐ g

h Other (Please specify) ______________ ☐ h

3. Is this hospital part of, or wholly, an NHS Trust? 3

a Yes ☐ a

b No ☐ b

PATIENT DETAILS

4. Date of birth D D M M Y Y ☐☐☐☐☐☐

5. Age at final operation ______________

6. Sex 6

Male ☐ a

Female ☐ b

7. Main diagnosis;

____

____

____

____

8. Final operation performed;

____

____

____

____

9. Established cause of death;

____

____

____

____

N.B. You may be asked for this information elsewhere on the form. NCEPOD considers it useful to record the details here in order to summarise the case.

10. Was a record of the patient's weight available?

a Yes

b No

10 a b

10A. If **yes**, what was this weight?

______ kg or ______ st ______

10B. If **no**, please indicate the patient's physique.

a Thin

b Average

c Obese/overweight

d Not recorded

10B a b c d

11. To which ethnic group did the patient belong?

a White

b West Indian/Guyanese

c Indian/Pakistani/Bangladeshi

d Chinese

e African

f Arab

g Mixed Origin

h Other (Please specify)

11 a b c d e f g h

______

ADMISSION DETAILS

12. Initial admission intention for the last operation performed;

a **Elective –** at a time agreed between patient and surgical service

b **Urgent –** within 48 hours of referral/consultation

c **Emergency –** immediately following referral/consultation, when admission is unpredictable and at short notice because of clinical need.

12 a b c

Please specify the following dates;

13. Date of initial referral for condition leading to final operation (eg date on letter of referral);

13
D D M M Y Y

14. Date of first consultation following referral;

14
D D M M Y Y

15. Decision to operate;

15
D D M M Y Y

Time 15A
(use 24 hour clock)

16. Date of admission to hospital in which final operation took place;

16
D D M M Y Y

Time 16A
(use 24 hour clock)

16B. Admission

16B

a Weekday (ie Monday to Friday) ☐ a

b Weekend (ie Saturday or Sunday) ☐ b

c Public Holiday ☐ c

d Extra-statutory Holiday (NHS) ☐ d

ELECTIVE ADMISSIONS

If the patient was admitted on an urgent or emergency basis please move straight to Q23.

17. Date placed on waiting list;

☐☐☐☐☐☐ 17

D D M M Y Y

18. Was the patient's category as an elective admission appropriate (bearing in mind subsequent events)?

18

Yes ☐

No ☐

19. If the patient waited longer than six months, was his/her clinical status reassessed in a pre-admission clinic prior to admission?

19

a Yes ☐ a

b No ☐ b

20. Had this patient's admission ever been cancelled on a previous occasion as a result of a lack of resources (ie not a patient imposed delay)?

20

Yes ☐

No ☐

If yes, please explain.

____

____

____

21. Was the outcome in this case altered by the time spent on the waiting list?

21

Yes ☐

No ☐

If yes, please explain.

____

____

____

____

22. Did any out-patient investigations impose an undesirable delay in setting a date for surgery?

22

Yes ☐

No ☐

If yes, please explain.

____

____

____

Now move to Q25.

URGENT AND EMERGENCY ADMISSIONS

If the patient was admitted on an elective basis please move straight to Question 25.

23. Was there any delay in **REFERRAL** on this occasion?

23

Yes ☐ a

No ☐ b

23A. If **yes**, was the delay;

23A

a Doctor related ☐ a

b Patient related ☐ b

c Other (Please specify) ☐ c

____

____

24. Was there any delay in **ADMITTING** the patient?

24

Yes ☐ a

No ☐ b

24A. If **yes**, was the delay due to;

24A

a Lack of resources (please specify) ____________ ☐ a

b Surgical staff committed elsewhere ☐ b

c Non-medical staff shortages ☐ c

d Other (please specify) ____________ ☐ d

24B. Did this delay affect the outcome?

24B

Yes ☐

No ☐

REFERRAL DETAILS

25. Source of referral;

25

a General Medical Practitioner ☐ a

b General Dental Practitioner ☐ b

c A/E department ☐ c

d Out-patient follow-up clinic ☐ d

e Transfer from another hospital ☐ e

f Other specialty ☐ f

g Self referral by patient ☐ g

h Own specialty ☐ h

i Other (Please specify) ____________ ☐ i

26. Was the patient transferred from another department within the hospital where the operation took place?

26

Yes ☐

No ☐

If **yes**, give date and time of transfer to surgical team:

Date ☐☐☐☐☐☐ 26A Time ☐☐☐☐ 26B

D D M M Y Y (use 24 hour clock)

N.B. If the patient was transferred as an in-patient from another hospital, ie option "e" in Q25, answer Q27 to Q30 below, otherwise go directly to Q31.

27. Location of referring hospital: (27)

- a non-NHS
- b same District (or Health Board)
- c same Region
- d outside Region
- e overseas
- f other (Please specify)

28. Type of referring hospital: (28)

- a District General Hospital
- b University/Teaching Hospital
- c Surgical Specialty Hospital
- d Other Acute/Partly Acute Hospital
- e Community Hospital
- f Defence Medical Services Hospital
- g Independent Hospital
- h Other (Please specify)

29. Why was the patient transferred?

30. Did the patient's condition deteriorate during transfer? (30)

- Yes
- No

31. To what type of area was the patient first admitted? (see definitions) (31)

- a Medical ward
- b Coronary care unit (CCU)
- c Geriatric ward
- d Surgical ward
- e Mixed medical/surgical ward
- f Gynaecological/obstetric ward
- g Paediatric ward
- h Admission ward
- i Day unit
- j HDU (see definition)
- k ICU (see definition)
- l A/E holding area (or other emergency admission ward)
- m Direct to theatre
- n Other (Please specify)

Definitions

A high dependency unit (HDU) is an area for patients who require more intensive observation and/or nursing than would be expected on a general ward. Patients who require mechanical ventilation or other organ support would not be admitted to this area.

An intensive care unit (ICU) is an area to which patients are admitted for treatment of actual or impending organ failure who may require technological support (including mechanical ventilation of the lungs and/or invasive monitoring).

32. Was the site of admission appropriate for the patient's condition?

	32
Yes	
No	

If **no**, please explain.

____

____

____

____

33. Was care undertaken on a formal shared basis with another specialty?

	33
Yes	
No	

If **yes**, please specify.

____

____

____

____

34. Which grade of surgeon made the **final decision to operate?**

Please tick the second column if a locum.

				Locum
a	HO	a		
b	SHO	b		
c	Registrar	c		
d	Senior Registrar	d		
e	Consultant	e		
f	Staff Grade	f		
g	Clinical Assistant	g		
h	Associate Specialist	h		
i	Other (Please specify) ______	i		

34

35. What was the grade of the most senior surgeon **consulted** before the operation?

Please tick the second column if a locum.

				Locum
a	HO	a		
b	SHO	b		
c	Registrar	c		
d	Senior Registrar	d		
e	Consultant	e		
f	Staff Grade	f		
g	Clinical Assistant	g		
h	Associate Specialist	h		
i	Other (Please specify) ______	i		

35

36. Working diagnosis by most senior member of surgical team;

____

____

____

37. What operation was proposed by the most senior member of the surgical team?

____

____

____

____

____

38. What was the immediate indication for the proposed operation?

____

____

____

____

____

39. Co-existing problems at time of final surgery (specify disorder in space next to category). Please put a tick in each appropriate box.

		39	
a	Respiratory __________	☐	a
b	Cardiac __________	☐	b
c	Renal __________	☐	c
d	Haematological __________	☐	d
e	Gastrointestinal __________	☐	e
f	Vascular __________	☐	f
g	Sepsis __________	☐	g
h	Neurological __________	☐	h
i	Endocrine (including diabetes mellitus) __________	☐	i
j	Musculoskeletal __________	☐	j
k	Psychiatric __________	☐	k
l	Alcohol-related problems __________	☐	l
m	Drug addiction __________	☐	m
n	Genetic abnormality __________	☐	n
o	Other (Please specify) __________	☐	o

40. ASA class (see definition opposite)

40	
☐	1
☐	2
☐	3
☐	4
☐	5

American Society of Anesthesiology (A.S.A.) Classifications of Physical Status

Class 1

This patient has no organic, physiological, biochemical or psychiatric disturbance. The pathological process for which operation is to be performed is localised and does not entail a systemic disturbance.

Class 2

Mild to moderate systemic disturbance or distress caused by either the condition to be treated surgically or by other pathophysiological processes.

Class 3

Severe systemic disturbance or disease from whatever cause, even though it may not be possible to define the degree of disability with finality.

Class 4

Severe systemic disorders that are already life threatening, not always correctable by operation.

Class 5

The moribund patient who has little chance of survival but is submitted to operation in desperation.

41. What was the anticipated risk of death related to the proposed operation?

		41	
a	Not expected	[ ]	a
b	Small but significant risk	[ ]	b
c	Definite risk	[ ]	c
d	Expected	[ ]	d

41A. If death was **expected**, specify the anticipated benefit of the operation.

____

____

____

____

PRE-OPERATIVE PREPARATION

42. What precautions or therapeutic manoeuvres were undertaken pre-operatively (excluding anaesthetic room management) to ensure adequate physiological function?

Enter a tick in each appropriate box.

N None [ ] **N**

		42	
a	Pulse rate recording	[ ]	a
b	Blood pressure recording	[ ]	b
c	Respiratory rate recording	[ ]	c
d	Temperature	[ ]	d
e	Central venous pressure measurement	[ ]	e
f	Cardiac support drugs or antidysrhythmic agents	[ ]	f
g	Gastric aspiration	[ ]	g
h	Intravenous fluids	[ ]	h
i	Correction of hypovolaemia	[ ]	i
j	Urinary catheterisation	[ ]	j
k	Blood transfusion	[ ]	k
l	Diuretics	[ ]	l
m	Anticoagulants	[ ]	m
n	Vitamin K	[ ]	n
o	Antibiotics (pre- or intra-operative)	[ ]	o
p	Bowel preparation (specify method used) __________	[ ]	p
q	Chest physiotherapy	[ ]	q
r	Oxygen therapy	[ ]	r
s	Blood gas analysis	[ ]	s
t	Pulse oximetry	[ ]	t

continued...

u Airway protection (eg in unconscious patients) ☐ u

v Tracheal intubation ☐ v

w Mechanical ventilation ☐ w

x Nutritional support ☐ x

y DVT prophylaxis
(please specify method used) ______________ ☐ y

z Others (please specify) ______________ ☐ z

43. If **no** DVT prophylaxis was used, is this your usual policy?

43

Yes ☐ a

No ☐ b

44. Was emergency radiology (including CT scanning) readily accessible?

44

Yes ☐

No ☐

If **no**, please explain

____

____

45. Did the patient's medication (excluding premedication) influence the outcome?

45

Yes ☐

No ☐

If **yes**, please explain:

____

____

46 Date of start of final operation before death;

☐☐☐☐☐☐ 46

D D M M Y Y

46A. Please circle day: M T W Th F Sa Sun

46B. Was this;

46B

a Public Holiday ☐ a

b Extra-statutory Holiday (NHS) ☐ b

c Neither ☐ c

47. Time of start of operation;
(not including anaesthetic time)

☐☐☐☐ 47

(use 24 hour clock)

48. Out of hours operations only;

Would this operation have been done during the routine list time if operating theatre space had been available?

48

Yes ☐ a

No ☐ b

If **yes**, please explain

____

____

____

49. What was the grade of the most senior operating surgeon?
Please tick the second column if a locum.

				Locum
a	HO	a		
b	SHO	b		
c	Registrar	c		
d	Staff Grade	d		
e	Senior Registrar	e		
f	Clinical Assistant	f		
g	Associate Specialist	g		
h	Consultant	h		
i	Other (please specify) ______________	i		

49

50. How long had this surgeon spent in this grade in this specialty?

______________ yrs ______________ mths

51. How many similar procedures had this surgeon performed in the last year? (If not known, please enter an estimate).

______________ procedures

52. Was a more senior surgeon **immediately** available, ie in the operating room/suite?

52

Yes ☐

No ☐

If **yes**, please specify grade and location.

Grade ______________________________

Location ______________________________

53. Diagnosis established at operation;

____

____

____

____

____

54. Final operation undertaken;

____

____

____

____

____

55. If the operation was different to that proposed, please explain.

____

____

____

____

____

N.B. Please include a copy of all operation notes. If the final operation is one of a sequence please send copies of preceding operation notes, numbered in sequence, and include any comments you wish to make about the relevance of these preceding operations to the final outcome. Identification will be removed at the NCEPOD office.

56. **Multiple operations.** If this operation was the most recent in a sequence or was preceded by a minor procedure, please list the other procedures.

Operation	Date	Specialty and grade of Operating Surgeon
a		
b		
c		
d		

57. Classify the final operation (see definitions below and choose the category most appropriate to the case).

57

a Emergency ☐ a

b Urgent ☐ b

c Scheduled ☐ c

d Elective ☐ d

Definitions

a **Emergency**

Immediate life-saving operation, resuscitation simultaneous with surgical treatment (eg trauma, ruptured aortic aneurysm). Operation usually within one hour.

b **Urgent**

Operation as soon as possible after resuscitation (eg irreducible hernia, intussusception, oesophageal atresia, intestinal obstruction, major fractures). Operation usually within 24 hours.

c **Scheduled**

An early operation but not immediately life saving (eg malignancy). Operation usually within 3 weeks.

d **Elective**

Operation at a time to suit both patient and surgeon (eg cholecystectomy, joint replacement).

58. In view of your answer to Q57, was there any delay due to factors other than clinical?

58

Yes ☐

No ☐

If **yes**, please specify:

59. Duration of operation (not including anaesthetic time)

__________ hrs __________ mins

Cardiac cases only:

Ischaemic Time

__________ hrs __________ mins

60. Was the time taken acceptable?

60

Yes ☐

No ☐

61. Were there any unanticipated intra-operative problems?

61

Yes ☐

No ☐

If **yes**, please specify:

LOCAL/REGIONAL ANAESTHESIA OR SEDATION

62. Was local/regional anaesthesia or sedation administered **by the operating surgeon** at any time during the procedure?

62

Yes ☐

No ☐

If **no**, go to Q66.

If **yes**, what was the main drug/agent used?

What dosage was administered?

63. Was any other drug administered with the local anaesthetic?

63

Yes ☐

No ☐

If **yes**, please describe.

64. If the procedure was performed **SOLELY UNDER LOCAL ANAESTHETIC OR SEDATION ADMINISTERED BY THE SURGEON,** which of the following were recorded during or immediately after the procedure?

64

a Blood pressure ☐ a

b Pulse ☐ b

c ECG ☐ c

d Pulse oximetry ☐ d

e Other (please specify) __________ ☐ e

f None ☐ f

65. Were facilities for resuscitation, including airway management, immediately available during this procedure?

	65
Yes	
No	

POSTOPERATIVE PROGRESS

66. Which of the following are available in the hospital in which the final operation took place (see definitions below)?

		66	
a	Theatre recovery area		a
b	Adult ICU		b
c	Adult HDU		c
d	Paediatric ICU/HDU		d
e	None of the above		e

Definitions (as used by the Association of Anaesthetists of Great Britain and Ireland)

1. A **recovery area** is an area to which patients are admitted from an operating room, where they remain until consciousness is regained and ventilation and circulation are stable.

2. A **high dependency unit (HDU)** is an area for patients who require more intensive observation and/or nursing care than would normally be expected on a general ward. Patients who require mechanical ventilation or other organ support would not be admitted to this area.

3. An **intensive care unit (ICU)** is an area to which patients are admitted for treatment of actual or impending organ failure who may require technological support (including mechanical ventilation of the lungs and/or invasive monitoring).

67. Was the patient admitted immediately to an ICU or HDU postoperatively?

		67	
a	ICU		a
b	HDU		b
c	Neither of the above		c

68. If **neither**, was the patient admitted to an ICU/HDU after an initial period on a routine postoperative ward?

	68	
Yes		a
No		b

After how many days postoperatively?

_______________ days

N.B. If the answer to either Q67 or Q68 was negative, then please answer question 69 and then proceed directly to Q74. If the answer to either question was yes, then please answer all the following questions.

69. Were you at any time unable to transfer the patient into an ICU/HDU within the hospital in which the surgery took place?

	69	
Yes		a
No		b

If **yes**, why?

____

____

70. Were the ICU/HDU facilities adequate?

	70
Yes	
No	

If **no**, what was inadequate?

____

____

____

71. What were the indications for the admission to ICU/HDU?
(This can be multiple entry).

		71	
a	Specialist nursing	☐	a
b	Presence of experienced intensivists	☐	b
c	General monitoring	☐	c
d	Metabolic monitoring	☐	d
e	Ventilation	☐	e
f	Surgical complications	☐	f
g	Anaesthetic complications	☐	g
h	Co-incident medical diseases	☐	h
i	Inadequate nursing on general wards	☐	i
j	Transfer from hospital without facilities	☐	j
k	Other (Please specify)	☐	k

72. Discharge from ICU/HDU was due to;

		72	
a	Elective transfer to ward	☐	a
b	Pressure on beds	☐	b
c	Death	☐	c
d	Other (please specify)	☐	d

73. Was the patient subsequently readmitted to an ICU/HDU etc?

	73	
Yes	☐	a
No	☐	b

If yes, please give details.

____

____

____

74. Were there any postoperative complications?

	74	
Yes	☐	a
No	☐	b

If **yes**, which of the following?

Please specify the complication in the space below each category.

		74A	
a	Haemorrhage/postoperative bleeding requiring transfusion	☐	a
b	Upper respiratory obstruction	☐	b
c	Respiratory distress	☐	c
d	Generalised sepsis	☐	d
e	Wound infection	☐	e
f	Wound dehiscence	☐	f
g	Anastomotic failure	☐	g
h	Low cardiac output	☐	h
i	Cardiac arrest	☐	i
j	Hepatic failure	☐	j
k	Renal failure	☐	k
l	Endocrine system failure	☐	l
m	Stroke or other neurological problems	☐	m
n	Persistent coma	☐	n
o	Other organ failure (please specify)	☐	o

p	Problems with analgesia	☐	p
q	DVT and/or pulmonary embolus	☐	q
r	Fat embolus	☐	r

continued..

s	Orthopaedic prosthetic complication	s
t	Pressure sores	t
u	Peripheral ischaemia	u
v	Urinary tract infection	v
w	Urinary retention/catheter blockage	w
x	Ureteric injury/fistula	x
y	Nutritional problems	y
z	Other (Please specify)	z

75. Was mechanical ventilation employed postoperatively?

75

Yes

No

75A. Is this your usual practice in this type of procedure?

75A

Yes

No

75B. If mechanical ventilation was employed, were there any complications with it?

75B

Yes

No

If yes, please specify.

DEATH

76. Date of death.

76

D D M M Y Y

76A.a Weekday

b Weekend

c Public holiday

d Extra-statutory holiday (NHS)

76: a, b, c, d

77. Time of death.

77

(use 24 hour clock)

78. Place of death

a	Theatre	a
b	Recovery room	b
c	Ward	c
d	ICU/HDU	d
e	CCU	e
f	Home	f
g	Another hospital	g
h	Other (please specify)	h

79. Was cardiopulmonary resuscitation attempted?

	79
Yes	
No	

If **not**, why not?

80. What was the immediate **clinical** cause of death? (This need not be a duplication of the death certificate.)

81. **CAUSE OF DEATH** (this should be a facsimile of the death certificate: please complete it accordingly).

I (a) Disease or condition directly leading to death

(b) Other disease or condition, if any, leading to I(a)

(c) Other disease or condition, if any leading to I(b)

II Other significant conditions CONTRIBUTING TO THE DEATH but not related to the disease or condition causing it

82. Was the death reported to the coroner?

82

Yes
No

82A. If **yes**, was a post mortem ordered (and performed) under the coroner's authority?

82A

Yes
No

83. Was a **hospital** post mortem requested?

83

Yes
No

If **no**, why not?

83A. If **yes**, was a hospital post mortem performed?

83A

Yes
No

If **no**, why not?

N.B. If a post mortem was not performed, please move to Q91.

84: Was the surgical team informed of the date and time of post mortem?

84

Yes
No

85. Which member of the surgical team attended the post mortem?

85

- a HO — a
- b SHO — b
- c Registrar — c
- d Staff Grade — d
- e Senior Registrar — e
- f Associate Specialist — f
- g Consultant — g
- h Other (please specify) — h

- i None of the above — i

85A. If a surgeon did not attend the post mortem, why not?

86 Did the consultant surgeon and his/her team receive a copy of the post mortem report?

86

Yes
No

87. What was the date of the first written information received about any post mortem?

87

D D M M Y Y

88. Please list what you regard as the relevant findings of the post mortem (not a copy of the death certificate).

____

____

____

____

____

____

PLEASE SEND A COPY OF ALL POST MORTEM REPORTS AND

POST MORTEM REQUEST FORM IF AVAILABLE

89. Was the pathological information given useful, ie did it contribute additional information to the understanding of the patient's illness?

89

Yes ☐

No ☐

If **not**, why not?

____

____

90. Who performed the post mortem?

90

a Specialist pathologist (e.g. Neuropathologist) ☐ a

b Consultant pathologist ☐ b

c Junior pathologist ☐ c

91. Has this death been considered, (or will it be considered) at a local audit/quality control meeting?

91

Yes ☐

No ☐

92. Was there a shortage of personnel in this case?

92

Yes ☐

No ☐

92A. If **yes**, which?

92A

a Consultant surgeons ☐ a

b Trainee surgeons ☐ b

c Consultant anaesthetists ☐ c

d Trainee anaesthetists ☐ d

e Skilled assistants ☐ e

f Nurses ☐ f

g ODAs ☐ g

h Porters ☐ h

i Other (Please specify)____________________ ☐ i

93. Who completed this questionnaire? 93

a HO a
b SHO b
c Registrar c
d Staff Grade d
e Senior Registrar e
f Associate Specialist f
g Consultant g
h Other (Please specify)________ h

94. Did you have any problems in obtaining the patient's notes? 94

Yes
No

If yes, how long did they take to reach you? ________

95. Were all the notes available? 95

Yes
No

95A. If no, which part was inadequate/unavailable? 95A

a Pre-operative notes a
b Operative notes b
c Postoperative notes c
d Death certificate book d
e Other notes (please specify)________ e

96. Were the nursing notes available? 96

Yes
No

97. Has the consultant surgeon seen and agreed this form? 97

Yes
No

98. Date questionnaire completed

98

D D M M Y Y

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

<u>YOU MUST NOT KEEP A COPY OF THIS QUESTIONNAIRE</u>

Please return it in the reply-paid envelope provided to:

NCEPOD
35-43 Lincoln's Inn Fields
LONDON
WC2A 3PN

THIS QUESTIONNAIRE IS THE PROPERTY OF NCEPOD

If you wish to inform the NCEPOD office of any other details of this case, please do so here or on a separate sheet.

National Confidential Enquiry into Perioperative Deaths
35-43 Lincoln's Inn Fields, London, WC2A 3PN

ANAESTHETIC QUESTIONNAIRE (DEATHS) 1992/93

QUESTIONNAIRE No. A

DO NOT PHOTOCOPY ANY PART OF THIS QUESTIONNAIRE

QUESTIONNAIRE COMPLETION

The whole questionnaire will be shredded when data collection is complete.

The information you supply is important. It must be accurate if valid conclusions are to be drawn.

Neither the questions nor the choices for answers are intended to suggest standards of practice.

Please **enclose** a copy of the ANAESTHETIC record and of the fluid balance chart(s). Any identification will be removed in the NCEPOD office.

Many of the questions can be answered by "Yes" or "No".
Please insert the relevant number in the appropriate box eg

1 for Yes

2 for No

Where multiple choices are given, please insert the relevant letter(s) of your answer in the box(es), and leave the remaining boxes blank. Where more details are requested, please write in BLOCK CAPITALS.

Eg question 6b

C
D

indicates that advice was sought from both a Senior Registrar and a Consultant.

Consultants or junior staff may write to the NCEPOD office under separate cover, quoting the questionnaire number.

All original copies of correspondence will be confidential **(but do not retain copies of your correspondence).**

In case of difficulty, please contact the NCEPOD office on:

071-831-6430

HAVE YOU ENCLOSED COPIES OF THE ANAESTHETIC RECORD AND FLUID BALANCE CHARTS?

HOSPITAL

1. In what type of hospital did the anaesthetic take place? 1
   - A District General Hospital
   - B University/Teaching Hospital
   - C Surgical Specialty Hospital
   - D Other Acute/Partly Acute Hospital
   - E Community Hospital
   - F Defence Medical Services Hospital
   - G Independent Hospital
   - H Other (please specify)

2. Is this hospital part of, or wholly, an NHS Trust? 2

   Yes = 1 No = 2

PROXY ANAESTHETISTS

3. If you were not involved in any way with this anaesthetic and have filled out this questionnaire on behalf of someone else, please indicate your position. 3
   - A Chairman of Division
   - B College Tutor
   - C Duty Consultant
   - D Other Consultant
   - E Other (please specify)

THE ANAESTHETIST(S)

4. Grade(s) of anaesthetist(s) who were present at this anaesthetic. Enter the appropriate letter for each person present. 4
   - A SHO
   - B Registrar
   - C Senior Registrar
   - D Consultant
   - E Staff Grade
   - F Associate Specialist
   - G Clinical Assistant
   - H General Practitioner
   - I Hospital Practitioner
   - J Other (please specify)

A B C D E F G H I J

5. Were any of the above anaesthetists employed in a locum capacity?

Yes = 1 No = 2 ☐ 5a

If **yes**, specify grade(s)

______________________________ b

6. Did the anaesthetist (of whatever grade) **seek advice** at any time from another anaesthetist (not mentioned in question 4)?

Yes = 1 No = 2 ☐ 6a

If **yes**, grade(s) of anaesthetist(s) from whom advice sought: 6b

A SHO ☐ A
B Registrar ☐ B
C Senior Registrar ☐ C
D Consultant ☐ D
E Staff Grade ☐ E
F Associate Specialist ☐ F
G Clinical Assistant ☐ G
H General Practitioner ☐ H
I Hospital Practitioner ☐ I
J Other (please specify) ☐ J

____

7. Did any colleague(s) (not mentioned in question 4) **come to help** at any time?

Yes = 1 No = 2 ☐ 7a

If **yes**, grade(s) of anaesthetist(s) who came to help: 7b

A SHO ☐ A
B Registrar ☐ B
C Senior Registrar ☐ C
D Consultant ☐ D
E Staff Grade ☐ E
F Associate Specialist ☐ F
G Clinical Assistant ☐ G
H General Practitioner ☐ H
I Hospital Practitioner ☐ I
J Other (please specify) ☐ J

____

We want to know about the experience of the **most senior anaesthetist** in the operating room at the start of this procedure

Questions 8 to 10 inclusive refer to this anaesthetist

8. Year of primary medical qualification ☐☐☐☐ 8a

and the university (or institution) awarding this qualification:

______________________________ 8b

If not in UK, please state country: ______________ 8c

9. Year of first full-time anaesthetic training post ☐☐☐☐ 9a

Which higher diploma in anaesthesia is held? 9b

A none ☐ A
B FFARCS/FCAnaes/FFARCSI/FFARACS ☐ B
C DA (or Part 1 FCAnaes) ☐ C
D Other (please specify) ☐ D

____

Year of award of higher qualification: ☐☐☐☐ 9c

10. If the most senior anaesthetist present was **not** in a training grade, please enter the appropriate letters in the boxes provided if he/she has regular weekly (ie more than 50 operations per year) NHS commitments in anaesthesia for the following: 10

A cardiac surgery ☐ A
B children under 3 years old ☐ B
C neurosurgery ☐ C
D plastic surgery ☐ D

THE PATIENT

11. Date of patient's birth ☐☐☐☐☐☐ 11

D D M M Y Y

12. Age of patient at time of operation ________Y ________M 12

13. Date of admission to hospital in which final operation took place eg 05 04 92 (5th April 1992). ☐☐☐☐☐☐ 13

D D M M Y Y

14. Time of admission — 14

use 24 hour clock

15. Date of final operation — 15

D D M M Y Y

16. Date of death — 16

D D M M Y Y

17. Was the patient transferred **from** another hospital? — 17

Yes = 1 No = 2

If **no**, please go to question 26
If **yes**, please answer questions 18 to 25

18. From what type of hospital was the patient transferred? — 18

A District General Hospital
B University/Teaching Hospital
C Surgical Specialty Hospital
D Other Acute/Partly Acute Hospital
E Community Hospital
F Defence Medical Services Hospital
G Independent Hospital
H Other (please specify)

____

19. Who accompanied the patient during transit? — 19

A ambulance crew — A
B relative(s) — B
C nurse (specify grade) __________ — C
D anaesthetist (specify grade) __________ — D
E other doctor (please specify) __________ — E
F other (please specify) __________ — F

20. Was there any special care of the airway during transfer? — 20a

Yes = 1 No = 2

If **yes**, which? — 20b

A added oxygen — A
B pharyngeal airway — B
C tracheal tube — C
D controlled ventilation — D
E other (please specify) — E

____

21. Did the patient's condition deteriorate during transfer? — 21

Yes = 1 No = 2 Not known = 3

If **yes**, please explain:

____

22. What was the patient's clinical circulatory state on arrival? — 22

A well-perfused and warm
B cold and vasoconstricted

23. What was the patient's state of clinical oxygenation on arrival? — 23

A well oxygenated
B mild hypoxaemia
C severe hypoxaemia

24. Was cardiorespiratory resuscitation required immediately on arrival? — 24

Yes = 1 No = 2

If **yes**, please explain (eg fluids, inotropes etc):

____

25. What was the patient's neurological status at the time of arrival? 25 ☐

A Glasgow Coma Scale less than 7
B Glasgow Coma Scale 7 or more

Glasgow Coma Scale

Eye opening	Pts	Verbal response	Pts	Motor response to pain (best limb)	Pts
Spontaneous	4	Orientated verbal response	5	Obeys commands	5
Eye opening to speech	3	Confused verbal response	4	Localisation	4
Eye opening to pain	2	Inappropriate words	3	Flexion normal/ abnormal	3
None	1	Incomprehensible sounds	2	Extension	2
		No verbal response	1	No motor response	1

THE OPERATION

26. Primary diagnosis

27. What operation was planned?

28. What operation was performed, if different?

29. If this operation was the most recent in a sequence, please list the previous procedures.

Procedure	Date

Please enclose a copy of all anaesthetic record(s)

30. Classification of operation (last before death). See definitions below. 30 ☐

A Emergency
B Urgent
C Scheduled
D Elective

Definitions

A **Emergency**
Immediate life-saving operation, resuscitation simultaneous with surgical treatment (eg trauma, ruptured aortic aneurysm). Operation usually within one hour.

B **Urgent**
Operation as soon as possible after resuscitation (eg irreducible hernia, intussusception, oesophageal atresia, intestinal obstruction, major fractures). Operation within 24 hours.

C **Scheduled**
An early operation, but not immediately life-saving (eg malignancy). Operation usually within 3 weeks.

D **Elective**
Operation at a time to suit both patient and surgeon (eg cholecystectomy, joint replacement).

CONDITION BEFORE OPERATION

31. Was a record of the patient's weight available?

31

Yes = 1   No = 2   ☐

If **yes**, what was this weight? ____________ kg

If **no**, the estimated weight was ____________ kg

32. Was a record of the patient's height available?

32

Yes = 1   No = 2   ☐

If **yes**, what was this height? ____________ cm

If **no**, the estimated height was ____________ cm

33. Was an anaesthetist **consulted** by the surgeon (as distinct from informed) before the operation?

33

Yes = 1   No = 2   ☐

34. Did an anaesthetist visit the patient before the operation?

34a

Yes = 1   No = 2   ☐

If **yes**, was this anaesthetist present at the start of the operation?

34b

Yes = 1   No = 2   ☐

35. Were any investigations done before the operation? (Including tests carried out in the referral hospital and available before the operation.)

35a

Yes = 1   No = 2   ☐

If **yes**, which of the following?

Please **write results in the space next to the test name**.

Indicate which test(s) by insertion of the appropriate letter in each box.

35b

A	Haemoglobin	____________ gm.litre^{-1}	☐	A
B	Packed cell volume (haematocrit)	____________	☐	B
C	White cell count	____________ x10^9.litre^{-1}	☐	C
D	Sickle cell test (eg Sickledex)	____________	☐	D
E	Coagulation screen	____________	☐	E
F	Plasma electrolytes	Na ____________ m mol.litre^{-1}	☐	F
G		K ____________ m mol.litre^{-1}	☐	G
H		Cl ____________ m mol.litre^{-1}	☐	H
I		HCO_3 ____________ m mol.litre^{-1}	☐	I
J	Blood urea	____________ m mol.litre^{-1}	☐	J
K	Creatinine	____________ micro mol.litre^{-1}	☐	K
L	Serum albumin	____________ g.litre^{-1}	☐	L
M	Bilirubin (total)	____________ micro mol.litre^{-1}	☐	M
N	Glucose	____________ m mol.litre^{-1}	☐	N
O	Urinalysis (ward or lab)	____________	☐	O
P	Blood gas analysis	____________	☐	P
Q	Chest x-ray	____________	☐	Q
R	Electrocardiography	____________	☐	R
S	Respiratory function tests	____________	☐	S

Continued

35b

- T Echocardiography ______ [ ] T
- U Special cardiac investigation (eg cardiac catheterization) ______ [ ] U
- V Special neurological investigation (eg imaging) ______ [ ] V
- W Others relevant to anaesthesia (please specify) [ ] W

______

______

36. Coexisting medical diagnoses (please enter the appropriate letter in a box, **and specify the disorder in the space next to the category**).

36

- A none ______ [ ] A
- B respiratory ______ [ ] B
- C cardiac ______ [ ] C
- D neurological ______ [ ] D
- E endocrine ______ [ ] E
- F alimentary ______ [ ] F
- G renal ______ [ ] G
- H musculoskeletal ______ [ ] H
- I haematological ______ [ ] I
- J genetic abnormality ______ [ ] J
- K other (please specify) [ ] K

______

______

______

37. What drug or other therapy was the patient receiving at the time of operation (but excluding premedication or drugs for anaesthesia)?

Please enter each appropriate letter, **and specify drugs and doses** in the space below each category.

37

- A none ______ [ ] A
- B analgesic – aspirin ______ [ ] B
- C analgesic – other non-narcotic (specify) ______ [ ] C
- D analgesic – narcotic (specify) ______ [ ] D
- E anti-angina ______ [ ] E
- F anti-arrhythmic ______ [ ] F
- G anticoagulant ______ [ ] G
- H anticonvulsant ______ [ ] H
- I antidepressant ______ [ ] I
- J antidiabetic ______ [ ] J
- K antihypertensive ______ [ ] K
- L anti-infective (antibiotic, antifungal, antiviral etc) ______ [ ] L
- M anti-Parkinson's ______ [ ] M
- N anxiolytic ______ [ ] N
- O benzodiazepines ______ [ ] O
- P bronchodilator ______ [ ] P
- Q cardio- or vaso-active drug (not otherwise specified) ______ [ ] Q
- R contraceptive ______ [ ] R
- S corticosteroid (including Dexamethasone) ______ [ ] S
- T cytotoxic ______ [ ] T
- U diuretic ______ [ ] U
- V H_2 blockers ______ [ ] V
- W psychotropic ______ [ ] W
- X other (please specify) [ ] X

______

38. Was there any history of a drug reaction? Please <u>exclude</u> minor reactions to penicillin. 38 ☐

Yes = 1 No = 2

If **yes**, specify drug and reaction:

____

____

____

____

39. ASA Status (enter class number) 39 ☐

Class 1
Class 2
Class 3
Class 4
Class 5 (Note we do not use the E subclassification)

ASA Grades

American Society of Anesthesiology Classification of Physical Status

Class 1

The patient has no organic, physiological, biochemical, or psychiatric disturbance. The pathological process for which the operation is to be performed is localized and does not entail a systemic disturbance.

Examples: a fit patient with inguinal hernia
fibroid uterus in an otherwise healthy woman.

Class 2

Mild to moderate systemic disturbance caused either by the condition to be treated surgically or by other pathophysiological processes.

Examples: non-, or only slightly limiting organic heart disease
mild diabetes
essential hypertension
anaemia.

Some might choose to list the extremes of age here, either the neonate or the octogenarian, even though no discernible systemic disease is present. Extreme obesity and chronic bronchitis may be included in this category.

Continued...

Class 3

Severe systemic disturbance or disease from whatever cause, even though it may not be possible to define the degree of disability with finality.

Examples: severely limiting organic heart disease
severe diabetes with vascular complications
moderate to severe degrees of pulmonary insufficiency
angina pectoris or healed myocardial infarction.

Class 4

Severe systemic disorders that are already life threatening, not always correctable by operation.

Examples: patients with organic heart disease showing marked signs of cardiac insufficiency
persistent angina or active myocarditis
advanced degree of pulmonary, hepatic, renal or endocrine insufficiency.

Class 5

The moribund patient who has little chance of survival but is submitted to operation in desperation.

Examples: burst abdominal aneurysm with profound shock
major cerebral trauma with rapidly increasing intracranial pressure
massive pulmonary embolus.

Most of these patients require operation as a resuscitative measure with little if any anaesthesia.

PREPARATION OF PATIENT BEFORE OPERATION

40. When was the last fluid/food given by mouth? 40 ☐

A more than 6 hours before operation

B between 4-6 hours before operation

C less than 4 hours before operation

D not known/not recorded

Please specify nature and volume if known.

____

____

____

41. Indicate measures taken to reduce gastric acidity and volume, as prophylaxis against acid aspiration. 41

A none
B antacids
C H_2 antagonists
D metoclopramide
E nasogastric/stomach tube
F other (please specify)

____

42. Did the patient receive intravenous fluid therapy in the 12 hours before induction? 42a

Yes = 1 No = 2

If **yes**, please specify nature and volume in 12 hour pre-induction period.

	Fluid (enter letter for each)	Total (mls) given in 12 hours before induction 42b
A Crystalloid or dextrose		
B Colloid		
C Whole blood		
D Red cell component		
E Other components eg. platelets		
F Mannitol		
G Total parenteral nutrition		
H Other		

43. Was anything added to the above solution(s)? 43

Yes = 1 No = 2

If **yes**, please specify:

____

____

44. Were measures (other than those specified in questions 20 and 24) taken to improve the respiratory system **before** induction of anaesthesia? 44a

Yes = 1 No = 2

If **yes**, please indicate which measure(s) by entering a letter for each. 44b

A antibiotic therapy
B bronchodilators (nature and dose)
C chest physiotherapy
D airway management eg oral airway, tracheostomy
E other (please specify)

____

45. Were premedicant drugs prescribed? 45a

Yes = 1 No = 2

If **yes**, please enter the appropriate letter in each box, **and specify drugs and dose** in the space next to each category. 45b

A Atropine ______
B Chloral hydrate ______
C Diazepam (eg Valium) ______
D Droperidol ______
E Fentanyl ______
F Glycopyrronium (Robinul) ______
G Hyoscine (Scopolamine) ______
H Lorazepam (eg Ativan) ______
I Ketamine ______
J Metoclopramide ______
K Methohexitone ______
L Midazolam (Hypnovel) ______

Continued

45b

M Morphine ______ [ ] M

N Papaveretum (Omnopon) ______ [ ] N

O Pethidine ______ [ ] O

P Prochlorperazine (eg Stemetil) ______ [ ] P

Q Temazepam ______ [ ] Q

R Promethazine (eg Phenergan) ______ [ ] R

S Trimeprazine (Vallergan) ______ [ ] S

T Other (please specify) [ ] T

______

______

46. Was **non-invasive** monitoring established **just before** the induction of anaesthesia?

46a

Yes = 1 No = 2 [ ]

If **yes**, please indicate whether

46b

A ECG [ ] A
B BP [ ] B
C pulse oximetry [ ] C
D other (please specify) [ ] D

______

If **yes**, to question 46 what was the blood pressure immediately before induction?

______ / ______ mmHg

47. Was **invasive** monitoring established **before** induction of anaesthesia (eg CVP, arterial line)?

47

Yes = 1 No = 2 [ ]

If **yes**, please specify

______

______

48. Was it necessary to take measures additional to those specified in questions 24 to 43 to improve the patient's cardiovascular function just before and at the induction of anaesthesia?

48a

Yes = 1 No = 2 [ ]

If **no**, please go to question 49.

If **yes**, please specify (enter appropriate letter in **each** box below).

B Crystalloid IV fluids (Ringer lactate, 0.9% saline, etc) 48b [ ]

Please specify type and amount:

______

C Colloid IV fluids (Dextran, gelatin, etc) 48c [ ]

Please specify type and amount:

______

D Whole blood transfusion 48d [ ]

How many units?

______

E Blood components (packed cells, FFP, Platelets etc) 48e [ ]

Please specify type and volume:

______

F Antiarrhythmic drugs (Verapamil etc) 48f [ ]

Please specify drug and dose:

______

G Cardiac glycoside 48g [ ]

Please specify:

______

H Diuretics 48h ☐

Please specify: ______________________

I Vasopressors 48i ☐

Please specify: ______________________

J Inotropic drugs by infusion (Dobutamine, adrenaline etc) 48j ☐

Please specify drug and strength, solution and dose: ______________________

K Others (please specify) 48k ☐

____

49. Was there an inappropriate delay before the start of the operation?

Yes = 1 No = 2 49a ☐

If **yes**, was this due to non-availability of: 49b

A	radiology	☐ A
B	haematology	☐ B
C	pathology	☐ C
D	operating theatre	☐ D
E	anaesthetist	☐ E
F	anaesthetist's assistant	☐ F
G	surgeon	☐ G
H	theatre staff	☐ H
I	portering staff	☐ I
J	other staff (please specify) ____________	☐ J
K	other (please specify) ____________	☐ K

50. Were any measures taken (before, during or after operation) to prevent venous thrombosis?

Yes = 1 No = 2 50a ☐

If **yes**, please enter letter for each measure taken 50b

		Before or during	After	
A	aspirin	☐	☐	A
B	heparin	☐	☐	B
C	dextran infusion	☐	☐	C
D	leg stockings	☐	☐	D
E	calf compression/stimulation	☐	☐	E
F	Warfarin	☐	☐	F
G	other (please specify)	☐	☐	G

____

____

THE ANAESTHETIC

51. Time of start of anaesthetic ☐☐☐☐ 51

(enter "X" in boxes if times not recorded) use 24 hour clock

52. Time of start of surgery ☐☐☐☐ 52

use 24 hour clock

53. Time of transfer out of operating room (ie to recovery, ITU etc) ☐☐☐☐ 53

use 24 hour clock

If you are not able to provide the **times**, please indicate total duration of operation (ie time of start of anaesthetic to time of transfer)

_______hours _______mins

54. What was the grade of the most senior **surgeon** in the operating room?

54 ☐

A House Officer
B Senior House Officer
C Registrar
D Senior Registrar
E Associate Specialist
F Clinical Assistant
G Staff Grade
H Consultant
I Other (please specify)

____

55. Did you have **non-medical** help with anaesthesia?

55a ☐

Yes = 1 No = 2

If **yes**, please specify

55b

A trained anaesthetic nurse ☐ A
B trainee anaesthetic nurse ☐ B
C theatre nurse ☐ C
D trained operating department assistant (ODA or SODA) ☐ D
E trainee ODA ☐ E
F operating department orderly (ODO) ☐ F
G ward nurse ☐ G
H physiological measurement technician ☐ H
I other (please specify) ☐ I

____

56. Is there an anaesthetic record for this operation in the notes?

56 ☐

Yes = 1 No = 2

If **yes**, please send a complete copy of it with this questionnaire to the NCEPOD office. (We will delete/remove identification marks).

If **no**, please give an account of the anesthetic below. Please include details of anaesthetic agents, drugs, routes of administration, breathing systems, and tube size.

FLUIDS DURING OPERATION

57. Did the patient receive intravenous fluids **DURING** the operation? 57a [ ]

Yes = 1   No = 2

If **yes**, please indicate which:

Crystalloid — Fluid (indicate type by inserting appropriate letter) [ ][ ][ ] — Total volume during operation (mls) [ ][ ][ ][ ] (×3) 57b

A Dextrose 5%
B Dextrose 4% saline 0.18%
C Dextrose 10%
D Saline 0.9%
E Hartmann's (Compound Sodium Lactate)
F Other (please specify) ______

Colloid — [ ][ ][ ] — [ ][ ][ ][ ] (×3) 57c

A Modified gelatin (Gelofusine, Haemaccel)
B Human Albumin solution
C Starch (HES)
D Dextran
E Mannitol (please specify concentration)
F Other (please specify) ______

Blood — [ ][ ] — [ ][ ][ ][ ] (×2) 57d

A Whole blood
B Red cell component
C Other component (please specify) ______

58. What was the assessed blood loss during operation? [ ][ ][ ][ ][ ][ ] ml 58

59. Were monitoring devices used during the management of this anaesthetic? 59a [ ]

Yes = 1   No = 2

If **yes**, please indicate which monitors were used.

Please enter appropriate letter(s) in boxes:

		Anaesthetic Room	Operating Room	
A	ECG	A [ ]	A [ ]	59b
B	pulse oximeter	B [ ]	B [ ]	
C	indirect BP	C [ ]	C [ ]	
D	pulse meter	D [ ]	D [ ]	
E	oesophageal or precordial (chest wall) stethoscope	E [ ]	E [ ]	
F	fresh gas O_2 analyser	F [ ]	F [ ]	59c
G	inspired gas O_2 analyser	G [ ]	G [ ]	
H	inspired anaesthetic vapour analyser	H [ ]	H [ ]	
I	expired CO_2 analyser	I [ ]	I [ ]	
J	airway pressure gauge	J [ ]	J [ ]	59d
K	ventilation volume	K [ ]	K [ ]	
L	ventilator disconnect device	L [ ]	L [ ]	
M	peripheral nerve stimulator	M [ ]	M [ ]	59e
N	temperature (state site) ______	N [ ]	N [ ]	
O	urine output	O [ ]	O [ ]	
P	CVP	P [ ]	P [ ]	59f
Q	direct arterial BP (invasive)	Q [ ]	Q [ ]	
R	pulmonary arterial pressure	R [ ]	R [ ]	
S	intracranial pressure	S [ ]	S [ ]	
T	other (please specify)	T [ ]	T [ ]	

______

______

60. Was there any malfunction of monitoring equipment? 60 [ ]

Yes = 1   No = 2

If **yes**, please specify:

______

______

61. Did anything hinder full monitoring? 61

Yes = 1 No = 2

If **yes**, please specify: (eg bilteral arm surgery, radiotherapy, skin pigmentation, inaccessibility, non-availability of monitors)

___

___

POSITION OF PATIENT

62. What was the initial main position of the patient during surgery? 62

A supine
B lateral
C prone
D sitting
E knee-elbow
F lithotomy (inc. Lloyd-Davies)
G jack knife
H other (please specify)

___

63. Was the main position changed during the procedure? 63

Yes = 1 No = 2

If **yes**, please explain

___

___

TYPE OF ANAESTHESIA

64. What type of anaesthetic was used? 64

A general alone (65-73)
B local infiltration alone
C regional alone (74-75, and 77)
D general and regional (65-75)
E general and local infiltration (65-73)
F sedation alone (76-77)
G sedation and local infiltration (76-77)
H sedation and regional (74-77)

Please now answer the questions (if any) indicated in brackets, and then continue from question 78.

GENERAL ANAESTHESIA

65. Did you take precautions **at induction** to minimise pulmonary aspiration? 65a

Yes = 1 No = 2

If **yes**, please indicate which 65b

A cricoid pressure
B postural changes – head up
C postural changes – head down
D postural changes – lateral
E pre-oxygenation without inflation of the lungs
F aspiration of nasogastric tube
G other (please specify)

___

66. How was the airway established during anaesthesia? 66

A face mask (with or without oral airway)
B laryngeal mask
C orotracheal intubation
D nasotracheal intubation
E tracheostomy
F patient already intubated prior to arrival in theatre suite
G other (please specify)

___

67. What was the mode of ventilation during the operation? 67

A spontaneous
B controlled

68. If the trachea was intubated, how was the position of the tube confirmed? 68

A tube seen passing through cords
B chest movement with inflation
C auscultation
D expired CO_2 monitoring
E oesophageal detector device
F other (please specify)

___

69. Were muscle relaxants used during the anaesthetic? 69a [ ]

Yes = 1 No = 2

If **yes**, please indicate which 69b

A depolarising [ ] A
B non-depolarising [ ] B

70. How was general anaesthesia maintained? 70

A nitrous oxide [ ] A
B volatile agent [ ] B
C narcotic agent [ ] C
D intravenous infusions [ ] D

71. Were there any problems with airway maintenance or ventilation? 71 [ ]

Yes = 1 No = 2

If **yes**, please specify

____

____

72. Was the method of airway management changed during the operation? 72 [ ]

Yes = 1 No = 2

If **yes**, please explain

____

____

73. Did you induce hypotension deliberately to aid the surgeon? 73a [ ]

Yes = 1 No = 2

If **yes**, specify lowest systolic pressure achieved [ ][ ][ ] 73b mmHg

REGIONAL ANAESTHESIA

74. If the anaesthetic included a regional technique, which method was used? 74

A epidural – caudal [ ] A
B lumbar [ ] B
C thoracic [ ] C
D interpleural [ ] D
E intravenous regional [ ] E
F peripheral nerve block, eg paravertebral, sciatic, intercostal [ ] F
G plexus block (eg brachial, 3-in-1 block) [ ] G
H subarachnoid (spinal) [ ] H
I surface (eg for bronchoscopy) [ ] I

75. Which agent was used? Please specify drug(s) and dosage(s) 75

A local ______________________________ [ ] A

B narcotic ______________________________ [ ] B

C other (please specify) [ ] C

____

SEDATION (as opposed to General Anaesthesia)

76. Which sedative drugs were given for this procedure (excluding premedication)? 76

A inhalant [ ] A
B narcotic analgesic [ ] B
C benzodiazepine [ ] C
D sub-anaesthetic doses of IV anaesthetic drugs [ ] D
E other (please specify) [ ] E

____

77. Was oxygen given? 77a [ ]

Yes = 1 No = 2

If **yes**, for what reason? 77b

A routine [ ] A
B otherwise indicated [ ] B
(please specify indications)

____

RECOVERY FROM ANAESTHESIA

Definitions

(as used by the Association of Anaesthetists of Great Britain and Ireland)

1. A recovery area is an area to which patients are admitted from an operating room, where they remain until consciousness is regained and ventilation and circulation are stable.
2. A high dependency unit (HDU or area A) is an area for patients who require more intensive observation and/or nursing care than would normally be expected on a general ward. Patients who require mechanical ventilation or invasive monitoring would not be admitted to this area.
3. An intensive care unit (ICU) is an area to which patients are admitted for treatment of actual or impending organ failure who may require technological support (including mechanical ventilation of the lungs and/or invasive monitoring).

78. Which special care areas (see definitions above) exist in the hospital in which the operation took place?

78

A recovery area or room equipped and staffed for this purpose ☐ A
B high dependency unit ☐ B
C intensive care unit ☐ C
D other (please specify) ______ ☐ D
E none of the above ☐ E

79. After leaving the operating room, did the patient go to a specific recovery area or room (ie option "A" in question 78)

79

Yes = 1 No = 2 ☐

If **yes**, please continue with questions 80 and following.

If **no**, please answer question 80 and then go straight to question 86.

If patient died in theatre go to question 88.

80. Were you unable at any time to transfer the patient into an ICU, HDU, etc?

80a

Yes = 1 No = 2 ☐

If **yes**, why?

80b

A closed at night ☐ A
B closed at weekend ☐ B
C understaffing ☐ C
D lack of beds ☐ D
E other (please specify) ☐ E

______

RECOVERY AREA/ROOM

81. Were monitoring devices used during the management of this patient in the recovery room?

81a

Yes = 1 No = 2 ☐

If **yes**, please indicate which monitors were used.

Enter a **letter(s)** in **each** box as follows:

81b

A ECG ☐ A
B pulse oximeter ☐ B
C indirect BP ☐ C
D pulse meter ☐ D
E oesophageal or precordial (chest wall) stethoscope ☐ E

81c

F inspired gas O_2 analyser ☐ A

81d

G expired CO_2 analyser ☐ G
H airway pressure gauge ☐ H
I ventilation volume ☐ I
J ventilator disconnect device ☐ J

81e

K peripheral nerve stimulator ☐ K
L temperature (state site) ______ ☐ L
M urine output ☐ M

81f

N CVP
O direct arterial BP (invasive)
P pulmonary arterial pressure
Q intracranial pressure
R other (please specify)

82. Who decided that the patient should be discharged from the recovery room?

82

A the most senior anaesthetist
B another anaesthetist
C surgeon
D nurse
E other (please specify)

83. Time of leaving recovery area.

83

use 24 hour clock

(enter "X" in boxes if times not recorded)

84. Had this patient recovered protective reflexes before discharge from the recovery area?

84

Yes = 1 No = 2 Not known = 3

85. Where did this patient go next (ie after the recovery room)?

85

A ward
B high dependency unit
C intensive care unit
D specialised ICU
E home
F another hospital
G died in recovery area
H other (please specify)

86. If the patient was **not admitted to a recovery room,** where did this patient go on leaving theatre?

86

A ward
B high dependency unit
C intensive care unit
D specialised ICU
E home
F another hospital
G other (please specify)

87. Was controlled ventilation used postoperatively?

87a

Yes = 1 No = 2

If **yes**, why?

87b

A respiratory inadequacy
B control of intracranial pressure or other neurosurgical indications
C part of the management of pain
D other reasons (please specify)

CRITICAL INCIDENTS DURING ANAESTHESIA OR RECOVERY

88. Did any of the following events, which required specific treatment, occur during anaesthesia or recovery (see definition below)?

Yes = 1 No = 2

88a ☐

Definition
A critical incident is defined as an adverse event, which did cause, or might have caused if left uncorrected, an adverse outcome.

If **yes**, please specify nature by insertion of the appropriate letter(s) in a box.

88b

A	air embolus	☐ A
B	airway obstruction	☐ B
C	anaphylaxis	☐ C
D	arrhythmia	☐ D
E	bradycardia (to or less than 50% of resting)	☐ E
F	bronchospasm	☐ F
G	cardiac arrest (unintended)	☐ G
H	convulsions	☐ H
J	cyanosis	☐ J
K	disconnection of breathing system	☐ K
L	hyperpyrexia (greater than 40°C or very rapid increase in temperature)	☐ L
M	hypertension (increase of more than 50% resting systolic)	☐ M
N	hypotension (decrease of more than 50% resting systolic)	☐ N
P	hypoxia	☐ P
Q	misplaced tracheal tube	☐ Q
S	pneumothorax	☐ S
T	pulmonary aspiration	☐ T
V	pulmonary oedema	☐ V
W	respiratory arrest (unintended)	☐ W
X	total spinal	☐ X
Y	wrong dose or overdose of drug	☐ Y
Z	other (please specify)	☐ Z

____
____

88c Please specify location of patient, treatment and outcome.

____
____
____
____
____

89. Was there any mechanical failure of equipment (excluding that for monitoring)?

Yes = 1 No = 2

89a ☐

If **yes**, please specify:

89b

A	equipment for IPPV	☐ A
B	suction equipment	☐ B
C	syringe drivers	☐ C
D	infusion pump	☐ D
E	other (please specify)	☐ E

____

90. Were there **early** (ie up to 7 days) complications or events after this operation?

NB – excluding death in theatre or recovery area

Yes = 1 No = 2

90a ☐

Please enter a letter for each, and specify in the space below each category:

90b

A ventilatory problems (eg pneumonia, pulmonary oedema) ☐ A

____

B cardiac problems
(eg acute LVF, intractable arrhythmias, post-cardiac arrest) ☐ B

____

C hepatic failure ☐ C

____

Continued...

Continued

90b

D septicaemia ☐ D

E renal failure ☐ E

F central nervous system failure (eg failure to recover consciousness) ☐ F

G other (please specify) ☐ G

Please give an account of any adverse events during this period.

91. Were narcotic analgesic drugs given in the first 48 hours after operation? 91

Yes = 1 No = 2 ☐

If **yes**, please specify drug(s), dose(s), frequency and route(s):

92. Did complications occur as a result of these analgesic methods? 92

Yes = 1 No = 2 ☐

If **yes**, please specify:

93. Were other sedative/hypnotic or other analgesic (non-narcotic) drugs given? 93

Yes = 1 No = 2 ☐

If **yes**, please specify drug(s), dose(s), times and routes

DEATH

94. Date of death 94

D D M M Y Y

95. Time of death 95

use 24 hour clock

96. Place of death 96

A theatre
B recovery area
C intensive care unit
D high dependency unit
E ward
F home
G another hospital
H other (please specify)

97. Cause of death

98. Do you have morbidity/mortality review meetings in your department?

Yes = 1 No = 2 98a ☐

If **yes**, will this case be, or has it been discussed at your departmental meeting?

Yes = 1 No = 2 98b ☐

99. Has a consultant anaesthetist seen and agreed this form?

Yes = 1 No = 2 99 ☐

REMINDER

Have you enclosed copies of the anaesthetic record and fluid balance charts?

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

YOU MUST NOT KEEP A COPY OF THIS QUESTIONNAIRE

Please return it in the reply-paid envelope provided to:

NCEPOD
35-43 Lincoln's Inn Fields
LONDON
WC2A 3PN

If you wish to inform the NCEPOD office of any other details of this case, please do so on a separate sheet.

CONSULTANT ANAESTHETISTS ONLY

We would like to publish the names of all consultants who have returned completed questionnaires. Please help us by providing your initials and surname. This page will be removed from the questionnaire

Initials ________ Surname ________________

Appendix F - Pathology proforma

GENERAL FEATURES OF THE PM REPORT

The report is typewritten:	Y	N
A Clinical History is provided:	Y	N

When present the Clinical History is:-

1 Unacceptably brief, obscure uninformative	**2** Poor	**3** Satisfactory	**4** Good	**5** Fully detailed, clear, informative

A summary of Lesions is present:	Y	N
When present, this corresponds accurately to the text report:	Y	N
An OPCS cause of death is present:	Y	N
When present, this corresponds accurately to the text report:	Y	N
When present, this follows OPCS formatting rules:	Y	N
A Clinico-Pathological Correlation is present:	Y	N

When present, the CPC is:

1 Unacceptably brief, obscure uninformative, inaccurate	**2** Poor	**3** Satisfactory	**4** Good	**5** Clear, concise, fully informative, accurate

---

SPECIFIC FEATURES OF THE PM REPORT

The description of External Appearances is:-

1 Unacceptably brief, inadequately detailed, badly organised	**2** Poor	**3** Satisfactory	**4** Good	**5** Clear, fully detailed, systematically presented

Scars and Incisions are measured:	N/A	Y	N

The gross description of the internal organs is:-

1 Unacceptably brief, inadequately detailed, badly organised	**2** Poor	**3** Satisfactory	**4** Good	**5** Clear, fully detailed, systematically presented

Organs weighed (paired organs score 1):	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**> 9**

The skull and Brain have been examined:	Y	N
Mention is made of presence or absence of effusions:	Y	N
If yes, volumes have been measured:	Y	N
The gross examination, as described, is appropriate to the clinical problem:	Y	N

Samples have been taken for:-

1 Histology	**2** Microbiology	**3** Toxicology	**4** Other	**5** None of these investigations

In my judgement, a through autopsy in this case would have called for:-

1 Histology	**2** Microbiology	**3** Toxicology	**4** Other	**5** None of these investigations

A histological report is included with the PM report: .. .. **Y** **N**

When present, the histological report is:-

1 Unacceptably brief, obscure, not relevant to clinical need in this case	**2** Poor	**3** Satisfactory	**4** Good	**5** Fully detailed, informative relevant to clinical need in this case

When absent, does the lack of histology detract significantly from the value of this report? .. .. **Y** **N**

My overall score for this autopsy is:-

1 Unacceptable, laying the pathologist open to serious professional criticism	**2** Poor	**3** Satisfactory	**4** Good	**5** Excellent, an exemplary report, meeting the highest standards of practice

---

CLINICAL RELEVANCE

When the history, ante-mortem clinical diagnosis and cause of death are compared with the postmortem findings, this postmortem demonstrates: (ring numbers: more than one answer will often apply)

1 A **discrepancy** in the cause of death or in a major diagnosis, which if known, **would** have affected treatment, outcome of prognosis.

2 A **discrepancy** in the cause of death or in a major diagnosis, which if known, would **not** have affected treatment, outcome or prognosis.

3 A **minor** discrepancy.

4 **Confirmation** of essential clinical findings.

5 An interesting **incidental** finding.

6 A **failure** to explain some important aspect of the clinical problem, despite a **satisfactory** autopsy.

7 A **failure** to explain some important aspect of the clinical problem, as a result of an **unsatisfactory** autopsy.

8 Some other feature (please give details) ....

LESSONS TO BE LEARNED

Record any feature of this case which might be quoted in the NCEPOD Report (examples of good/bad surgical or pathological practice; illustration of value of autopsy; etc)

....

Appendix G - Participants

Consultant anaesthetists

These consultant anaesthetists returned at least one questionnaire relating to the period 1 April 1992 to 31 March 1993. We are not able to name all of the Consultants who have done so as their names are not known to us.

M.A.Abbott
P.Abbott
T.R.Abbott
C.N.Adams
H.Adams
K.Aggarwal
M.Ahmed
M.V.Ahmed
S.Ahmed
A.R.Aitkenhead
M.Akhtar
N.K.S.Al Quisi
K.Alagesan
J.I.Alexander
A.Ali
M.A.Ali
M.W.B.Allan
J.Allen
J.G.Allen
R.Allen
J.Allt-Graham
S.J.Almond
T.A.A.Ammar
I.Anderson
J.D.Anderson
S.K.Anderson
J.M.Anderton
D.S.Andrew
J.I.Andrews
J.H.L.Antrobus
T.N.Appleyard
C.Aps
G.M.D.Archer
P.L.Archer
A.C.Ardill
E.N.Armitage
R.Armstrong
A.E.Arrowsmith
G.Arthurs
K.Arunasalam
M.Ashby
J.N.Aspbury
B.Astley
D.W.Atherley
S.Atkinson
T.R.Austin
W.Aveling
P.C.B.Babington
A.J.Badami
D.M.Bailey
P.W.Bailey
A.B.Bainton
P.Bajorek
G.M.Baker
J.R.Baker
P.M.Baker
P.H.Balakrishnan
G.J.Baldock
J.Ballance
P.G.Ballance
P.K.Ballard
H.G.R.Balmer
D.B.Bamber
P.A.Bamber
P.Banerjee
J.D.Barber
A.J.Barclay
D.M.M.Bardgett
P.Barker
M.B.Barnett
R.F.Barrett
P.Barry
L.Z.Barsoum
P.M.Bashir
P.J.F.Baskett
H.L.R.Bastiaenen
B.A.Bastian
T.K.Basu
A.M.Batchelor
P.H.Bavister
A.V.Beaugie
A.C.Beaumont
G.P.Beck
C.P.Beeby
M.J.Beech
A.P.G.Beechey
H.T.B.Beers
C.Beeton
C.F.Bell
P.F.Bell
M.C.Bellamy
J.M.Bellin
J.L.Bembridge
M.Bembridge
M.Benedict
J.A.Bennett
P.J.Bennett
S.M.Berger
M.Berry
D.W.Bethune
D.G.Beynon
B.B.Bhala
D.Bhar
S.Bhattacharya
K.M.Bill
J.F.Bion
K.J.Bird
R.J.S.Birks
D.G.M.Bishop
M.Biswas
A.Black
I.H.C.Black
E.Bland
C.E.Blogg
M.D.Blundell
R.W.Boaden
A.R.Bodenham
D.G.Bogod
S.Bolsin
C.V.Bonnici
M.D.Boobyer
P.D.Booker
F.Bostock
R.A.Botha
J.D.Bousfield
D.J.Bowen
R.M.Bowen Wright
B.J.M.Bowles
C.J.Bowley
R.A.Bowman
V.Boyd
A.S.Boyle
H.G.C.Bradfield
E.Bradshaw
M.M.Brady
R.G.B.Bramwell
N.Braude
B.M.Bray
M.Bray
D.P.Breen
J.E.Brett
M.D.Brewin
D.D.Brice
P.W.Brighten
V.B.Brim
J.Broadley
P.J.Brock
P.M.Brodrick
L.Bromley
C.M.Brookes
R.C.Brookes
A.M.Brooks
A.E.Brown
G.C.S.Brown
J.J.Brown
L.Brown
L.A.Brown
P.M.Brown
C.H.W.Browne
M.T.T.Bryant
R.W.Buckland
A.J.Budd
R.Buist
M.D.G.Bukht
J.N.Bulmer
N.J.Burbridge
K.R.Burchett
A.N.Burlingham
J.C.Burnell
S.Burnley
D.Burt
J.Butler
B.J.Buxton
W.F.Byrne
J.M.Caddy
D.R.Cadle

P.A.Cain
I.Calder
C.Callender
B.Cameron
K.S.Cameron
F.N.Campbell
W.I.Campbell
W.D.J.Cantrell
R.Carley
R.J.T.Carlisle
J.C.G.Carmichael
C.M.E.Carr
L.E.Carrie
I.W.Carson
A.J.Carter
J.Carter
J.A.Carter
J.A.Carter
M.I.Carter
N.P.Carter
R.F.Carter
D.P.Cartwright
P.D.Cartwright
F.F.Casale
W.F.Casey
T.I.Cash
J.N.Cashman
J.S.Catling
R.Cattermole
W.P.Cave
I.S.Chadwick
A.G.Chaffe
S.K.Chakraborty
P.D.Challen
E.P.D.Chalmers
M.E.Chamberlain
J.J.Chambers
J.M.Chapman
G.A.Charlton
J.E.Charlton
P.Charters
C.L.Charway
S.N.Chater
D.A.Child
D.Childs
J.M.Chishti
A.T.Chmielewski
M.A.Choksi
A.S.Christian
D.Christmas
A.B.Church
G.Clark
G.P.M.Clark
J.M.Clark
R.M.Clark
W.G.B.Clark
C.W.M.Clarke
H.L.Clarke
W.B.Clarkson
K.C.Clayton
N.W.B.Clowes
R.W.D.Clunie
P.Clyburn
M.B.Coates
M.Cobley
P.G.Cobner
D.F.Cochrane
A.J.Coe
A.T.Cohen
D.G.Cohen
J.R.Cole
R.Cole
A.J.Coleman
P.Coleman
B.B.Collier
K.M.Collins
L.J.Colville
M.P.Colvin
I.Conacher
A.G.Conn
Q.G.Conn
J.D.R.Connolly
P.T.Conroy
M.Conway
P.Conway
A.B.Conyers
J.H.Cook
P.R.Cook
A.M.C.Cooper
P.D.Cooper
W.G.Cooper
D.L.Coppel
G.C.Corser
S.Cottam
J.Cotter
R.J.Coultas
D.Counsell
D.J.Cousins
D.C.Crawford
P.Creagh-Barry
M.M.Crosse
A.W.A.Crossley
R.H.Cruickshank
S.G.H.Cruickshank
J.G.Cundill
J.P.Curran
P.G.Cutler
J.A.Dako
J.G.Dalgleish
J.R.Dalton
P.E.Daly
M.Daniels
W.L.Dann
M.Darowski
E.M.Darwood
D.G.D.Davidson
J.P.Davie
G.Davies
G.K.Davies
H.Davies
J.S.Davies
K.J.Davies
N.J.H.Davies
P.A.Davies
S.Davies
T.D.W.Davies
B.L.Davis
J.C.Dawson
C.D.Day
S.L.De Zoysa
W.W.Deacon
B.M.Dempsey
D.R.Derbyshire
H.C.Desai
R.C.Desborough
D.Desgrand
W.R.Desira
M.J.Desmond
A.K.Dewar
F.Dewar
J.A.Dewar
A.W.Diamond
D.Dickson
G.R.Dickson
T.J.Digger
H.R.Dingle
A.M.Dixon
J.Dixon
M.B.Dobson
P.Dodd
S.Dolin
R.M.Doshi
J.W.Dowdall
R.M.Dowling
J.Downer
S.Dowson
H.F.Drake
P.M.Du Boulay
J.E.Duggan
N.H.Duncan
S.R.Dunn
N.M.Dunne
I.A.R.Dunnett
R.P.H.Dunnill
A.M.Duthie
D.J.R.Duthie
A.D.Dyson
P.Eadsforth
G.M.Eames
C.Earlam
C.R.Eatock
J.M.Eaton
P.S.Eccersley
D.L.Edbrooke
D.E.Eddleston
J.M.Eddleston
W.G.Edge
J.Edmonds-Seal
L.Edmondson
R.S.Edmondson
A.E.Edwards
G.Edwards
H.Edwards
J.C.Edwards
J.M.Edwards
R.Edwards
E.K.Eite
D.J.Elliott
P.Elliott
M.E.Eltoft
F.M.Emery
E.M.C.Ernst
W.A.R.Erskine
D.C.Erwin
R.W.Eustace
C.S.Evans
D.H.C.Evans
M.Evans
M.Evans
M.L.Evans
P.Evans
P.J.D.Evans
R.D.Evans
R.J.C.Evans
S.F.Evans
M.C.Ewart
M.J.Fairbrass
J.E.Fairfield
G.Farnsworth
M.H.Faroqui
M.C.Farrell
J.Farrimond
D.Fell
R.H.Fell
J.A.Fenwick
B.J.M.Ferguson
N.V.Fergusson
G.Field
S.Firn
A.Fisher

G.C.Fisher
M.F.Fisher
A.M.Florence
G.D.Flowerdew
M.J.Flynn
P.Ford
R.M.M.Fordham
P.C.Forrester
D.M.Forster
S.Forster
R.Forward
B.Foster
J.M.Foster
M.A.Fox
R.M.Foxell
J.R.Fozard
G.A.Francis
J.G.Francis
R.N.Francis
C.B.Franklin
J.Freeman
J.W.Freeman
M.K.Freeman
R.M.Freeman
R.M.Frew
J.Friend
S.Frimpong
A.R.Frost
D.I.Fry
J.M.Fryer
C.A.Fuge
G.Furness
P.Furniss
G.J.J.Fuzzey
R.W.Gabriel
P.S.Gadgil
P.J.Galea
E.J.Galizia
L.B.S.Gallagher
D.W.Galloway
S.W.Gammanpila
C.P.O.Garrett
R.Gautam
P.A.Gaynor
M.Geadah
I.R.Gell
L.W.Gemmell
K.A.George
S.P.Gerrish
R.G.Ghaly
F.M.Ghandour
J.S.Gibson
K.J.Gill
S.S.Gill
G.B.Gillett
J.A.Glass
M.J.Glavina
C.M.T.Gleave
V.A.Goat
P.Goldberg
J.C.Goldstone
N.Goodman
D.T.Goodrum
A.P.E.Goodwin
J.E.Goodwin
W.Gooneratine
H.L.Gordon
M.B.Gough
I.F.M.Graham
D.J.Grainger
I.C.Grant
N.H.Graveston
D.Gray
H.S.J.Gray
G.G.Grayling
J.D.Greaves
C.R.Grebenik
B.Green
B.Green
R.Greenbaum
D.L.Greenhalgh
B.K.Greenwood
I.C.Gregory
M.A.Gregory
D.P.G.Griffiths
F.J.Griffiths
R.B.Griffiths
R.Grummett
K.E.J.Gunning
R.K.Gupta
B.P.Guratsky
C.L.Gwinnutt
H.Hackett
E.G.Hadaway
D.R.Haines
A.M.Hainsworth
M.S.Hakim
G.Hall
P.J.Hall
G.Hall-Davies
I.Hallack
M.S.Hamer
M.R.Hamilton-Farrell
G.W.Hamlin
J.L.Handy
M.Hanna
C.D.Hanning
J.G.Hannington-Kiff
M.Hardwick
I.Hardy
P.Hardy
P.A.J.Hardy
S.A.Hargrave
D.H.Harley
N.F.Harley
M.Harmer
K.W.Harper
N.J.N.Harper
S.J.Harper
R.W.Harris
S.J.Harris
T.J.B.Harris
A.R.Harrison
C.A.Harrison
G.R.Harrison
J.F.Harrison
K.M.Harrison
R.A.Harrison
S.G.C.Harrison
I.K.Hartopp
C.R.Harvey
D.C.Harvey
P.B.Harvey
C.R.Hasbury
H.Hassan
S.Hawkins
T.J.Hawkins
C.M.Heal
G.A.H.Heaney
D.G.Heap
M.L.Heath
P.J.Heath
D.W.Heaviside
R.Hebblethwaite
J.Heber
J.E.Hegarty
R.T.Hegde
N.M.Heggie
M.P.D.Heining
C.P.H.Heneghan
J.G.Henly
J.D.Henville
I.H.Herrema
M.J.Herrick
J.B.Hicks
B.D.Higgs
H.Hill
J.Hindmarsh
I.P.Hine
W.Hinton
N.P.Hirsch
G.M.Hitchings
D.J.Hoad
R.M.H.Hodgson
J.N.Hodkinson
M.C.Holderness
S.Holgate
D.E.Holland
N.Hollis
G.R.Hollister
T.E.Hollway
J.W.L.Holmes
W.Holmes
C.S.Hopkins
E.L.Horsman
J.N.Horton
B.C.Hovell
E.C.Howard
R.P.Howard
J.P.Howe
C.W.Howell
P.J.Howell
R.S.C.Howell
D.Howes
S.Howlin
R.H.A.Hoyal
J.R.Hoyle
N.Huddy
M.C.Hudson
R.B.S.Hudson
N.J.Huggins
D.G.Hughes
D.R.Hughes
D.I.Hughes-Davies
J.Hulf
C.J.Hull
M.G.Hulse
J.E.Hunsley
P.C.W.Hunt
T.M.Hunt
J.M.Hunter
S.J.Hunter
J.Hurst
B.K.D.Huss
P.J.G.Hutchings
A.Hutchinson
H.T.Hutchinson
J.Hutchinson
C.Hutter
D.S.Hutton
P.Hutton
A.Ievins
M.M.Imrie
C.S.Ince
M.S.Inglis
G.S.Ingram
C.N.Isherwood
A.P.F.Jackson
A.S.Jackson
D.M.Jackson

I.J.B.Jackson
P.W.Jackson
R.H.Jago
A.P.Jain
M.L.James
P.James
R.H.James
J.R.Jamieson
A.P.Jarvis
B.Jayaratne
R.Jayaweera
D.W.Jayson
V.Jeevananthan
J.D.M.Jeffrey
N.G.Jeffs
J.A.Jellicoe
B.J.Jenkins
I.A.Jenkins
J.G.Jenkins
J.R.Jenkins
G.Jephcott
E.Jessop
D.A.Jewkes
P.Jeyaratnam
G.Johns
R.J.Johns
M.K.Johnson
R.A.Johnson
R.C.Johnson
J.R.Johnston
P.Johnston
P.L.Johnston
R.D.Johnstone
B.C.Jones
D.F.Jones
D.I.Jones
G.N.Jones
G.W.Jones
I.W.Jones
J.A.Jones
M.J.Jones
M.J.T.Jones
P.I.E.Jones
R.E.Jones
R.M.Jones
S.Jothilingam
N.S.Kaduskar
P.Kai
B.S.K.Kamath
M.B.Kamath
G.M.Kane
L.D.Karalliedde
A.G.Kassi
K.K.Kataria
R.Kavan
N.H.Kay
P.M.Kay
G.A.Kazi
S.J.Keens
P.J.Keep
D.R.Kelly
E.P.Kelly
D.J.Kennedy
A.P.Kent
E.J.Kershaw
I.Kestin
S.Kethar-Thas
A.A.Khan
A.H.Khan
I.A.Khan
T.Khanam
V.K.Khanna
S.M.Kilpatrick
A.Kimberley
N.W.King
T.A.King
T.J.Kinsella
R.M.Kipling
T.Kirkpatrick
R.Kishen
P.A.Knappett
J.Kneeshaw
A.A.Knibb
C.J.Knickenberg
C.L.Knight
P.F.Knight
A.B.Knight-George
M.K.Kocan
N.Koehli
M.S.Kokri
J.J.Kothari
M.A.Kraayenbrink
B.Kumar
C.M.Kumar
D.A.Laffey
A.P.J.Lake
J.M.Lalor
R.Lalsingh
A.S.T.Lamb
C.J.Lamb
G.Lamplugh
A.Landes
J.R.Lane
P.R.W.Lanham
P.D.Lassey
B.V.Latham
R.D.Latimer
I.P.Latto
E.G.Lawes
D.J.Layfield
D.E.Lee
K.G.Lee
P.Lee
J.F.Lees
J.M.Leigh
A.Leslie
P.J.A.Lesser
J.R.Lethbridge
J.R.Lewis
M.A.Lewis
M.A.H.Lewis
P.Lewis
R.N.Lewis
R.P.Lewis
J.P.Lilley
M.J.Lindop
K.G.Lindsay
W.A.Lindsay
S.Ling
A.Linsley
S.P.K.Linter
D.J.Lintin
R.A.F.Linton
A.B.Loach
B.W.Loader
I.Locker
A.S.Lockhart
G.Lockwood
A.D.Logan
L.Loh
T.Long
T.M.W.Long
M.A.Longan
R.T.Longbottom
M.Lothian
P.G.Loughran
R.Loveday
K.G.Lowry
C.F.Loyden
J.Lucas
T.Ludgrove
J.Lumley
D.Lush
M.Lutton
M.C.Luxton
D.J.R.Lyle
G.R.Lyons
D.H.MacDougall
A.A.MacKenzie
K.R.MacLeod
I.D.Macartney
K.C.Macintosh
L.J.Mackay
S.Mackenzie
D.I.M.Macnair
T.H.Madej
J.M.F.Maginness
O.A.Maher
O.Mahmoud
A.R.Mahroo
C.J.D.Maile
I.M.J.Mair
C.G.Male
S.Mallett
R.A.M.Mann
A.Mannan
R.Mannar
M.Manoj
J.Manser
N.J.Manus
J.J.Margary
J.S.Mark
R.J.Marks
A.Marsh
R.H.K.Marsh
C.Marshall
F.P.F.Marshall
M.A.Marshall
A.J.Martin
D.G.Martin
J.L.Martin
J.W.Martin
S.A.Masey
C.J.Mason
R.A.Mason
Z.Masri
N.J.A.Massey
B.R.Master
A.P.Masters
J.S.Mather
S.P.Mather
H.A.Matheson
K.H.Matheson
H.M.L.Mathews
A.K.Mathur
A.J.Matthews
N.C.Matthews
P.J.Mawson
J.R.May
R.M.Mayall
E.J.McAteer
D.M.McAuley
D.M.I.McCallum
I.J.McCallum
W.McCaughey
J.W.McCrory
I.P.McEwan
J.F.McGeachie
T.D.McGhee
A.McHutchon

I.McInnes
A.C.McKay
E.P.McKiernan
R.G.C.McKinlay
M.McKinney
W.McLeery
I.McLellan
T.J.McMurray
J.J.McPherson
P.McQuillan
D.P.Meadows
G.A.Meadows
R.M.Mehta
N.P.Mercer
W.K.Merifield
S.B.Merrill
M.N.A.Messih
M.Meurer-Laban
R.Michel
C.M.Middleton
M.Mikhael
S.W.Millar
R.Miller
R.I.Miller
K.R.Milligan
B.R.Milne
I.S.Milne
M.D.Milne
T.J.Mimpriss
P.L.Misra
M.D.Mitchell
R.G.Mitchell
R.W.D.Mitchell
K.A.Mobley
S.P.Moffett
A.H.M.Mollah
C.Monk
R.A.Moody
C.Moon
J.R.A.Moon
C.A.Moore
J.K.Moore
K.C.Moore
N.A.Moore
W.E.Morcos
G.A.R.Morgan
M.Morgan
P.Morgan
R.J.M.Morgan
R.N.W.Morgan
J.O.Morgan-Hughes
J.E.Morris
R.Morris
A.Morrison
P.Morrison
G.W.Morriss
A.J.Mortimer
P.E.Moskovits
E.Moss
M.A.Moxon
G.van Mourik
L.L.Mudie
F.J.Mukasa
B.D.Mukerji
J.T.Mulvein
J.V.B.Mundy
J.Murphy
F.P.Murray
J.F.Murray
J.M.Murray
A.Murray-Wilson
K.R.Myerson
H.Myint
M.L.Nancekievill
K.Nandi
N.H.Naqvi
P.J.Nash
K.M.Natrajan
A.Naunton
M.N.Navaratnarajah
S.Nethisinghe
H.Newbegin
D.M.Newby
J.P.Newell
B.Newman
L.H.Newman
V.J.Newman
D.E.F.Newton
W.S.Ng
D.J.Niblett
M.P.Nicholas
A.Nicol
J.M.V.Nicoll
A.K.Nigam
J.Nightingale
K.W.Nightingale
P.Nightingale
S.Nithianandan
H.Noble
J.Noble
W.A.Noble
I.Norley
J.Norman
J.P.Normandale
P.E.North
D.Northwood
A.C.Norton
W.G.Notcutt
M.R.Nott
G.F.Nunn
A.C.O'Callaghan
J.F.O'Dea
J.J.O'Donnell
B.O'Donohoe
N.P.O'Donovan
H.O'Dwyer
M.J.O'Neil
E.O'Sullivan
P.A.Oakley
R.W.Okell
A.Olivelle
J.Olver
D.A.Orr
I.A.Orr
J.K.Orton
H.Osman
R.Owen
R.J.E.Page
W.A.Pais
P.H.Palin
N.Palmer
G.Panch
J.C.Pappin
G.R.Park
H.Parry
A.Patel
L.S.I.Pathiratne
M.R.Patrick
S.Paul
M.Payne
T.Peachey
J.E.Peacock
A.C.Pearce
R.M.G.Pearson
A.Peebles-Brown
M.S.Pegg
C.J.Pemberton
N.Penfold
G.N.Penlington
N.H.Pereira
B.W.Perriss
C.G.Peters
A.C.Peterson
H.V.Petts
A.J.Phillips
D.C.Phillips
G.Phillips
G.H.Phillips
P.D.Phillips
B.Philpott
M.Pickering-Pick
F.J.Pickford
G.M.Pitt
M.H.Plumley
R.B.Plummer
A.G.Pocklington
B.J.Pollard
C.G.Pollock
J.C.Ponte
N.Poobalasingam
E.J.B.Porter
J.Porter
A.J.Porterfield
D.Potter
D.Pounder
D.Powell
H.Powell
J.N.Powell
I.Power
K.J.Power
A.B.Powles
C.I.Pratt
K.A.Price
V.Price
A.K.Pridie
G.D.Prince
E.A.Proctor
C.Prys-Roberts
G.Purcell-Jones
E.A.Putnam
N.Puttick
A.Pyne
M.A.Quader
P.Radford
H.Raithatha
H.H.Raithatha
A.Raju
S.Ralph
V.S.Ram
A.Ramachandran
A.J.Rampton
W.N.Ramsden
N.P.C.Randall
I.N.Rao
N.Rao
W.S.Rao
J.M.Raper
G.Raphael
S.Ratnavel
A.Ravalia
S.B.Rawal
P.R.Rawle
W.A.L.Rawlinson
A.K.Ray
P.R.Rayner
A.Razak
P.Razis
S.E.Rebstein
N.Redfern
D.R.O.Redman

L.R.Redman
A.Redpath
P.N.Reed
D.G.Rees
M.F.Reid
C.S.Reilly
S.A.M.Remington
A.D.Reynolds
C.P.Rice
D.C.Richards
M.J.Richards
JRichardson
J.Richardson
M.E.Richardson
D.J.H.Richmond
M.N.Richmond
P.L.Riddell
D.Riddington
I.F.Riddle
S.Ridley
J.Rigg
B.Riley
P.J.Rimell
P.Ritchie
P.A.Ritchie
D.S.Robbie
D.R.D.Roberts
F.L.Roberts
W.O.Roberts
R.Robertshaw
D.S.Robertson
J.A.Robertson
D.W.Robins
D.A.Robinson
F.P.Robinson
J.E.Robinson
K.N.Robinson
P.N.Robinson
Q.L.A.Robinson
R.C.Rodgers
P.Roe
P.Rogers
D.Rogerson
A.M.Rollin
D.M.Ross
J.M.Rouse
G.S.Routh
W.L.Rowe
P.Royle
A.P.Rubin
E.Rush
I.F.Russell
M.Russell
D.V.Rutter
C.R.Ryan
D.A.Ryan
J.P.Ryan
W.Ryder
D.A.Sagar
S.N.Saggar
B.B.Sahal
A.Saleh
M.G.D.Salem
N.P.Salmon
J.C.Salt
P.J.Salt
A.A.Samaan
R.V.Samak
I.O.Samuel
T.A.Samuels
B.Sandhar
S.Sanghera
A.Sansome
V.Sarma
D.A.Saunders
S.N.Saxena
M.J.H.Scallan
N.M.Schofield
P.A.Schwarz
J.G.Scott
P.V.Scott
W.E.Scott
V.Scott-Knight
M.M.Sealey
W.F.S.Sellers
W.G.Sellwood
A.Sen
P.Sengupta
P.R.Sengupta
A.Seth
H.Shah
J.L.Shah
R.K.Shah
R.N.N.Shah
A.B.Shanks
C.J.Shannon
R.Sharawi
D.Shaw
I.H.Shaw
J.Shaw
T.C.Shaw
U.A.Sheorey
K.M.Sherry
R.N.Shetty
D.M.Shewan
D.H.Short
S.Short
A.J.Shribman
L.E.Shutt
W.J.Siddall
S.A.Siddiqui
C.A.Sides
J.M.Silk
M.F.de Silva
J.Silver
A.D.Simcock
D.Simpson
M.E.Simpson
P.J.Simpson
J.R.Sinclair
M.Sinclair
T.Sivalingam
D.G.Skewes
A.C.Skinner
M.A.Skues
I.P.Slee
C.Smales
J.R.Smethurst
B.A.C.Smith
B.L.Smith
C.Smith
H.S.Smith
J.E.Smith
M.Smith
M.B.Smith
N.J.Smith
P.Smith
P.A.Smith
S.P.Smith
W.D.Smith
P.R.F.Smyth
J.R.Sneyd
S.Somanathan
I.D.Somerville
G.R.Sowden
C.C.Spanswick
P.Spargo
H.M.S.Speedy
H.A.Spencer
R.A.Spilsbury
P.L.Spreadbury
T.H.Spreadbury
J.S.Sprigge
J.M.Squire
S.Srivastava
L.St John-Jones
A.F.Stakes
B.J.Stanford
V.Stanhill
J.C.Stanley
I.K.Stanley-Jones
J.M.Stanton
C.Starkey
P.A.Steane
B.Steer
G.L.Steer
P.H.Steller
G.W.Stephen
C.M.Steven
A.J.Stevens
J.Stevens
J.M.Stevenson
A.I.Stewart
P.Stewart
E.Stielow
J.G.L.Stock
M.A.Stockwell
J.C.Stoddart
J.R.Stoneham
P.J.Stow
J.A.C.Strachan
S.K.Strahan
C.M.Stray
M.Street
J.E.Strong
P.Strube
J.F.Stubbing
C.Studd
J.T.Styles
E.Sumner
D.N.Sutton
J.E.Sweeney
P.T.Sweet
G.V.Symons
R.M.Tackley
P.C.M.Taggart
D.B.B.Talwatte
P.G.Tannett
T.J.Tarr
P.F.Tatham
D.H.Tayler
E.A.Taylor
E.A.S.Taylor
G JTaylor
G.Taylor
I.H.Taylor
S.Taylor
R.Telford
G.Teturswamy
G.S.Thind
A.N.Thomas
D.A.Thomas
D.G.Thomas
D.W.Thomas
G.W.Thomas
J.B.Thomas
J.L.Thomas
R.C.Thomas
V.L.Thomas
E.E.M.Thompson

I.D.Thompson
J.Thompson
J.F.W.Thompson
M.C.Thompson
J.Thomson
W.Thomson
J.L.Thorn
A.Thornberry
R.E.Thornington
R.J.Thornton
T.A.S.Thorp
M.H.Thorpe
P.M.Thorpe
M.A.Tobias
M.E.Tolley
A.A.Tomlinson
J.H.Tomlinson
M.J.Tomlinson
M.D.Trask
I.C.Tring
A.P.Triscott
T.Trotter
D.A.B.Turner
D.J.Turner
G.Turner
J.M.Turner
M.A.Turner
R.J.N.Turner
A.Turrall
D.G.Tweedie
A.J.Twigley
M.M.Twohig
C.K.G.Tyler
I.Ulyett
V.K.N.Unni
A.Valijan
J.P.Van Besouw
G.L.Van Hasselt
M.E.P.Van Ryssen
R.G.Vanner
B.Q.Varley
R.S.Vaughan
A.Vella
L.M.Vella
A.M.Veness
N.Venkat
P.A.Ventham
C.Verghese
R.Verma
A.P.Vickers
M.D.Vickers
R.G.Vindlacheruvu
T.Waddell
A.J.Wadon
C.A.Wadon
A.C.Wainwright
C.M.Wait
C.S.Waldmann
B.A.Waldron
A.K.Y.Walker
H.A.C.Walker
J.A.Walker
R.S.Walker
W.A.Wallbank
A.J.Walmsley
E.Walsh
E.M.Walsh
F.Walters
H.R.Walters
B.Walton
P.Walton
J.G.Wandless
H.M.Wanninayake
M.E.Ward
S.Ward
I.H.Warnell
J.A.Warner
T.D.Waterhouse
H.R.Waters
T.G.Watkins
D.A.Watson
D.M.Watson
K.Watson
P.J.Q.Watson
J.M.Watt
J.W.H.Watt
J.A.Watt-Smith
C.H.Watters
T.D.Wauchob
T.B.Webb
J.L.Webster
N.R.W.Webster
B.Weldon
O.G.W.Weldon
D.West
K.J.West
G.A.Weston
R.G.Wheatley
E.Whelan
D.G.White
D.J.K.White
J.B.White
P.O.White
P.Whitehurst
D.K.Whittaker
M.P.Whitten
R.T.Whitty
A.K.Wielogorski
P.C.Wiener
A.Wignarajah
I.Wije
A.B.S.Wijetilleka
R.G.Wilkes
A DWilkey
B.R.Wilkey
D.J.Wilkinson
K.Wilkinson
P.A.Wilkinson
R.Will
D.G.Willatts
A.B.Williams
C.Williams
D.J.M.Williams
E.G.N.Williams
J.G.Williams
L.J.Williams
V.Williams
C.M.Wilson
D.B.Wilson
T.J.Wilson
H.J.Wilton
D.P.Winder
J.H.Winder
J.Windsor
C.C.Wise
P.S.Withington
M.J.Wolfe
B.M.Wood
D.W.Wood
N.M.Woodall
T.E.Woodcock
I.Woods
S.D.Woods
P.V.Woodsford
C.H.M.Woollam
W.J.W.Wraight
G.Wray
G.Wright
I.G.Wright
J.H.Wright
M.M.Wright
R.Wyatt
W.A.Yanny
P.Yate
A.P.B.Yates
D.W.Yates
J.E.J.Yates
K.Yau
D.A.Young
P.N.Young
D.A.Zideman

Appendix H - Participants

Consultant surgeons and gynaecologists

These consultant surgeons and gynaecologists returned at least one questionnaire relating to the period 1 April 1992 to 31 March 1993.

K.Abdel-Aal
P.Abel
P.Abrams
J.S.Ackroyd
H.M.Adair
C.B.T.Adams
M.Adiseshiah
F.Afshar
N.K.Agrawal
A.Aiken
J.S.Albert
C.H.Aldam
D.Alderson
M.I.Aldoori
D. Ali
A.Allan
D.Allan
W.R.Allan
D.R.Allen
N.Allen
P.R.Allen
T.R.Allen
R.Allsopp
W.H.Allum
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E.K.Alpar
N.S.Ambrose
A.H.Amery
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G.D.Angelini
H.G.Annan
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T.J.Archer
V.P.Argent
D.G.Arkell
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T.G.Armitage
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C.P.Armstrong
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R.Baker
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T.Bates
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S.Haynes
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D.V.Heath
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D.Johnston
G.W.Johnston
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K.R.Jones
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C.W.Pattison
P.H.Pattisson
J.G.Payne
S.R.Payne
H.J.Pearson
J.B.Pearson
R.C.Pearson
P.R.BPedlow
A.L.G.Peel
T.N.D.Peet
C.A.S.Pegg
E.D.Pereira
P.M.Perry
J.W.R.Peyton
P.J.Pheils
H.Phillips
J.B.Phillips
R.K.S.Phillips
N.H.Philp
T.Philp
J.Pickard
J.M.Pickles
M.C.Pietroni
T.A.Piggot
R.Pillai
I.M.Pinder
D.J.Pinto
M.R.Pittam
J.L.Plewes
L.H.Pobereskin
R.D.Pocock
J.P.Pollard
R.Pollard
R.J.Porter
K.R.Poskitt
M.P.Powell
P.H.Powell
S.J.A.Powis
D.P.Powles
P.J.Pownall
J.L.Pozo
D.Pratt
T.R.Preston
J.J.Price
J.N.Primrose
W.J.Primrose
M.G.Prinn

A.L.Prior
C.J.Pritchett
G.Proud
W.G.Prout
G.A.Pryor
J.V.Psaila
M.C.A.Puntis
J.K.Pye
A.R.Quayle
J.B.Quayle
C.R.Quick
J.M.Quinby
R.C.Quinnell
A.R.Qureshi
A.G.Radcliffe
A.T.Raftery
A.N.Rahman
G.E.T.Raine
H.A.Rainey
R.M.Rainsbury
K.S.Raju
D.N.L.Ralphs
J.W.A.Ramsay
P.D.Ramsden
C.Rand
A.Rashid
D.A.Ratliff
G.Ravichandra
C.R.W.Rayner
P.Reddy
R.M.Redfern
T.R.Redfern
H.Reece-Smith
M.W.Reed
A.Rees
R.Rees
D.T.Reilly
J.A.Rennie
C.J. Renton
A.Resouly
J.R.Reynolds
J.R.Rhind
A.Rhodes
P.Rhys-Evans
H.Riad
B.F.Ribeiro
J.M.Rice-Edwards
A.J.Rich
A.B.Richards
D.J.Richards
P.Richards
P.L.Richardson
W.D.Richmond
J.W.Rickett
C.C.Rigby
K.M.Rigg
R.F.Rintoul
A.W.S.Ritchie
A.H.N.Roberts
G.Roberts
J.G.Roberts
P.N.Roberts
J.F.Robertson
K.P.Robinson
M.R.G.Robinson
R.E.Robinson
M.J.Robson
H.S.Rogers
I.M.Rogers
K.Rogers
K.Rolles
D.A.Rosenberg
I.L.Rosenberg
A.H.M.Ross
B.A.Ross
E.R.S.Ross
H.B. Ross
L.D.Ross
R.P.Rosswick
P.K.M.Rostron
M.P.Rothera
R.L.Rothwell-Jackson
C.Rowe-Jones
B.J.Rowlands
A.R.Rowsell
G.T.Royle
C.M.S.Royston
N.Rushton
C.F.J.Russell
R.Russell
K.R.P.Rutter
P.C.Rutter
P.G.Ryan
S.Sabanathan
H.I.Sabin
N.P.M.Sacks
S.Sagar
G.R.Sagor
Z.Saidan
J.R.C.Sainsbury
F.D.Salama
J.E.L.Sales
A.Salman
M.C.P.Salter
W.N. Samarji
J.S.Samra
D.R.Sandeman
C.J.Sanderson
D.P.S.Sandhu
D.G.D.Sandilands
J.R.Sansom
N.Santaney
D.Sarson
P.Sauven
P.E.A. Savage
T.Sayer
G.I.Scott
I.H.K.Scott
J.W.Scott
M.H.Scott
M.M.Scott
N.Scott
R.A.P.Scott
J.Scott Ferguson
R.A.Sells
R.P.Sengupta
B.Sethia
M.Shafiq
M.Shahid
J.E.G.Shand
A.Shandall
J.P.Shardlow
V.L.Sharma
D.J.Sharp
J.Shaw
L.M.A.Shaw
M.D.M.Shaw
J.R.Shearer
R.J.Shearer
C.Shearman
J.M.Shennan
B.G.F.Shepheard
J.H.Shepherd
J.L.Sher
W.G.Sheridan
K.P.Sherman
C.L.Shieff
B.A.Shorey
A.J.Shorthouse
K.Shute
D.E.Sibson
S.H.Silverman
G.W.Simonds
B.A.Simpson
J.N.Simson
S.K.Singh
S.Siva
F.D.Skidmore
P.W.Skinner
M.Slapak
E.G.W.Slater
C.J.Smallpeice
C.J.Smart
W.A.B.Smellie
E.E.J.Smith
E.M.Smith
G.H.Smith
G.M.R.Smith
H.D.Smith
J.A.R.Smith
M.Smith
M.A.Smith
M.R.Smith
P.Smith
P.H.Smith
P.L.C.Smith
R.B.Smith
M.J.Solan
J.J.F.Somerville
R.K.Soni
A.S.Soorae
L.M.South
J.A.Southam
R.Southcott
W.P.Soutter
O.C.Sparrow
G.J.Spearing
J.Spencer
C.J.Spivey
J.Spivey
R.G.Springall
T.Spyt
F.W.Stafford
J.D.Stamatakis
P.A.Stanworth
L.F.A.Stassen
W.S.L.Stebbings
R.J.C.Steele
T.C.Stevenson
C.R.Stewart
D.J.Stewart
M.Stewart
R.D.Stewart
H.M.Stibbe
D.G.Stock
C.J.Stoddard
C.D.P.Stone
M.Stone
B.J.Stoodley
J.Stothard
M.A.Stott
A.T.Stotter
M.J.Stower
C.J.L.Strachan
W.E.Strachan
F.A.Strang
J.Studley
H.G.Sturzaker
H.M.Sue-Ling
P.Surtees

M.Sutcliffe
J.Sutherst
J.M.Symes
L.Symon
E.M.Symonds
E.P.Szypryt
W.Tait
R.W.Talbot
K.C. Tan
A.R.Taylor
B.A.Taylor
I.Taylor
K.M.Taylor
P.Taylor
R.M.R.Taylor
S.A.Taylor
T.C.Taylor
T.V.Taylor
C.Teasdale
T.H.Tebbutt
P.J.Teddy
J.G.Temple
J.Templeton
N.Theodorou
A.P.Thomas
D.G.T.Thomas
D.R.Thomas
J.M.Thomas
M.H.Thomas
N.P.Thomas
P.A.Thomas
R.J.Thomas
W.E.G.Thomas
C.E.R.Thompson
H.H.Thompson
J.Thompson
J.F.Thompson
M.H.Thompson
M.R.Thompson
P.M.Thompson
S.G.Thompson
W.Thompson
M.P.Thomson
R.G.Thomson
R.W.Thomson
J.A.C.Thorpe
S.F.Tindall
R.C.Todd
A.H.Tooley
K.M.Toop
J.M.Towler
E.R.Townsend
T.Treasure
N.J.Treble
J.C.Tresadern
R.G.Tudor
W.Tudor Davies
D.T.L.Turner
J.H.Tweedie
S.N.Tyrrell
C.Ubhi
A. Ujam
H.C.Umpleby
W.Ursell
G.H.Urwin
M.M.Usherwood
D. Uttley
J.Vafidis
A.C.R.Vass
R.Vaughan
P.S.Veitch
I.D.Vellacott
K.D.Vellacott
G.E.Venn
R.H.Vickers
C.M. Vickery
P.Vowden
R.T.Waddington
P.J.F.Wade
P.N.Wake
R.K.Walesby
A.P.Walker
E.M.Walker
M.A.Walker
M.G.Walker
R.G.H.Wallace
W.A.Wallace
J.Wallwork
H.P.J.Walsh
T.H.Walsh
P.Walter
H.Walters
A.S.Ward
J.P.Ward
M.P.Ward
P.J.Ward
A.J.Warrington
J.S.Waters
M.W.Waterworth
T.A.Waterworth
G.T.Watkin
R.M.Watkins
J.Watkinson
M.G.Watson
B.G.Way
P.C.Weaver
R.M.Weaver
A.J.Webb
J.K.Webb
P.J.Webb
D.J.T.Webster
J.H.H.Webster
K.R.Wedgwood
D.Weeden
A.Wells
F.C.Wells
J.M.Wellwood
C.L.Welsh
P.W.Wenham
S.Westaby
G.A.Westmore
C.A.Westwood
A.M.Wheble
M.H.Wheeler
P.Whelan
I.A.Whitaker
C.M.White
H.J.O. White
S.M.Whitehead
D.E.Whittam
M.H.Wickham
J.A.K.Wightman
D.J.W.Wilkin
D.C.Wilkins
J.L.Wilkins
A.J.Wilkinson
A.R.Wilkinson
G.A.L.Wilkinson
M.J.S.Wilkinson
D.J.Willatt
K.Willett
A.Williams
B.T.Williams
C.B.Williams
C.R.Williams
G.Williams
J.A.Williams
J.P.R.Williams
K.G.D.Williams
M.Williams
M.A.Williams
N.S.Williams
R.J.Williams
W.G.Williams
B.Williamson
R.C.N.Williamson
C.C.Wilmhurst
A.Wilson
P.E.H.Wilson
R.Y.Wilson
R.Windle
C.W.O.Windsor
M.C.Winslet
K.S.H.Wise
M.Wise
J.D.Wisheart
J.H.N.Wolfe
R.L.Wolverson
C.B.Wood
J.Wood
R.F.M.Wood
C.R.J.Woodhouse
W.Woods
D.A.K.Woodward
A.B.Woodyer
C.C.Wray
N.L.Wright
P.D.Wright
J. Wrighton
A.Wu
A.P.Wyatt
J.Wyllie
M.H.Yacoub
D.Yates
R.Yeo
C.K.Yeung
R. Yogasagarar
Y.N.Yogasundram
A.E.Young
C.P.Young
H.L.Young
R.A.L.Young
T.W. Young
M.R.Zeiderman

Appendix J - Local Reporters

This list shows the local reporters as of 27 October 1995. We have therefore used the latest regional boundaries, trusts or units.

We recognize that there are many clinical audit and information departments involved in providing data, although we have named only the consultant clinician nominated as local reporter.

Anglia and Oxford

Addenbrooke's	Professor G.A. Gresham
Bedford Hospital	Mr N. Waterfall
Heatherwood & Wexham Park Hospitals	Dr M.H. Ali
Hinchingbrooke Health Care	Dr A. Whitehead
The Horton General Hospital	Dr N.J. Mahy
The Ipswich Hospital	Mr I.E. Cowles
James Paget Hospital	Dr D.A. Harrison
Kettering General Hospital	Dr B.E. Gostelow
King's Lynn & Wisbech Hospitals	Dr D. Eakins
The Luton & Dunstable Hospital	Dr D.A.S. Lawrence
Milton Keynes General	Dr S.S. Jalloh
Norfolk & Norwich Health Care	Dr B.G. McCann
Northampton General Hospital	Dr J.V. Clark
Nuffield Orthopaedic Centre	Dr K. Fleming
The Oxford Radcliffe Hospital	Dr K. Fleming
Papworth Hospital	Dr N. Cary
The Radcliffe Infirmary	Dr K. Fleming
Peterborough Hospitals	Dr P.M. Dennis
Royal Berkshire & Battle Hospitals	Dr R. Menai-Williams
South Buckinghamshire	Dr M.J. Turner
Stoke Mandeville Hospital	Dr A.F. Padel

West Suffolk Hospitals	Dr H. Alrusie

North Thames

Basildon & Thurrock General Hospitals	Dr S.G. Subbuswamy
Central Middlesex Hospital	Dr C.A. Amerasinghe
Chase Farm Hospitals	Dr H.A.S. Reid
Chelsea & Westminster Healthcare	Mr S.J. Booth
Ealing Hospital	Dr C. Schmulian
East Hertfordshire	Dr A. Fattah
Eastman Dental Hospital	Dr T.E. McEwan
Essex Rivers Healthcare	Mrs A. Bridge
Forest Healthcare	Dr K.M. Thomas
Great Ormond Street Hospital for Children	Professor R.A. Risdon
The Hammersmith Hospitals	Dr I. Lindsay (Charing Cross Hospital) Dr G. Stamp (Hammersmith & Queen Charlotte's Hospitals)
Harefield Hospital	Mr K. Robinson
Havering Hospitals	Dr D.A. Thomas (Harold Wood Hospital) Ms C. Colley (Oldchurch Hospital)
Hillingdon Hospital	Dr F.G. Barker
Homerton Hospital	Ms J. Pomroy
Mid Essex Hospitals	Mr A.H.McL. Ross
Moorfields Eye Hospital	Professor P. Luthert
Mount Vernon and Watford Hospitals	Dr W.K. Blenkinsopp (Watford General Hospital) Mrs S. Procter (Mount Vernon Hospital)
Newham Healthcare	Dr S.I. Baithun
North Herts	Dr D.J. Madders
The National Hospital for Neurology and Neurosurgery	Mrs J. A. Sullivan
The North Middlesex Hospital	Dr K.J. Jarvis
Northwick Park & St Mark's	Dr S. Boyle

The Princess Alexandra Hospital Unit	Dr R.G.M. Letcher
Redbridge Health Care	Dr P. Tanner
Royal Brompton Hospital	Professor D. Denison
The Royal Free Hampstead	Dr J.E. McLaughlin
The Royal Hospitals	Dr D. Lowe (St Bartholomew's Hospital) Dr P.J. Flynn (The Royal London Hospital)
The Royal Marsden	Mr R.J. Shearer
The Royal National Orthopaedic Hospital	None
The Royal National Throat, Nose & Ear Hospital	None
St Mary's Hospital	Ms R. Hittinger
St Albans and Hemel Hempstead	Dr A.P. O'Reilly (Hemel Hempstead General Hospital) Dr S. Hill (St Albans City Hospital)
Southend Health Care	Ms L. Bell
The University College London	Ms A. Glover
Wellhouse	Dr J. El-Jabbour
West Middlesex University Hospital	Dr R.G. Hughes
The Whittington Hospital	Dr J. Dyson

North West

Aintree Hospitals	Dr W. Taylor (Fazakerley Hospital) Dr C.T. Burrow (Walton Hospital)
Blackburn, Hyndburn & Ribble Valley Health Care	Mr J.C. Tresadern
Blackpool Victoria Hospital	Dr K.S. Vasudev
Bolton Hospitals	Dr S. Wells
Burnley Health Care	Mr D.G.D. Sandilands
Bury Health Care	Dr E.Herd
The Cardiothoracic Centre - Liverpool	Dr W.E. Kenyon
Central Manchester Healthcare	Dr E.W. Benbow
Chorley & South Ribble	Dr C. Loyden

The Countess of Chester Hospital	Mr G. Foster
East Cheshire	Dr A.R. Williams
Furness Hospitals	Dr V.M. Joglekar
Halton General Hospital	Dr M.S. Al-Jafari
Lancaster Acute Hospitals	Dr R.W. Blewitt
Liverpool Women's Hospital	Mr R.E. Kingston
Mid Cheshire Hospitals	Miss H. Moulton
North Manchester Healthcare	Dr I.K. Hartopp
Preston Acute Hospitals	Dr C.M. Nicholson
Rochdale Healthcare	Mr S.A. Murray
Royal Liverpool Children's	Ms L. Hannam
Royal Liverpool and Broadgreen University Hospitals	Mr A. Cogan (Royal Liverpool University Hospital) Dr W.E. Kenyon (Broadgreen Hospital)
Royal Manchester Children's	Dr M. Lendon
Oldham	Dr I. Seddon
St Helens and Knowsley Hospitals	Dr G.M. Edwards
Salford Hospitals	Dr A.W. Jones
South Manchester University Hospitals	Dr P.S. Hasleton (Wythenshawe Hospital) Dr J. Coyne (Withington Hospital)
Southport and Formby	Dr S.A.C. Dundas
Stockport Acute Services	Dr P. Meadows
Tameside & Glossop Acute Services	Dr A.S. Day
Trafford Healthcare	Dr B.N.A. Hamid
The Walton Centre for Neurology and Neurosurgery	Dr D. Crooks
Warrington Hospital	Dr M.S. Al-Jafari
West Lancashire	Mr A.D. Johnson
Westmorland Hospitals	Dr R.W. Blewitt
Wigan and Leigh Health Services	Ms S. Tarbuck

Wirral Hospital	Dr M.B. Gillett
Wrightington Hospital	Mr A.D. Johnson

Northern and Yorkshire

Airedale	Dr R.D. Pyrah
Bishop Auckland Hospitals	Dr D.C.A. Senadhira
Bradford Hospitals	Dr B. Naylor
Calderdale Healthcare	Mr R.J.R. Goodall
Carlisle Hospitals	Dr E.D. Long
Cheviot & Wansbeck	Dr J.A. Henry
City Hospitals Sunderland	Miss K. Ramsay
Darlington Memorial Hospital	Ms C. Evans
Dewsbury Health Care	Dr P. Gudgeon
East Yorkshire Hospitals	Mr G. Britchford
Freeman Group of Hospitals	Dr M.K. Bennett
Gateshead Hospitals	Dr I.M.J. Mathias
Grimsby Health	Dr W.M. Peters
Harrogate Health Care	Miss A.H. Lawson
Hartlepool and Peterlee Hospitals	Mr C.P.L. Wood
Huddersfield	Dr H.H. Ali
North Durham Acute Hospitals	Dr D. Wood (Dryburn Hospital) Dr C.M. Dobson (Shotley Bridge General Hospital)
North Tees Health	Dr J. Hoffman
North Tyneside Health Care	Dr S. Johri
Northallerton Health Services	Dr D.C. Henderson
Pinderfields Hospitals	Dr S.S. Gill
Pontefract Hospitals	Dr I.W.C. MacDonald
Royal Hull Hospitals	Dr M.R.F. Reynolds

The Royal Victoria Infirmary & Associated Hospitals	Miss D. Robson (Royal Victoria Infirmary) Dr D. Scott (Newcastle General Hospital) Dr J.D. Hemming (Hexham General Hospital)
St James's & Seacroft University Hospitals	Mr N.S. Ambrose
Scarborough & N E Yorkshire Healthcare	Dr A.M. Jackson
Scunthorpe & Goole Hospitals	Dr G. Kurien
South Tees Acute Hospitals	None
South Tyneside Health Care	Dr K.P. Pollard
United Leeds Teaching Hospitals	Dr C. Abbott
West Cumbria Health Care	Dr D. Smith
York Health Services	Dr J.M. Hopkinson

South and West

The Bournemouth and Christchurch Hospitals	Ms K. Hatchard
Dorset Community	Dr A. Anscombe
East Gloucestershire	Dr W.J. Brampton
East Somerset	Dr G.R.G. Purcell
Frenchay Healthcare	Dr N.B.N. Ibrahim
Gloucestershire Royal	Dr B.W. Codling
Northern Devon Healthcare	Dr C.M.D. Ross
North Hampshire Hospitals	Dr E.M. Husband
Plymouth Hospitals	Dr C.B.A. Lyons
Poole Hospital	Dr D.S. Nicholas
Portsmouth Hospitals	Dr N.J.E. Marley
Royal Cornwall Hospitals	Dr R. Pitcher
The Royal Devon & Exeter	Dr R.H.W. Simpson
Royal United Hospital Bath	Dr P.J. Tidbury
St Mary's Hospital	Mr P. Wellington
Salisbury Health Care	Dr C.A. Scott

South Devon Healthcare	Dr D.W. Day
Southampton University Hospitals	Dr I.E. Moore
Southmead Health Services	Miss G. Davies
Swindon and Marlborough	Mr M.H. Galea
Taunton & Somerset	Mr I. Eyre-Brook
The United Bristol Healthcare	Dr E.A. Sheffield
West Dorset General Hospitals	Dr A. Anscombe
Weston Area Health	Dr M.F. Lott
Winchester & Eastleigh Healthcare	Dr A.C. Vincenti

South Thames

Ashford Hospital	Dr J. Dawson
Brighton Healthcare	Dr J. Bennett
Bromley Hospitals	Dr M.H. Elmahallawy
Crawley and Horsham	Dr D. Lyle
Dartford & Gravesham	Dr A.T.M.F. Rashid
East Surrey	Ms S. Hatton
Eastbourne Hospitals	Mr T.G. Reilly
Epsom Health Care	Dr T.J. Matthews
Frimley Park Hospital	Dr G.F. Goddard
Greenwich Healthcare	Dr G.G. Menon (Brook General Hospital) Dr T. Pinto (Greenwich District Hospital)
Guy's & St Thomas'	Professor D.A. Levison (St Thomas' Hospital) Dr B.Hartley (Guy's Hospital)
Hastings & Rother	Dr M.E. Boxer
Kent and Canterbury Hospitals	Mr M.Guarino
Kent & Sussex Weald	Dr G.A. Russell
King's Healthcare	Dr S. Humphreys
Kingston Hospital	Mr R.D. Leach

The Lewisham Hospital	Dr C. Keen
Mayday Health Care	Dr S.M. Thomas
The Medway	Dr A. Palmer
The Mid Kent Healthcare	Dr V.K. Hochuli
Mid Sussex	Dr P.A. Berresford (Princess Royal Hospital) Mr P.H. Walter (Hurstwood Park Neurological Centre)
Queen Mary's Sidcup	Dr E.J.A. Aps
Queen Victoria Hospital	Dr G.A. Russell
Richmond, Twickenham & Roehampton	Mr M. McSweeney
The Royal Surrey County & St Luke's Hospitals	Dr B.T.B. Manners
The Royal West Sussex	Mr J.N.L. Simson
St George's Healthcare	Dr S. Dilly
The St Helier	Dr E.H. Rang
St Peter's Hospital	Mr R.H. Moore
South Kent Hospitals	Dr C.W. Lawson
Thanet Healthcare	Mr K. Duddy
Worthing Southlands Hospitals	Mrs J.North

Trent

Barnsley District General Hospital	Dr J.M. Frayne
Bassetlaw Hospital	Dr J.M. Heaton
Central Sheffield University Hospitals	Dr C.A. Angel
Chesterfield and North Derbyshire Royal	Dr P.B. Gray
Derby City General Hospital	Mr J.R. Nash
Derbyshire Royal Infirmary	Mr J.R. Nash
The Doncaster Royal Infirmary & Montagu Hospital	Dr J.A.H. Finbow
Glenfield	Miss S. Lee
Grantham and District Hospital	Dr D. Clark

The King's Mill Centre for Health Care Services	None
Leicester General Hospital	Dr E.H. MacKay
The Leicester Royal Infirmary	Ms D. Burt
Lincoln Hospitals	Dr J.A. Harvey
Louth & District Healthcare	None
Northern General Hospital	Dr C.A. Angel
Nottingham City Hospital	Professor D.R. Turner
Pilgrim Health	Dr D.C.S. Durrant
Queen's Medical Centre, Nottingham, University Hospital	Professor D.R. Turner
Rotherham General Hospitals	Mr R.B. Jones
Sheffield Children's Hospital	Dr C.A. Angel
West Lindsey	Dr J.A. Harvey

West Midlands

Alexandra Healthcare	Dr J.C. Macartney
Birmingham Heartlands Hospital	Dr M. Taylor
Birmingham University Hospital	Dr B. Jones (Selly Oak Hospital) Dr H.Thompson (Birmingham General Hospital) Professor E.L. Jones (Queen Elizabeth Hospital)
Birmingham Women's Health Care	Dr D.I. Rushton
Burton Hospitals	Dr N. Kasthuri
The Children's Hospital, Birmingham	Dr F. Raafat
City Hospitals	Dr W.R. Shortland-Webb
The Dudley Group of Hospitals	Dr S. Ghosh
George Eliot Hospital	Dr J. Mercer
Good Hope Hospital	Dr A.M. Light
Hereford Hospitals	Dr F. McGinty
Kidderminster Health Care	Dr G.H. Eeles

Mid Staffordshire General Hospitals	Dr V. Suarez
North Staffordshire Hospital The Princess Royal	Dr T.A. French Dr R.A. Fraser
Robert Jones & Agnes Hunt Royal Orthopaedic Hospital	Dr R.A. Fraser Mr A. Thomas
Royal Shrewsbury Hospitals	Dr R.A. Fraser
The Royal Wolverhampton Hospitals	Dr J. Tomlinson
Rugby	Dr J.F. Nottingham
Sandwell Healthcare	Dr J. Simon (Sandwell District General Hospital) Dr H.L. Whitwell (Midland Centre for Neurosurgery & Neurology)
Solihull Hospital	Dr K.A. James
South Warwickshire General Hospitals	Dr E.J. Vella
Walsgrave Hospital	Dr T.G. Ashworth
Walsall Hospitals	Dr R. Singh
Worcester Royal Infirmary	Miss A.C. Parberry

Defence Medical Services

All perioperative deaths in Defence Medical Services hospitals are reported to NCEPOD by the Commanding Officer or by a person nominated by the Commanding Officer.

Northern Ireland

Altnagelvin Group of Hospitals	Dr J.N. Hamilton
Armagh and Dungannon	Mr B. Cranley
Belfast City Hospital	Mr S.T. Irwin
Causeway	Dr C. Watters
Craigavon Area Hospital Group	Mr B. Cranley
Down Lisburn	Dr M. Thompson (Downe Hospital) Dr B. Huss (Lagan Valley Hospital)
Green Park Healthcare	None
Mater Hospital	Dr H. Mathews
Newry and Mourne	Mr B. Cranley

Omagh / Fermanagh Hospital	Dr F. Robinson (Tyrone County Hospital) Dr W. Holmes (Erne Hospital)
The Royal Group of Hospitals	Dr J.M. Sloan
The Ulster, North Down & Ards Hospitals	Dr T. Boyd
United Hospitals Group	Mr I. Garstin (Antrim Hospital) Mr P.C. Pyper (Mid Ulster Hospital) Mr D. Gilroy (Whiteabbey Hospital)

Wales

Bridgend & District	Dr A.M. Rees
Carmarthen & District	Dr R.B. Denholm
Ceredigion & Mid Wales	Ms H. Walker
East Glamorgan	Dr D. Stock
Glan Clwyd District General Hospital	Dr B. Rogers
Glan Hafren	Dr M.S. Matharu
Glan-Y-Mor NHS Trust	Dr S. Williams
Gwynedd Hospitals	Dr M. Hughes
Llandough Hospital	Dr J. Gough
Llanelli / Dinefwr	Dr L.A. Murray
Merthyr & Cynon Valley	Dr R.C. Ryder
Morriston Hospital	Dr S. Williams
Nevill Hall & District	Dr R.J. Kellett
Pembrokeshire	Dr G.R. Melville Jones
Powys Health Care	Dr P.J. Snow
Swansea	Dr S. Williams
University Hospital of Wales	Professor B. Knight (Cardiff Royal Infirmary) Dr A.G. Douglas-Jones (University Hospital of Wales)
Wrexham Maelor Hospital	Dr R.B. Williams

Guernsey / Isle of Man / Jersey

Guernsey	Dr B.P. Gunton-Bunn

Isle of Man	Dr J.M. Deguara
Jersey	Dr D. Spencer

BMI

The Alexandra Hospital	Mrs S. Owen
The Blackheath Hospital	Mrs G. Mann
Chaucer Hospital	Mr R. Muddiman
Chiltern Hospital	Ms J. Knight
Clementine Churchill Hospital	Dr I. Chanarin
Harley Street Clinic	Ms S. Thomas
Highfield Hospital	Mrs C. Morley
The Park Hospital	Miss E. Zissler
The Portland Hospital	Miss A. Sayburn
Princess Grace Hospital	Miss M. Hatwell
Princess Margaret Hospital	Miss J. Jones
Priory Hospital	Dr A. Jacobs
The Sloane Hospital	Miss J. Wilson
Thornbury Hospital	Mrs J. Cooper
Fawkham Manor Hospital	Ms S. Hill

BUPA

BUPA Alexandra Hospital	Mr P.J. Curtis
BUPA Belvedere Hospital	Mr S.J. Greatorex
BUPA Hospital Bristol	Miss G. Martin
BUPA Hospital Bushey	Mr R. Lye
BUPA Cambridge Lea Hospital	Miss S. Full
BUPA Hospital Cardiff	Dr A. Gibbs
BUPA Chalybeate Hospital	Mrs J. Hartley
BUPA Hospital Clare Park	Miss R. Newbould

BUPA Dunedin Hospital	Mrs H. Mundella
BUPA Hospital Elland	Ms M.E. Schofield
BUPA Fylde Coast Hospital	Mrs C. Aucott
BUPA Gatwick Park Hospital	Mrs D. Wright
BUPA Hospital Harpenden	Mrs P. Eaves
BUPA Hartswood Hospital	Ms N. Howes
BUPA Hospital Hull & East Riding	Mrs J. Fisher
BUPA Hospital Leeds	Mrs G.M. Whorwell
BUPA Hospital Leicester	Mr P. Nelson
BUPA Hospital Little Aston	Mr K. Smith
BUPA Hospital Manchester	Ms A. McArdle
BUPA Murrayfield Hospital	Mr D. Pickering
BUPA North Cheshire Hospital	Mr N. Berry
BUPA Hospital Norwich	Ms M. Welch
BUPA Parkway Hospital	Mr G. Jones
BUPA Hospital Portsmouth	Mr P O'Conor
BUPA Roding Hospital	Ms J.A. Crampton
BUPA St Saviour's Hospital	Mr P. Tempest
BUPA South Bank Hospital	Mr B. Gordon
BUPA Wellesley Hospital	Mrs L. Horner

Compass

Bath Clinic	Miss B.K. Stowell
Droitwich Private Hospital	Miss P.C. Breckons
Esperance Private Hospital	Mrs S. Magnus
Garden Hospital	Mrs C. Voos
Hampshire Clinic	Ms R.A. Phillips
London Independent Hospital	Mrs B. Cole

Manor Hospital	Dr J.H.B. Saunders
Nuneaton Private Hospital	Mrs P.M. Jacques
Paddocks Hospital	Ms D. Roberts
Ridgeway Hospital	Mrs S.M. Maslin
Saxon Clinic	Mr W.M. Nuttall
Shirley Oaks Hospital	Miss K. Lim
West Sussex Clinic	Mrs J. Paddington
Winterbourne Hospital	Mrs A. McLachlan
Werndale Private Hospital	Mr P. Maliphant

Nuffield

Nuffield Acland Hospital	Miss C. Gilbert
Birmingham Nuffield Hospital	Mrs S. Staton
Bournemouth Nuffield Hospital	Miss S.A. Chapman
Chesterfield Nuffield Hospital	Miss P.J. Bunker
Cleveland Nuffield Hospital	Mrs S. Jelley
Cotswold Nuffield Hospital	Mrs J.T. Penn
Duchy Nuffield Hospital	Mrs M. Alsop
East Midlands Nuffield Hospital	Mrs P. Shields
Essex Nuffield Hospital	Mrs B.M. Parker
Exeter Nuffield Hospital	Mrs A. Turnbull
Fitzroy Nuffield Hospital	Mrs R.J. Hackett
Huddersfield Nuffield Hospital	Miss S. Panther
Hull Nuffield Hospital	Miss S.J. Verow
The Grosvenor Nuffield Hospital	Mrs J.L. Whitmore
Lancaster & Lakeland Nuffield Hospital	Miss A. Durbin
Nuffield Hospital Leicester	Miss S. Peacock
Mid Yorkshire Nuffield Hospital	Mrs G.A. Duffield

Newcastle Nuffield Hospital	Miss K.C. Macfarlane
North London Nuffield Hospital	Mrs R.M. Raeburn-Smith
North Staffordshire Nuffield Hospital	Mrs A. Woolrich
Nuffield Hospital Plymouth	Mrs T. Starling
Purey Cust Nuffield Hospital	Mr J. Gdaniec
Shropshire Nuffield Hospital	Mrs S. Crossland
Somerset Nuffield Hospital	Mrs J. Dyer
Sussex Nuffield Hospital	Miss J. Collister
Thames Valley Nuffield Hospital	Mrs S.E. Clifford
Tunbridge Wells Nuffield Hospital	Mrs L.R. Lockwood
Wessex Nuffield Hospital	Mrs C.E. Chandler
Woking Nuffield Hospital	Miss B.E. Harrison
Wolverhampton Nuffield Hospital	Mrs G.M. Nicholls
Wye Valley Nuffield Hospital	Mrs W.P. Mawdesley

St Martin's Hospitals

The London Bridge Hospital	Miss S. Taber
The Lister Hospital	Miss K. Upton

Other Independent Hospitals

Benenden Hospital	Mr D. Hibler
The Wellington Hospital	Mr R. Hoff

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