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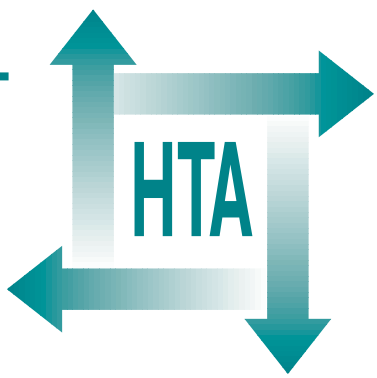
Health Technology Assessment
NHS R&D HTA Programme



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Extended scope of nursing practice: a multicentre randomised controlled trial of appropriately trained nurses and pre-registration house officers in pre-operative assessment in elective general surgery

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NHS R&D HTA Programme

The NHS R&D Health Technology Assessment (HTA) Programme was set up in 1993 to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and provide care in the NHS.

Initially, six HTA panels (pharmaceuticals, acute sector, primary and community care, diagnostics and imaging, population screening, methodology) helped to set the research priorities for the HTA Programme. However, during the past few years there have been a number of changes in and around NHS R&D, such as the establishment of the National Institute for Clinical Excellence (NICE) and the creation of three new research programmes: Service Delivery and Organisation (SDO); New and Emerging Applications of Technology (NEAT); and the Methodology Programme.

This has meant that the HTA panels can now focus more explicitly on health technologies ('health technologies' are broadly defined to include all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care) rather than settings of care. Therefore the panel structure has been redefined and replaced by three new panels: Pharmaceuticals; Therapeutic Procedures (including devices and operations); and Diagnostic Technologies and Screening.

The HTA Programme will continue to commission both primary and secondary research. The HTA Commissioning Board, supported by the National Coordinating Centre for Health Technology Assessment (NCCHTA), will consider and advise the Programme Director on the best research projects to pursue in order to address the research priorities identified by the three HTA panels.

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Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

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Contents

List of abbreviations

ATN	appropriately trained nurse
CI	confidence interval
ENRiP	Exploring New Roles in Practice [study]
GP	general practitioner
PRHO	pre-registration house officer
RCT	randomised controlled trial
SD	standard deviation*
SEM	standard error of the mean*
UKCC	UK Central Council for Nursing, Midwifery and Health Visiting (nursing profession's statutory body)

* Used only in tables

Executive summary

Objectives

- To determine whether pre-operative assessment carried out by an appropriately trained nurse (ATN) is equivalent in quality to that carried out by a pre-registration house officer (PRHO).
- To assess whether pre-assessments carried out by ATNs and PRHOs are equivalent in terms of cost.
- To determine whether assessments carried out by ATNs are acceptable to patients.
- To investigate the quality of communication between senior medical staff and ATNs.

Design

The study design was principally a prospective randomised equivalence trial but was accompanied by additional qualitative assessment of patient and staff perceptions, and an economic evaluation.

Setting

The study was carried out at four NHS hospitals, three of which were teaching hospitals, in three NHS Trusts in Southampton, Sheffield and Doncaster.

Subjects

All patients attending at one site for assessment prior to general anaesthetic for elective general, vascular, urological or breast surgery were potentially included in the study. Of 1907 patients who were randomised, 1874 completed the study with a full evaluation.

Interventions

The intervention consisted of a pre-operative assessment carried out by either an ATN or a PRHO. Of the patients who completed the study with a full evaluation, 926 patients were randomised to the PRHO arm of the trial and 948 to the ATN arm. Three ATNs took part in the study, one from each centre, together with a total of 87 PRHOs.

Main outcome measures

Immediately following the initial assessment of a patient by a PRHO or an ATN, one of a number of clinical research fellows, all specialist registrars in anaesthetics, repeated the assessment and recorded it on a study form, together with a list of investigations required. The clinical research fellow then evaluated the competency of the initial assessor by comparing the quality of their assessment with their own. Any deficiencies in ordering of investigations and referral to other specialities were met in order to maximise patient care. Three areas of ATN and PRHO performance were judged separately, history taking, examination and ordering of tests, and each was graded into one of four categories, the most important of which was under-assessment, which would possibly have affected peri-operative management. In the case of ordering of tests, it was possible to have both over- and under-assessed a patient on different tests.

Results

The pre-operative assessments carried out by the ATNs were essentially equivalent to those performed by the PRHOs in terms of under-assessment that might possibly have affected peri-operative management, although there was variation between the ATNs in terms of the quality of history taking. This may be related to the low number of patients seen at one study site.

PRHOs ordered significantly more unnecessary tests than the ATNs. The substitution of ATNs for PRHOs was calculated to be cost neutral.

The results of the qualitative assessment showed that the use of ATNs for pre-operative assessment was acceptable to patients; however, there was no evidence that communication between senior medical staff and those carrying out pre-operative assessments was improved by their introduction.

Conclusions

This study demonstrated no reason to inhibit the development of fully nurse-led pre-operative assessment, provided that the nurses are appropriately trained and maintain sufficient workload to retain skills.

Implications for the health service

ATNs provide an acceptable and efficient alternative to PRHOs for the purposes of routine pre-operative assessment. Consideration will have to be given, however, to the positions of these nurses within the surgical team, and also to their career structure.

Recommendations for future research

Further research is needed in the following areas:

- the extent and type of training needed for nurses undertaking the pre-operative assessment role
- the use, costs and benefits of routine pre-operative testing.

Chapter 1
Introduction

The Calman reforms of junior doctors' training[1] and the junior doctors' hours initiative[2] have, together, significantly reduced the supply of junior doctors' time available to complete the range of tasks that traditionally have been carried out by the pre-registration house officer (PRHO) within the NHS. Together with the drive to reduce costs within the NHS, these changes have increased the pressure to replace PRHOs with non-medical staff.[3] As pre-operative assessment is a significant feature in the workload of the surgical PRHO, attention has been focused on the potential for extending nursing activities in this area. The interest in using nurses in this role in the UK has grown with reports of successful schemes in other countries, particularly the USA and Australia.[4,5] Typically, studies to establish the implications of these new roles on quality of care, cost-effectiveness and acceptability have tended to be single site, with small samples.[6] Information with which to guide the development of nurse involvement in the pre-operative assessment service in the UK has therefore been limited.[3–7]

This study, which aimed to fulfil this information need, was a three-centre, randomised, controlled equivalence trial of appropriately trained nurses (ATNs) and PRHOs in pre-operative assessment in elective general surgery.

Pre-operative assessment

Pre-operative assessment of a patient takes place in several stages. In addition to the assessment carried out in the outpatient department by (usually) a consultant surgeon or (sometimes) a specialist registrar, the patient, once admitted, is also assessed by an anaesthetist who confirms the patient's general health state and assesses problems that specifically concern the choice of anaesthetic. The anaesthetist's assessment is the definitive stage at which an individual patient's fitness for operation is decided. Between these stages there has been, traditionally, a pre-operative assessment on admission to the ward carried out by a PRHO. This assessment includes a full general and disease-specific medical history of the patient's health, a physical examination and ordering of necessary investigations, often guided by a protocol. A separate nursing assessment upon admission traditionally includes information-giving and preparation of the patient for surgery.

This process is time consuming, repetitive and inefficient. The traditional PRHO assessment was long seen as contributing to the training of the junior doctor but is now considered to be of limited educational value.[8] As it occurred on admission, it allowed no time for the return of test results, or for more in-depth evaluation of fitness for surgery. Likewise, the pre-operative assessment visit carried out by the anaesthetist was usually on the evening before surgery, allowing little time for return of test results. To overcome this problem, pre-operative assessment clinics have been developed, which a patient attends for assessment and work-up prior to their definitive admission, allowing plenty of time for return and interpretation of test results.

While the pre-operative assessment clinic overcomes the problems of unfitness for surgery, it does nothing to allay the problem of reduced availability of PRHOs. This has been the driving force behind substituting other professionals for PRHOs, thus releasing them to perform tasks that comply with the Calman recommendations.[1] Hence, the development of nurse-led pre-operative assessment in a pre-operative clinic environment has potential advantages in several areas. It could reduce the volume of PRHO service work while facilitating timely assessment, allowing all documentation and test results to be in place on admission, thus enabling the correct planning of peri-operative care. Furthermore, the amalgamation of medical and nursing assessments might reduce repetition. Thus, there are several processes being implemented in parallel, and it is important to stress that what is being examined in this study is the substitution of ATNs for PRHOs, and **not** the role of the pre-operative assessment clinic.

Chapter 2
Methods

A randomised controlled trial (RCT) was performed at three centres over 12 months. For the purposes of shorthand and correspondence, it was called the 'OpCheck trial'.

Choice of outcome measures

If all the information necessary to allow correct planning of peri-operative care is not available to an anaesthetist and surgeon on the day of an operation, the risk of it being cancelled on the day of surgery is significantly increased. However, cancellation on the day of surgery was not suitable as the primary outcome measure for this study as there are many factors other than the quality of pre-operative assessment that affect a cancellation decision; for example, the lack of availability of beds, the skill and experience of the anaesthetist, and the availability of test results at short notice. If this final outcome cannot be used for evaluation purposes, then a measure of process has to be used instead. The most appropriate would seem to be the degree of competence of pre-operative assessors in carrying out the assessment, in terms of establishing the fitness of a patient for surgery, identifying any potential difficulties and investigating them appropriately. It was decided that PRHOs and ATNs would be compared on this basis, competence being judged by a 'gold standard', in the form of a clinical research fellow who was a specialist registrar in anaesthetics. The primary hypothesis was therefore that:

- there is no statistically significant difference in the competence of pre-operative assessment performed by ATNs and PRHOs in elective general surgery.

It was decided that PRHOs and ATNs would be compared on their performance in history taking, examination and test ordering. The study would also collect resource data for each arm of the trial to estimate and compare the cost-effectiveness of PRHOs and ATNs in the provision of pre-operative assessment. This is described in chapter 4. The secondary hypothesis that addresses this question is that:

- there is no statistically significant difference in the cost-effectiveness of ATNs and PRHOs for performing pre-operative assessment in elective general surgery.

Further work addressed two further secondary hypotheses, considered in chapters 5 and 6:

- there is no difference in the satisfaction of patients with the assessments undertaken by ATNs and PRHOs when performing pre-operative assessment in elective general surgery
- the quality of communication between senior medical staff and the staff carrying out the pre-operative assessment is improved by the introduction of ATNs.

It was planned that the study should take 25 months in total and comprise three phases. Phase 1 involved recruitment and training of staff, and piloting at two of the three centres in order to collect data for use in the calculation of sample size. The centres were a teaching hospital serving a city in the Trent Region (Northern General Hospital), a teaching hospital on two sites serving a city in the South and West Region (Southampton General Hospital) and a district general hospital serving a town in the Trent Region (Doncaster Royal Infirmary). Phase 2 was a further pilot period to ensure that any logistical problems in running the study had been solved. Phase 3 was the main study, incorporating data collection for 12 months at each centre, followed by analysis and report writing.

Phase 1

The first phase of the trial consisted of recruitment and training of staff, and piloting of data collection methods to establish a definitive sample size for the study. Three nurses were recruited, one per site (Southampton, Sheffield and Doncaster). Research in this area has demonstrated that the level of training provided for nurses operating in extended roles within pre-operative assessment was often inadequate for ensuring public safety.[7] On this basis, therefore, it was decided that the comparator to the PRHO should be a nurse who

had received appropriate training. The nurses involved in this study undertook the anatomy, physical examination and test-ordering modules of taught Masters courses in advanced practice or their equivalent. They were responsible for arranging their own appropriate clinical mentor from medical staff within the trust and for ensuring that their mentor regularly observed them in practice. Formal assessment was by completion of a learning logbook or its equivalent, which was approved by the mentor. In addition, there was a 1-month pilot recruitment phase to identify any logistical problems and establish a basic level of experience of assessment in the clinic setting.

Two clinical research fellows were initially appointed, one at Southampton and one to work between Sheffield and Doncaster. During the course of the study one was replaced because of maternity leave requirements. During this phase, data collection forms were devised in preparation for phase 2. In addition, discussions with assessment clinic staff began, to consider and negotiate the smooth running of the patient recruitment period.

Ethics Committee approval was obtained from the three centres, and adjustments to patient information sheets were made as appropriate.

Sample size calculation

Absolute equivalence cannot be proven without an infinitely large trial. Effective equivalence can be established by defining limits of relative performance within which equivalence is assumed. By convention, the usual limits for equivalence are from 80% to 125% of the expected number of events in a control arm. In order to establish the expected event rate in the control arm, 40 patients from each of two sites (Sheffield and Southampton) were assessed by PRHOs. At each site, six (15%) were judged to have been under-assessed to an extent which might affect peri-operative management. It was specified that the ATNs should not exceed the 15% under-assessment observed among PRHOs by more than 25% of that figure (3.75%).

Since the primary concern was whether the ATN would prove to be inferior to the existing PRHO in terms of under-assessment that might affect peri-operative management, only a one-sided calculation was needed.[8] Thus, $\alpha = 0.1$ was specified (equivalent to 0.05 in a two-sided calculation). Following Makuch and Simon,[9] it was then calculated that 2250 patients (1125 in each arm of the trial) were required for 80% power ($\beta = 0.2$). The actual annual patient throughput in general surgery is shown in *Table 1* for each hospital in the OpCheck study in 1995/96

TABLE 1 *Surgical throughput in three study centres*

Trust	General surgery throughput 1995/96
Northern General Hospital	9,200
Doncaster Royal Infirmary	9,600
Southampton University Hospital	12,628

The authors were therefore confident at this stage that there would be sufficient patients at each site over a year to demonstrate equivalence should equivalence exist.

Phase 2

Phase 2 of the study was a further 1-month pilot phase in March 1998, during which any logistical problems in running the study were sorted out and data collection forms were tested and adjusted.

Phase 3

Phase 3 was the main data collection period for the study, commencing in April 1998 and finishing March/April 1999.

Sample group

All patients attending for assessment prior to general anaesthetic for elective general, vascular, urological or breast surgery were potentially available for inclusion in the study.

Patient recruitment

Randomisation was accomplished using a balanced block design (four patients to each block) with a separate randomisation process at each of the three centres. A separate series of consecutively numbered, opaque sealed envelopes was administered at each research centre. Patients received a patient information leaflet about the trial with their clinic appointment letter. They were invited to participate in the trial and, if agreeable, to consent to randomisation at the assessment clinic. On receipt of patient consent, the next consecutively numbered envelope was opened and assessment proceeded as appropriate. In order to avoid excessive patient delays, the

recruitment and randomisation process was halted when more than two patients were waiting to see the trial ATN.

Pre-operative assessment

An ATN or PRHO undertook the assessment according to the usual procedure at each site. This included taking a full medical and disease-specific history, carrying out a physical examination, ordering any investigations necessary (according to local protocols), evaluating fitness for anaesthesia and, if necessary, considering referral to another speciality for additional assessment. Depending on the site, this assessment may or may not have included explanations about admission and surgery. However, because of legal constraints, nurses are currently prevented from obtaining consent to operation. Hence, the procedure for obtaining consent to operation was negotiated separately at each site, according to local preference and requirements.

Clinical research fellow evaluation

Immediately following the initial ATN/PRHO assessment, a clinical research fellow repeated the assessment and recorded this on a study form, together with a list of investigations required. The clinical research fellow then evaluated the competency of the initial assessor by comparing the quality of the ATN/PRHO assessment with that performed by him/herself. Any deficiencies in ordering of investigations and referral to other specialities were met in order to maximise patient care.

Three areas of the ATN and PRHO performance were judged separately – history taking, examination and ordering of tests – and each was graded into one of four categories:

(i) correct
(ii) over-assessment
(iii) under-assessment that would not affect peri-operative management
(iv) under-assessment that would possibly affect peri-operative management.

In the case of the ordering of tests, it was possible to have both over- and under-ordered.

Patient follow-up

Each patient was followed-up to establish if admission and surgery had proceeded as planned. Cancellation of surgery after the assessment clinic for administrative, medical or other reason was recorded, as were any extra tests ordered or problems noted on admission.

Data analysis

Primary analysis to determine equivalence was based on the event rates for under-assessment possibly affecting peri-operative management in history taking, physical examination and test ordering, for both the PRHO (control) and the ATN (intervention) groups. The event rates for over-ordering of tests for both groups were also recorded. As outlined above, a clinically important difference was first calculated for each variable by multiplying the PRHO event rate by 1.25 (thus establishing an upper practical equivalence limit) and subtracting from it the observed PRHO event rate. This was then compared with the upper 95% confidence limit for the observed difference between the event rates in the PRHO and ATN groups. The confidence interval (CI) for the difference in proportions was calculated using the Confidence Interval Analysis statistical programme.[10]

The interpretation of equivalence trials is illustrated in *Figure 1* (note: diagram is not to scale). Absolute equivalence cannot be proven without an infinitely large trial. Effective equivalence can be established by defining limits of relative performance within which equivalence is assumed. The vertical line in the centre of the diagram represents exact equivalence in the two trial arms (i.e. zero difference). The vertical lines to either side represent lower and upper practical equivalence limits, within which equivalence is accepted. By convention these are usually specified as 80% and 125% of a reference or control value. If the 95% CI around the difference in event rates lies completely outside either practical equivalence limit, then the performance of the two therapies being compared is judged not to be equivalent, the exact interpretation depending upon whether the figure for the new intervention lies above the upper equivalence limit or below the lower. If the 95% CI straddles either or both the lower or upper practical equivalence limits, then equivalence is judged uncertain, although it is possible to judge, say, that one performance is no worse than another, while remaining uncertain about whether or not it is better. If the 95% CI lies entirely within the equivalence limits, then equivalence is accepted. In this case, the interest was primarily in the upper limit, the difference between this limit and exact equivalence being defined as a clinically important difference between the performance of PRHOs and ATNs.

Initially, the numbers of cases were compared in which history taking, examination or test ordering

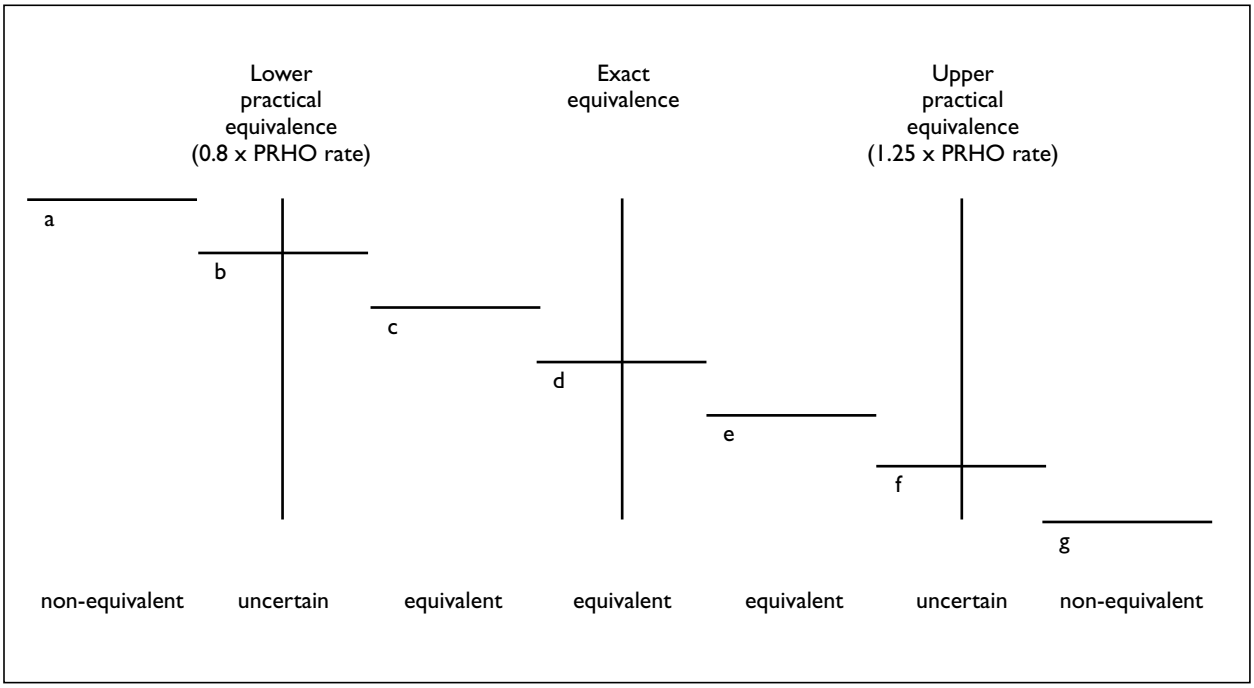

FIGURE 1 *The interpretation of equivalence trials*

had been judged as having the potential to affect the peri-operative management of a patient. Subsequently analyses were undertaken separately for history taking, examination, and test under- and over-ordering.

Analyses of data from all three centres were originally undertaken. As demonstrated by the results, however, there was considerable heterogeneity generated by data on history taking at the Doncaster site; hence a second analysis was conducted using data from Sheffield and Southampton only.

In order to inform the cost-effectiveness analysis, a separate equivalence calculation was performed for over-ordered tests.

A further calculation was performed, to examine whether there was equivalence in the numbers of patients for whom under-assessment possibly affecting management had taken place in any of the three variables studied in an individual case. The methods used were analogous to those described above.

Expert panels

The opinion of the clinical research fellows was a key element in the evaluation of the ATN and PRHO performance, and it was of vital importance to ensure that these views were representative. To this end, expert panels at Southampton and Sheffield were formed to review a sample of the assessment notes and the decisions made by the ATN/PRHO and the clinical research fellow. Each panel contained three surgeons or anaesthetists.

The panels were asked to judge whether, in their opinion, the clinical research fellow had made a fair assessment or was too lenient or too harsh. The panels were provided with the ATN or PRHO assessment, the clinical research fellow assessment and judgement sheet, and the local guidelines for surgery and protocols for ordering tests. All assessments marked 'under-assessed possibly affecting management' were put before the expert panel, along with samples of the 'under-assessed not affecting management' and 'correct assessments'. It was agreed that it would be impossible to fully blind the panel to the origin of the initial clerking, because of handwriting and style of writing. It would also have been impractical to blind the panel as to the clinical research fellow's judgement without themselves examining the patient and, in any case, this would negate the need for a 'gold standard'. In an attempt to eliminate some bias, the Southampton panel judged the Sheffield data and vice versa. In addition, the Sheffield panel assessed all the ATNs' documentation first and PRHOs' second, and the Southampton panel the reverse. The panels were not told of this aspect of presentation. The results of the expert panel assessment are given in appendix 1.

The tables presented later in the results (chapter 3) show cases in which under-assessment possibly affected management for any of the three variables, and for each in turn, both before and after expert panel assessment. Complete results are given in appendix 2.

Economic analysis, patient satisfaction and psychological evaluation

Methods for the economic analysis, patient satisfaction and psychological evaluation relating to this trial are presented in the relevant chapters.

Chapter 3
Main trial results

More than 31,000 elective surgical procedures are carried out annually in the three NHS trusts in which this trial was based: the figures given for each centre are the approximate annual caseloads. Altogether, 354 pre-assessment clinics were sampled over a period of 1 year and 2070 patients were approached regarding trial entry. A total of 155 patients refused trial entry and eight were excluded because they were unable to understand the information in the patient information leaflet. Of the 1907 patients who were randomised, 1874 were evaluable: full details are given in appendix 1. Of these 1874 patients, 926 were randomised to the PRHO arm of the trial and 948 to the ATN arm. The mean age of patients in the PRHO group was 56.82 years and in the ATN group 56.87 years. In the PRHO group, 51% were men compared with 52% in the ATN group. Of the evaluable patients, 1011 were recruited from Southampton, 627 from Sheffield and 236 from Doncaster. In Southampton, the ATN saw 511 patients compared with 319 in Sheffield and 118 in Doncaster. Raw data are given in the tables in appendix 2.

Overall analysis of equivalence

The overall analysis of equivalence is shown in *Table 2*. In all there were 259 patients for whom history taking, examination or test ordering were judged as under-assessments possibly affecting management: 121 (of 948) of these were in the ATN arm and 138 (of 926) in the PRHO arm. The upper 95% CI for the actual percentage difference is less than the clinically important percentage difference, meaning that it is probable that ATNs are, overall, no worse than PRHOs.

Expert panel assessment

The expert panel reviewed all 259 cases in which a judgement had been made of 'under-assessment possibly affecting management', plus an equal sample of other cases. Of the former, they decided that 36 needed to be changed, 15 in the ATN group and 21 in the PRHO group, the majority being moved to the category of 'under-assessment not affecting management'. A total of 75 cases changed in the sample group, 39 in the ATN group and 26 in the PRHO group. Cases moved in both directions, although the majority were returned to the 'correct assessment' category. No bias was noted in judgements between the two arms of the trial. Results amended to include the judgements of the expert panel are presented alongside unamended results.

The results of the separate analyses of history taking, examination and test ordering for data from all three centres are summarised in *Table 3*. Across all three centres, equivalence in history taking is uncertain, the upper 95% CI for the actual percentage difference being more than the clinically important percentage difference. Thus it cannot be ruled out that the ATNs performed worse than the PRHOs in history taking. For examination and test ordering, the actual percentage difference is once again less than the clinically important percentage, and it can be stated with some certainty that ATNs performed no worse than PRHOs.

The results of this analysis are given in *Table 4* for the Southampton and Sheffield data only. When the data for Doncaster are excluded, the upper

TABLE 2 *Cases in which under-assessment possibly affected management in any of history taking, examination or test ordering, showing number and percentage in control (PRHO) and intervention (ATN) groups, clinically important percentage difference ((PRHO x 1.25%) – PRHO), and actual percentage difference (95% CI) – all centres, pre and post assessment by expert panel*

	Number (%) in PRHO group	Number (%) in ATN group	Clinically important percentage difference	Actual percentage difference (95% CI)
Pre assessment by expert panel				
History taking, physical examination or test-ordering	138/926 (14.90)	121/948 (12.76)	+3.73	–2.14 (–5.27 to 0.99)
Post assessment by expert panel				
History taking, physical examination or test-ordering	125/926 (13.50)	101/948 (10.70)	+3.37	–2.84 (–5.79 to 0.11)

TABLE 3 *Cases in which under-assessment possibly affected management in history taking, examination and test ordering, and when tests were considered over-ordered, showing numbers and percentages in control (PRHO) and intervention (ATN) groups, clinically important percentage differences ((PRHO x 1.25%) – PRHO) and actual percentage differences (95% CI) for all centres, pre and post assessment by expert panel*

	Number (%) in PRHO group	Number (%) in ATN group	Clinically important percentage difference	Actual percentage difference (95% CI)
Under-assessment (pre assessment by expert panel)				
History taking	53/926 (5.72)	64/948 (6.75)	1.43	1.03 (–1.16 to 3.22)
Physical examination	46/925* (4.97)	40/948 (4.22)	1.24	–0.75 (–2.65 to 1.14)
Test-ordering	69/926 (7.45)	59/948 (6.22)	1.86	–1.23 (–3.51 to 1.06)
Under-assessment (post assessment by expert panel)				
History taking	44/926 (4.75)	50/948 (5.27)	1.19	0.52 (–1.45 to 2.50)
Physical examination	47/925* (5.08)	35/948 (3.69)	1.27	–1.39 (–3.24 to 0.47)
Test-ordering	71/926 (7.67)	65/948 (6.86)	1.92	–0.81 (–3.16 to 1.54)
Over-assessment (pre assessment by expert panel)				
Test-ordering	206/926 (22.25)	113/948 (11.90)	5.56	–10.3 (–13.7 to –6.95)
Over-assessment (post assessment by expert panel)				
Test-ordering	205/926 (22.14)	116/948 (12.2)	5.53	–9.9 (–13.3 to –6.50)

* *Physical examination data missing for one patient*

95% CI for the actual percentage difference for history taking is once again less than the clinically important percentage difference, as are those for physical examination and test ordering.

Over-ordering of tests

In terms of over-ordering of tests, it can be seen from *Table 3* that PRHOs ordered nearly twice as many unnecessary tests as ATNs. The upper 95% CI for the actual percentage difference is far less than the clinically important difference and is actually below an analogous clinically important difference ({0.80 × PRHO %} – PRHO % = –4.45%) based around the lower practical equivalence limit. This result holds for the data from all three centres and also when the data from Doncaster are excluded (*Table 4*).

ATN workloads at the three study centres

The accrual of patients to the ATN by centre for each month of the recruitment period is shown in *Figure 2*. While Doncaster started with similar numbers to the other two centres in months 1 and 2, recruitment was negligible for months 3 to 10 and very few patients were seen. Overall, Doncaster provided very few patients and the ATN obtained very limited experience compared with either the PRHO or the other ATNs. The cause of the poor recruitment figures by the Doncaster centre was the extended sick leave of one of the PRHOs, which rendered random allocation impossible during this period.

The median numbers of patients seen by the ATN per month at each centre were as follows:

- Southampton 40
- Sheffield 32.5
- Doncaster 8.5

Clearly, the variation in numbers of patients seen per month, and the relatively few patients seen overall in Doncaster, might have contributed to the Doncaster ATN's apparent lack of skill in history taking.

TABLE 4 *Cases for which under-assessment possibly affected management in history taking, examination and test ordering, and when tests were considered over-ordered, showing numbers and percentages in control (PRHO) and intervention (ATN) groups, clinically important percentage differences ((PRHO x 1.25%) – PRHO%), and actual percentage differences (95% CI) for Southampton and Sheffield only, pre and post assessment by expert panel*

	Number (%) in PRHO group	Number (%) in ATN group	Clinically important percentage difference	Actual percentage difference (95% CI)
Under-assessment (pre assessment by expert panel)				
History taking	49/808 (6.06)	44/830 (5.30)	1.52	–0.76 (–3.01 to 1.48)
Physical examination	39/807* (4.83)	27/830 (3.25)	1.21	–1.57 (–3.48 to 0.34)
Test-ordering	63/808 (7.80)	52/830 (6.27)	1.95	–1.53 (–4.01 to 0.95)
Under-assessment (post assessment by expert panel)				
History taking	42/808 (5.20)	33/830 (3.98)	1.30	–1.22 (–3.25 to 0.81)
Physical examination	39/807* (4.83)	23/830 (2.77)	1.21*	–2.06 (–3.91 to –0.20)
Test-ordering	62/808 (7.67)	49/830 (5.99)	1.92	–1.77 (–4.21 to 0.67)
Over-assessment (pre assessment by expert panel)				
Test-ordering	178/808 (22.03)	92/830 (11.08)	5.51	–10.9 (–14.5 to –7.38)
Over-assessment (post assessment by expert panel)				
Test-ordering	177/808 (21.91)	94/830 (11.33)	5.48	–10.6 (–14.2 to –7.01)

* *Physical examination data missing for one patient*

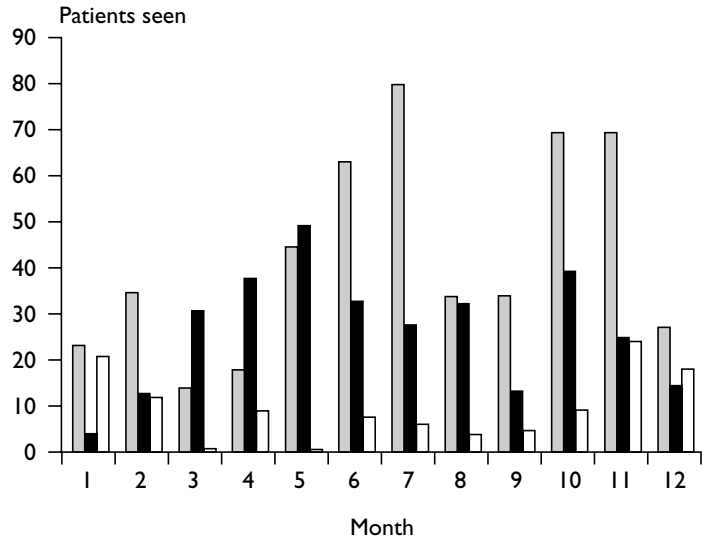

FIGURE 2 *Numbers of patients assessed by each of the three ATNs by trial month (□, Southampton; ■, Sheffield; □, Doncaster)*

Chapter 4

Economic evaluation

Introduction

The economic evaluation set out to address the question, 'What is the expected cost per completed patient episode for patients who receive their pre-operative assessment from ATNs and those who receive their pre-operative assessment from PRHOs?'

Methods

The structure of the surgical care process is such that no difference in clinical outcome should be expected. The anaesthetic assessment, usually on the day of surgery, operates as a safety net for omissions in assessment up to that point. Differences in the quality of the pre-operative assessment will manifest themselves through differences in resource use. Thus the economic evaluation of this trial is more accurately described as a cost-minimisation rather than a cost-effectiveness study.

The effectiveness data used in this analysis were provided from the OpCheck trial described earlier. Specifically, the probabilities of adequate history taking, physical examination and ordering of diagnostic tests were taken from the observed frequencies in each arm of the trial. The probability of any specific test being ordered, appropriately or inappropriately, was also taken from the trial.

Benefit measurement and evaluation

As this is a cost-minimisation study, there is no measurement or valuation of benefit, only a measurement of outcome. The outcome measure is the completed patient episode. A completed patient episode is defined as a patient referred for surgery who arrives on the day of surgery with complete and accurate clerking, and who dies before surgery or has their surgery cancelled.

Costing

The resources used in pre-operative assessment were identified by prospective observation at the pre-operative assessment clinics in the four centres involved in the trial. Capital equipment, accommodation and support staff were independent of whether the assessment was carried out by the PHRO or the ATN. Thus resource data collection focused on the resources used by the assessor (PRHO or ATN) during the assessment, and the resource use that was determined by the quality and outcome of that assessment.

The relevant resources were:

- cost of training for ATN
- PRHO/ATN time spent on assessment
- diagnostic tests ordered
- cancelled or delayed operations
- anaesthetists' time organising tests or referrals.

The cost of training the ATN was calculated as the course fees plus consultant clinical supervision during the pilot study. A conservative assumption was made that ATNs would stay in the job for 12 months only and, hence, the full cost of training was allocated within 1 year.

Time spent on assessment by the PRHO/ATN, the diagnostic tests ordered and the specialist referral rates were collected prospectively from the trial.

The design of the OpCheck trial was such that differences in performance of pre-operative assessment were prevented from impacting upon the anaesthetic assessment. Thus assumptions had to be made about the duration of anaesthetic assessment for a correctly assessed case, an under-assessment on history taking, an under-assessment on physical examination, and an under-assessment on test ordering. It was assumed that an under-assessment would lead to a 10% increase in the time required for the anaesthetic assessment on the day of operation compared with that for a correctly assessed case. The duration of the anaesthetic assessment was based on the observed duration of pre-operative assessments in both arms of the trial.

The unit costs of each of these resources were calculated using national pay scales for nursing and medical staff. The centres involved in the OpCheck trial provided the unit costs of the diagnostic tests. The cost of operations was calculated from NHS reference costs for the operations actually observed.[11] The cost of delay or cancellation was assumed to be a constant proportion (10%) of the cost of an operation.

Modelling

As stated above, the OpCheck trial was designed with a safety net to ensure that involvement in it did not expose a patient to any additional risk compared with normal practice or impose an additional workload upon NHS service personnel. There were significant protocol-driven costs within the trial; also, potential service resource implications could not be observed within the trial. Thus, estimating the likely impact on the costs of pre-operative assessment of substituting ATNs for PHROs required modelling the 'real world' pre- and peri-operative process.

The model estimates the expected cost per completed episode for the ATN and the PRHO. The expected cost is the sum of:

- the salary for the cost of the pre-operative assessment
- the additional training cost
- the cost of tests correctly ordered
- the expected cost of unnecessary tests ordered
- the expected costs of tests ordered on the day of operation.

The expected cost of tests organised on the day of operation includes the cost of delayed operations and the cost of the anaesthetist's time spent in arranging the tests.

Adjustments for timing of costs and benefits

None of the care processes observed as part of the OpCheck study lasted more than 12 months. Thus, by convention, discounting is not required.[12,13]

Allowance for uncertainty

One-way sensitivity analysis was used to assess the importance of the assumptions relating to the operation delay and extended anaesthetic assessment due to under-examination, history taking and tests having to be done on the day of operation. The proportions were varied from 1% to 100%. One-way sensitivity analysis was also used to examine the impact of changing the salaries of the ATN, PRHO and the anaesthetist. The salaries were varied by ± 20%.

A Monte Carlo simulation was used to explore the uncertainty around the sample-based parameter values within the model.[14] Specifically, distributions were described for:

- the duration of assessment
- the expected cost of operations delayed or cancelled
- the expected cost of tests not ordered
- the expected costs of unnecessary tests
- the probability of inadequate history or examination
- the probability of under-ordering of tests
- the probability of ordering unnecessary tests.

Data from the OpCheck trial were used to identify the appropriate probability distributions for modelling these parameter values. Chrystal Ball software[15] was used to fit a distribution to the data from the trial. When no standard distribution provided a good fit, the trial data were used directly. For the probability of under-examination, history, test ordering and test over-ordering, 95% CIs were calculated and a triangular distribution was assumed, described by the CI range and centred upon the proportion observed in the trial.[10]

Results

The costs and effectiveness data used within the model are presented in *Tables 5–8*. The expected cost and incremental cost estimates produced by the deterministic model are given in *Table 9*. The results of the five one-way sensitivity analyses using the deterministic model are presented in *Table 10* and, in *Figure 3,* the distribution of the incremental cost, generated by the Monte Carlo simulation model, of ATNs compared with PRHOs is presented.

Conclusions

Although the deterministic model estimates the incremental cost of an ATN compared with a PRHO to be approaching £1 per correctly assessed patient, the Monte Carlo simulation model produces a mean estimate of +£0.02, essentially cost neutrality. Given that the model makes much greater use of the information generated by the trial, this is the preferred estimate of the expected cost of substituting doctors for nurses in this role.

The clear implication is that junior doctor workload may potentially be reduced through this type of substitution. A second implication is that if PRHOs are to continue in this role, there is considerable scope for efficiency savings through improved performance.

The internal robustness of the results from the Monte Carlo simulation model is good, as the

TABLE 5 *Unit costs of tests*

Test	Cost (£)
Lipid profile	2.11
Fasting lipid profile	1.19
Full blood count	1.58
Urea and electrolyte	2.64
Liver function test	3.20
Coagulation screen	7.03
Blood glucose	2.33
Erythrocyte sedimentation rate	1.39
Serum lithium	2.33
Serum digoxin	4.51
Calcium and albumin	2.99
Thyroid function test	3.68
Uric acid	2.02
Cholesterol	1.65
Sickle cell	9.60
Magnesium	5.11
Blood group and save	2.92
Blood cross match	5.11
ECG	3.80
24-hour ECG	13.25
Pacemaker check	37.00
Echocardiogram	18.75
Chest X-ray	36.00
Neck X-ray	13.19
Thoracic inlet views	17.98
Pulmonary function test	13.19
Cord check	20.00
Other*	5.75

* *Calculated as the mean cost of all 'one-off' tests ordered by the PRHO/ATN within the OpCheck study*

TABLE 6 *Unit costs of operations by speciality and complexity*

	Cost (£)			
	General surgery	**Urology**	**Breast**	**Vascular**
Minor	556.61	548.93	651.83	–
Intermediate	774.03	993.97	765.61	803.34
Major	2000.73	1253.00	1438.66	4374.57
Complex	3990.97	–	2938.00	3431.95

TABLE 7 *Salary costs per annum*

Post	Salary per annum (£)
ATN (G grade)	20,145
PRHO	16,710
Senior anaesthetist	41,890

TABLE 8 *Probability of correct, over- and under-assessment*

	History	Examination	Test ordering
PRHO			
Over-assessment	0	0.001	0.215
Correct assessment	0.897	0.887	0.632
Under-assessment	0.048	0.051	0.075
ATN			
Over-assessment	0.002	0.006	0.115
Correct assessment	0.906	0.929	0.733
Under-assessment	0.0503	0.037	0.062

TABLE 9 *Disaggregated expected costs per completed patient episode*

	PRHO	ATN
Cost of training (£)	–	0.79
Cost of history and examination (£)	6.19	6.75
Cost of tests (£)	15.41	13.11
Total cost (£)	21.60	20.65
Cost difference (£)	**–0.95**	

TABLE 10 *One-way sensitivity analyses in the deterministic model*

Parameter	Incremental cost (£)
Cost of delayed operation	
1% of cost of operation	0.66
100% of cost of operation	–17.49
Cost of extended anaesthetic assessment	
1% increase in duration of assessment	–0.94
100% increase in duration of assessment	–1.44
ATN salary	
20% increase in salary	0.22
20% decrease in salary	–2.13
PRHO salary	
20% increase in salary	–2.17
20% decrease in salary	0.25
Consultant anaesthetist	
20% increase in salary	–0.99
20% decrease in salary	–0.93

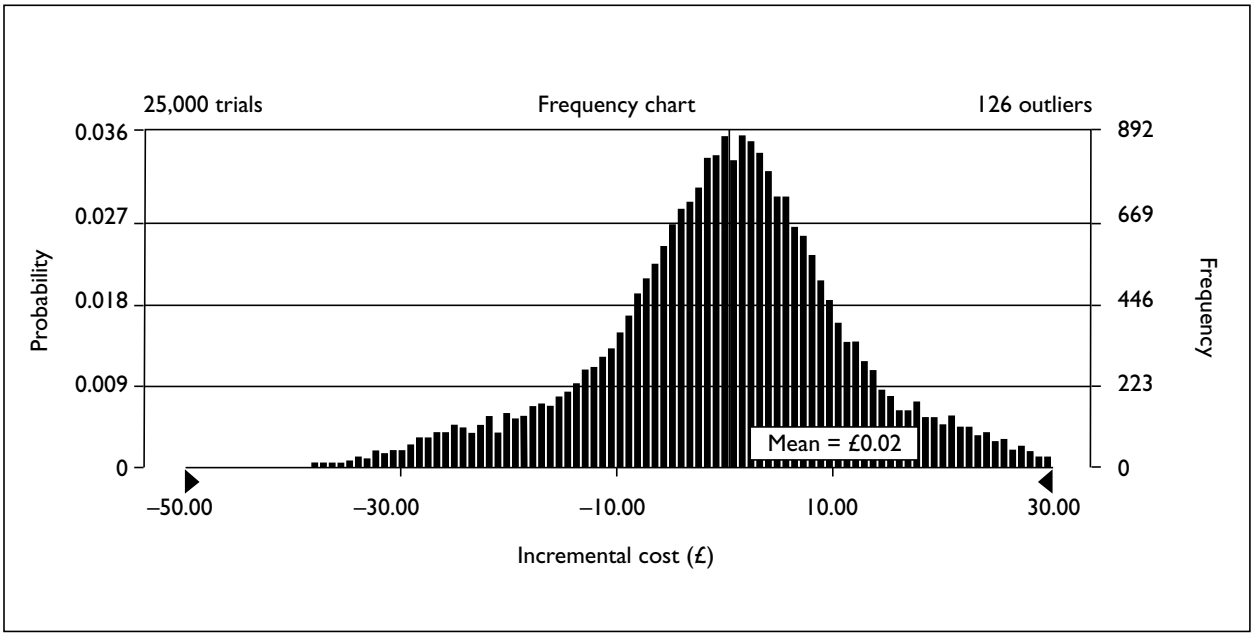

FIGURE 3 *Distribution of incremental cost per completed patient episode: ATN versus PRHO (95% CI, –26 to 23.60; interquartile range, –6.27 to 6.80). (The parameter distributions used in the Monte Carlo simulation are presented in appendix 3)*

distribution is symmetrical around the mean estimate. If the estimated incremental cost is to be questioned, it must be on the basis of the structure of the model, that is, the care processes assumed. Given that the care processes are quite simple in this area, its seems unlikely that the structure, based as it is on observed practice at the OpCheck study centres, is significantly mis-specified.

Sensitivity analysis identified the costs incurred due to operations being delayed as a key determinant of the cost difference between an ATN and a PRHO. Pre-trial audit data, collected as part of the OpCheck study, found that operations are rarely cancelled on the day of operation and therefore the assumption that poor pre-operative assessment leads to additional use of anaesthetists' time, and delays in the start of operations, has some external validity.

The salary of the ATN compared with that of the PRHO is a potentially important factor, and training lower grade nurses to do the task might impact upon the expected cost of pre-operative assessment by nurses. However, the assumption of equal performance by less experienced nurses would have to be tested.

Chapter 5

Patient satisfaction

This chapter addresses the second secondary hypothesis specified in chapter 2.

- There is no difference in the satisfaction of patients with the assessments undertaken by ATNs and PRHOs when performing pre-operative assessment in elective general surgery.

Background

The recent changes in service provision and the widespread use of nurses in place of doctors are both likely to have an impact on how patients perceive their care. Patient satisfaction has emerged as an important component of health-care evaluation, reflecting the growing culture of consumer-led health services. In response to this, a number of standardised patient satisfaction measures have been developed. As part of this study, a systematic search of the literature was undertaken to look for existing instruments that could measure patient perceptions of nurse for doctor substitution in a pre-operative setting. However, no instrument was found in this search that had been found to be valid, reliable and responsive in a context similar to that of this trial.

Pre-operative assessment is but a small part of the whole process that patients experience. The literature addresses the difficulty some patients have in retaining information given pre-operatively,[16] and it was questioned whether patients would find it difficult to isolate the pre-operative assessment from the many events that comprised their admission episode. The literature suggested that improving patients' awareness of their treatment pre-operatively had a positive impact on their postoperative behaviour, which indicates considerable recall.[17–18]

It was also unclear whether the eventual outcome would reflect the level of satisfaction not only with pre-operative assessment but also with various stages of the process. Patients might be satisfied with the ATN in the pre-operative assessment clinic but have their perceptions influenced retrospectively by the outcome of their surgery, by the recovery period, or by mundane issues like the difficulty in finding a parking space on the day of assessment. The criticisms levelled at the use of patient satisfaction measures range from concerns about the patient's ability to judge clinical effectiveness to anxieties about the reliability and validity of such measures.[19,20] The complex psychological factors involved in assessing patient satisfaction may be obscured by the use of a standardised instrument, particularly if it has been adapted from another area. Any such instrument, moreover, must be designed with great care, in order to avoid the false security afforded by blandly positive patient ratings.[21]

Rather than using such an instrument, therefore, it was decided to use a qualitative approach to obtain patients' perceptions of the impact of the changing professional roles. In this chapter, patients' perceptions of how nurses and doctors work together are described, together with the impact of this on the care they received.

Methods

Semi-structured interviews were undertaken with a sample of patients. The sample was purposive in that the aim was to ensure that patients who were interviewed had been seen by either the ATN or the PRHO and had undergone a variety of surgical procedures, and that the gender and age mix reflected the study population. As Miles and Huberman pointed out,[22] when working with the small number of cases used in qualitative research, "random sampling can deal you a decidedly biased hand".

Development of the interview guide

The research questions were informed primarily by the literature on previous studies that looked at patients' satisfaction and the changing role of nurses. Our interest was in many aspects of patient's perceptions of the changing role of nurses; in particular, whether they considered that nurses brought different or additional qualities to the pre-surgical work-up. Nursing literature reflects a view from the profession that nurses are in danger of losing their traditional skills and values in their acceptance of new roles.[23–28] Our interest was in finding out if patients also held

these views. Overall, the remit of the study identified seven key questions for discussion.

- Are patients with existing additional health problems more anxious before surgery?
- What are patients' perceptions of the pre-operative assessment visit?
- Would patients' satisfaction with their care differ if they had been seen by the ATN or the PRHO?
- What are patients' perceptions of the changing role of nurses and their preparation for advanced practice?
- What qualities do patients valued in nurses and doctors?
- How well do doctors and nurses communicate with patients and with each other?
- What factors would influence a patient's choice of a nurse or doctor in any future admissions?

An interview guide was developed from these research questions (see appendix 4). This was designed to ensure that the research questions were considered while giving a degree of flexibility to both the interviewer and the participants.

Timing of interviews

Much consideration was given to the timing of interviews. It was decided not to interview patients immediately following pre-operative assessment; to do so could have led to patients feeling 'over-researched', and would have necessitated a further time commitment in an already time consuming process. To have interviewed at admission, before surgery, might also have been counterproductive, as most patients would be focused on their impending surgery. It was therefore decided to interview patients after surgery and before discharge. By allowing them time for reflection, and to experience a sense of personal 'outcome', it was hoped that patients would be able to give the questions serious consideration and be able to consider the surgery and pre-operative assessment as distinct procedures. It was recognised, however, that patients are often in hospital for a very short time following surgery, and that it would not always be possible to interview a cross-section of the patient population recruited to the study if this were restricted to interviewing only in hospital prior to discharge. For this reason, as described below, a series of telephone interviews were also undertaken.

Selection for interview

Patients were candidates for interview if they had given written consent to being included in the OpCheck study and were hospitalised between December 1998 and April 1999. Patients were aware that they could be approached for interview but that they did not have to participate. The project managers and the research nurses responsible for recruitment and consent to the study approached patients on the wards post-operatively. Ward nursing staff were consulted before approaching patients to avoid burdening patients who had had insufficient time to recover from their surgery. Participants were interviewed face to face if:

(a) the researcher was available
(b) the participants agreed to take part
(c) they were sufficiently recovered from their surgery
(d) a private area was available.

Since, as described above, this might have led to a biased sample of respondents, additional telephone interviews were undertaken to ensure that the sample was representative of the study population as a whole.[29–31] It was also considered that using the telephone might allow participants to speak more freely than when they were still in hospital. Chapple discussed the view that the telephone allows participants an opportunity to discuss feelings that they may be unwilling to express when face to face with the researcher.[29] Participants were telephoned by arrangement after they returned home, at a mutually convenient time. The specific problems of conducting telephone interviews, particularly with the elderly, have been explored by Worth and Tierney.[32] They advised caution as hearing impairment may make the use of the telephone difficult for some older people. However, they concluded that overall it was a very satisfactory method to use with older people. Both face-to-face and telephone interviews were continued until 'saturation point' was reached. By convention, this is defined as being when a series of additional interviews add little to what you have already learned.[33] The responses from face-to-face and telephone interview groups are reported separately.

Focus group

As an addition to the semi-structured interviews, a focus group was arranged to explore patients' perceptions of their experiences after 8–12 weeks had elapsed from their pre-operative assessment visit. This is becoming a more popular method of giving patients a voice in the development of new services. Focus groups allow the researcher to explore how the group expresses and reacts to their individual experiences.[34] The participants interact with each other, ask questions, exchange

anecdotes and comment on each other's experiences. Our aim was to allow the group to explore their experience of the pre-operative assessment, how it related to their hospital stay and how they perceived the ATN and PRHOs, in ways that would be less easily accessible in one-to-one interviews.

The focus group was a convenience sample drawn from the patients recruited to the main study from Doncaster and Sheffield. They were initially sent a letter that explained the purpose of the meeting, with an invitation to attend (appendix 5). A reply slip with a stamped, addressed envelope was included. To maximise the number of those able to attend, the meeting was held in the evening at a city centre hotel, with a taxi arranged for one participant who did not have transport. All the other participants received their travel expenses. As suggested by the literature, refreshments were provided to help participants to relax.[35] The questions of interest to the team were placed at the bottom of the table on a flip chart (appendix 6), so that it was easy for all participants to refer back to these questions during group discussion. The session was recorded on audiotape using a specialist microphone. A member of the research team (CCM) explained the 'ground rules' or guidelines; these included the purpose of the group meeting, the aim to try and allow one person to talk at a time, and confidentiality. The session lasted approximately 90 minutes.

Data analysis

Two researchers (CCM and CH) transcribed the interview audiotapes verbatim, with additional secretarial support. One researcher (CCM) read and re-read the transcripts and undertook the initial coding, that is, systematically identifying similar responses across the transcripts. A second member of the research team (CH) validated the coding. A third researcher (PN) read a selection of the transcripts to check the coding. A similar procedure was followed for the focus group audiotape transcript.

Response: semi-structured interviews

A total of 42 semi-structured interviews were undertaken, evenly divided between men and women; 24 interviewees were from the two sites in Southampton and 18 were from the Doncaster and Sheffield sites. The age range was 27–80 years. Of the 42 interviewees, 22 had been randomised to assessment by ATNs and 20 by PRHOs. Forty participants classed themselves as 'white' European; the remaining two classed themselves as Afro-Caribbean and Asian, respectively.

Three researchers based in Sheffield carried out all the interviews. One researcher (CCM) carried out interviews and developed the interview guide in consultation with the rest of the team and undertook the data analysis. A second experienced researcher (CH) carried out interviews and assisted with the data analysis. The third researcher was a research nurse on secondment to the study, who was supported by the experienced researchers during the interviews she undertook. This nurse identified herself to patients as a researcher who was part of the study team and did not wear a uniform. She was present during five of the interviews carried out by CCM. She also carried out two telephone interviews under supervision.

Interviews varied in length from 20 minutes to 1 hour, the length being largely determined by the participants' interest and enthusiasm. Interviewers kept to the main areas of interest to the study by using open-ended prompts. They also reflected back to the participants, encouraging them to either clarify their meaning or give additional explanations. The researchers were aware that some patients might be unable to distinguish between the processes of pre-operative preparation, admission and surgery. There were no communication problems that the researchers were unable to deal with. One telephone interview was with a participant for whom English was not a first language. No apparent misunderstandings occurred either during this interview or in a face-to-face interview with another participant whose first language was also not English. All the interviews were recorded on audiotape and transcribed verbatim. The telephone interviews were taped, once consent had been obtained from the participant, using specialist recording equipment.

Comments log

In addition to the above, many patients, when recruited to the study, made comments. A log was kept and those questions and comments that occurred most frequently are summarised at the end of this chapter.

Response: focus group

Twelve letters of invitation were sent out and all replied. Eight patients agreed to attend but two were unable to make it on the night and telephoned to cancel. There were thus six participants in the focus group and two researchers were present to facilitate the discussion (CCM; PN). Participants were aged 44–75 years. The three men and three women had been in hospital in

the previous 8–12 weeks. Three had had the same operation (major category 3) and the other three had similar types of operation (intermediate category 2).

Results

Face-to-face interviews

The hypothesis that patients with previous existing health problems may be less confident with the ATN in pre-operative work-up was not generally supported by the views of the patients. Indeed, some patients who were frequent attendees at hospital or general practitioners' (GPs) surgeries had experience of nurses in extended practice roles.

> "I go to my nurses at home [GP] and they do my blood, my blood pressure, my blood samples and my cholesterol. I only go to the nurse. I went to see my own doctor once when my ulcer was playing up and he said, 'Hang on a minute, I'll phone the nurse.' So you've got to have some faith in the nurse and she may know more about it than the doctor. I don't think they're better than a doctor but, if they're dealing with one particular thing all the time, then they'll shine in that particular skill."

However, some patients with an existing medical condition do have increased anxieties when the unexpected happens, for example:

> "... I do have a heart murmur ... and I knew I had to have an ECG as it's standard procedure. Then he [PRHO] decided he would do a heart echo, which I hadn't had done before. He didn't explain, although I knew it was just a scan. I asked the lady doing the scan where it was going and she said to the surgeon, but it wasn't the surgeon that asked for it. You see, I thought he'd look at it and then he'd be able to tell if there was anything wrong and that he would tell me ... I wish he'd told me after they'd done it, rather than letting me go away and worry about it."

Patients' views of pre-operative assessment were very positive. They recognised that it was useful in identifying any health problems and allowed them to find out about their impending surgery. Patients' expectations of what would happen to them were fairly accurate.

> "I think the pre-assessment is a wonderful idea, it saves so much time – wonderful, a good idea."

> "You know there is nothing to worry about. They really give you a good going over and assess whether you're fit at that particular moment in time to have the operation ... I think that's the biggest thing, to put people's minds at ease."

Did patients perceive their care differently depending on whether they were seen by the ATN or the PRHO? Overall, there was little perceived difference between the two groups. Both groups expressed high levels of satisfaction with the care received. Indeed, a number of patients (five) found that they were unable to remember whom they had seen or were sure that they had seen the nurse or the doctor when the opposite was the case, although care had been taken to ensure that the ATNs were easily identified as nurses by their uniforms, name badges and the way in which they introduced themselves to patients. The comments made by these five patients were similar in nature to those of other interviewees. Three were very positive about nurses taking on this particular role, one was unconcerned and the last was uncertain.

Negative responses and comments were usually of an operational nature, for example, lack of privacy, and, as a result of this, one patient overheard the "junior doctor" complain that they were "in a hurry" to travel to another site. The interviewers asked specifically if the patient would have preferred the other (ATN or PRHO) had they not been taking part in the study. All the patients responded that they were happy to accept whoever they had been allocated. However, as will be described later, this was not always the case for their future choice. Some gave messages that were quite contradictory. For example:

> "It didn't worry me either way when she said she was the nurse and my immediate reaction was 'Well, OK, she's got to prove to me that she's going to do a more thorough job than a doctor would'."

With regard to perceptions of the changing role of nurses and their preparation for advanced practice, patients were generally aware that nurses are undertaking many aspects of care that would previously have been in the medical domain. Some patients had experience of nurses in general practice, as described above. Patients were very enthusiastic about the contribution nurses made and could make in the future. Many were also aware that nurses could undertake further training but often made assumptions about the level of qualifications involved.

> "... but nurses are qualified these days to do all sorts."

> "No, I just put my trust in the people who were doing the job, that they knew what they were doing. I was happy to accept that the people you sent along would be properly trained to do the job."

> "I think from a nursing point of view they could have an opportunity ... For example, if you want to become a doctor, you just get a degree and go and work on the degree side but, in fairness, I think there are a lot of people who can start as a basic nurse and work their way up. I don't think there should be any limitation on that score as I think that some nurses are more than capable and, on some occasions, know more than the house doctors or juniors who are just starting."

> "She's been trained, hasn't she [the ATN], and if she's been trained, what difference does it make?"

> "... It depends on whether they specialise in certain jobs. I might go to one who hadn't got an idea about one thing but she'd be good at something else if she's been trained for it, so I don't think you can class everyone as the same."

> "... the profession is changing so rapidly; they are doing lots of things that they didn't do before."

The qualities that patients valued in nurses and doctors were largely similar; however, there were some important differences, as the examples will illustrate. As expected, nurses were valued most highly for their caring and compassionate approach to patients. Many patients considered that doctors also showed similar qualities but not always. One patient was very clear about how he felt about nurses:

> "I'd say like your best mate! I'm not talking about being pampered or anything like that but about being able to talk to someone, someone you can relate to ... any problem and they'll sort it out."

Other comments included:

> "... just being caring about people, I think that's the important thing. And also being aware if anyone's pain changes and ... being on top of it."

> "In my opinion – I didn't have any problems – as long as they are considerate and just really answer the questions that the patients need to know, that's the key to it."

> "They are very caring, aren't they? And they do your best for you. You sort of put your faith in them. You think, 'They know what they are doing' and you feel quite confident actually. I did; I was quite confident with them about what they were doing. I thought they were lovely."

> "... you've got the doctor in the background if you need him but the nurse is there all the time. It's like the difference between having a parent and a babysitter."

The opinions expressed about good doctors reflected an ambivalent attitude towards doctors. Patients have different expectations and, although they value caring and compassion, they also value technical skill. Interestingly, some patients did not always believe that the two could coexist in one person.

> "I think that mostly a doctor gives you the confidence that you can do what is assigned [for you] to do. I think that's the prime thing and, at the end of the day, it's the result that counts."

> "... somebody that smiles at you when you are nervous. It's just down to confidence, I think. If they come across and they are polite – as long as the patients are put at ease, I think that's it."

> "... and the doctor came round yesterday; I felt really bad and I couldn't describe what I felt like ... and he sat at the side of my bed and he said, 'I'll look at your tummy again' ... he listened to what I was saying to him. He stopped and he sat down! And he examined me for himself to get his own opinion of what I was saying. To make sure that actually I was all right before he was happy to continue. And that's what makes him good."

However, the same patient also said:

> "... as much as it's nice to be listened to, and one thing and another, if a specialist came round but they were difficult to deal with – if they were able to do their job and they got excellent results for a complicated procedure, then I'd want them!"

A few patients differentiated between grades of doctors; one, in particular, commented that house officers were closer to the patients as they saw them on the ward every day:

> "I feel the house doctors do a lot of work and they get a lot of backlash, as well as having to take orders as well."

Our participants were asked if they considered that nurses and doctors talked to them as patients in the same way. The study team were aware from the literature that this may not be the case, and wanted to know whether, as nurses were interacting with patients in a more technical medical role, they were also changing their style of communication. The results show that the ATNs became very quick and adept at performing preoperative clerking but there were no suggestions from the participants that there were any changes in the manner in which they communicated with patients.

Although two of the ATNs were men, some of the participants did identify some communication barriers between patients and medical staff as being gender-based, as in the following example.

> "... I think that doctors are a little bit more aloof – maybe it's the differences in the sexes ... but it's just that little bit as though they're detached..."

Another considered it was more to do with training:

> "I think that it's part of the nurses' training to be approachable and it's part of the job, isn't it? More so than the doctor, although I think it should be an important part of being a doctor as well."

One patient in particular drew attention to his impression that doctors had changed in the 5 years since he was last in hospital, and were now far more approachable and understanding.

> "They're more polite nowadays and doctors especially have got more time for you and you can talk to them better. When I was in 5 years ago, it seemed as if they wanted to get you out of their office as quickly as possible. They seem kinder now, a lot kinder than they used to be, and they explain things. The only thing I knew was that I was coming in for a bypass. I didn't know what that was or how they did it! But now they sit you down and tell you everything that is going on."

Other participants were concerned that the working relationship between nurses and doctors could become strained if nurses were encouraged to advance their practice further into the medical domain. One comment was:

> "Personally, at the moment, it seems to me in the NHS that there appears to be a good relationship between nurses and doctors. I mean the 'you are nurses and we are doctors but we work together'. But I would hate to see doctors getting uppity about nurses doing something that they thought was theirs."

Only a small number of patients (three) felt able to comment directly on the possibility of nurses losing their traditional skills when undertaking additional responsibilities and leaving the 'nursing' to others.

> "... that could well be, you know; if they are pushed too far they could well lose that image."

> "I feel the nurse's role has diminished terribly; nurses aren't appreciated any more and they don't hold places of esteem in the community ... In most places I've been recently, it's been the care assistants that are nursing. I've never seen a nurse washing, shaving, or caring for a person..."

This same patient considered that there was nothing wrong with nurses taking on additional work, as she considered an experienced nurse would be better at most things than a junior doctor; however, she seems to suggest from her comments that she would regret nurses further diminishing their traditional role. Another patient expressed the view that:

> "Years ago, when a nurse was a nurse that was all she did; now she's got to do everything..."

Patients were largely happy to see either a nurse or a doctor at any future visit they might need to make for surgery. About half of the patients would have no preference in the future; they would be happy to be seen by either the nurse or the doctor. Three patients would actively choose a nurse in future; the same number would prefer the doctor for certain medical problems. The preparation and training the nurse received for the job would have some influence on the future choice for 11 patients (see comments above). The remaining three patients were concerned that nurses really wanted to take on this new role and they thought that this would influence their choice. Care was taken with this question to be sensitive to the patient, who might have been diagnosed with a potentially life-threatening condition. Examples were chosen for conditions that were unrelated to their current surgical admission.

> "No, I don't think so as, at the end of the day, the actual job is done by the surgeon, so I'm in hospital to have whatever has got to be done. I'm quite happy about it."

> "... but if I was going in for something where I didn't know, I would be asking a lot of questions. Usually you can get better answers from nurses than from doctors."

> "Well, I wouldn't like to be going into a junior doctor ... What I mean is, if you were saying that a nurse and a doctor were alongside each other with the same amount of experience, then I'd probably go for the doctor but, in most instances, it seems the nurses have a lot more experience than the doctors. In 90% of cases, the nurses would be able to deal with the queries, but they'd always have a backup".

> "Like you say, the nurse clinic ... I always believe that nurses have more to do with patients anyway so, when it comes to it, I would be quite happy to go to a nurse clinic – an assessment clinic with the nurses – for most things but, for a cancer, I think I would prefer the doctor."

By contrast, other patients took the view that, given the choice in future:

> "...I think I would rather have the nurse."

> "...I'd go to the one that gets you in fastest and gets it over and done with."

One patient gave a view of how things may change in the future:

> "People expect to see doctors, don't they? It's the way people have been brought up but, in a changing world, it may be different."

Telephone interviews

The responses were very similar for the face-to-face and telephone interview groups, as had been expected from the literature. The views quoted above are representative of all of those interviewed.

Focus group

As described previously, three patients had had the same kind of operation but their experiences were very different. One had made a swift, full recovery, whereas the other two were still experiencing difficulties, including pain, some 10 weeks postoperatively. Changing service provision meant that they had been discharged into the care of their GPs and had not been followed-up by the surgeon who performed their operations. This was a source of anxiety to those with post-operative complications.

The group was also interested in the hospital policy of early discharge. One of the group considered that getting out early was right for him, although the feeling in the group was that they were discharged too early. [For ease of identification, P with a number indicates which participant is speaking.]

> "I was worse when I got home. I felt worse." [P1]

> "I was in for less than a day. I came up [from surgery] at half-past-eleven and the doctor came the following day at 10 o'clock and said I could go home. I was surprised, because they'd told me 2 or 3 days at the hospital ... I was bad when I got home because it had been too early." [P2]

> "How can they tell you that you're OK when you've still got your catheter bag and the gas and air? ... The doctor said I could go home! How did he know I was all right?" [P1]

> "I think they generalise, like T had a marvellous recovery, but that doesn't mean that everybody is the same. [P3]

> "Yes, that's right." [P4]

One participant had worked for the NHS as a gardener until retirement and held very strong views on the role of nurses.

> "Nursing has come a long way from when I started in the Health Service. What I missed was the fact that there was no sister, as I recognise it, on the ward. I recognise a sister with the dark blue uniform and a belt. I never saw one – that's the authority that I recognise ... nursing has come a long way from nursing as I recognise nursing. I recognise them [now] more as technicians than nurses. ... I never knew a nurse do anything like that in the past." [P5]

> "I know a lot of people miss that. They call it progress." [P3]

The group went on to discuss the importance of being able to see the consultant at least occasionally when attending the hospital.

> "The reason I wanted to see the consultant was because he was the one actually doing the operation. If the registrar had been doing it, I'd have had no problem ... but I would have liked to see him because he was doing it. Even that once, just to know ..." [P3]

> "When I was at the clinic and they were deciding what to do, the doctor I had kept going next door to ask him [the consultant]. I mean, he was only next door ... so why didn't he just pop in?" [P2]

> "The thing about these registrars is that they are very good. I've been operated on before by a registrar." [P4]

The consensus of the group when looking at the question of what would influence any future choice between a PRHO or nurses in pre-operative assessment was initially that it would make no difference. However, an opinion was expressed that nurses, although skilled, should not be in charge and that doctors should still see the patients.

> "... I still think that the doctor should see to the wants of the patient first. The nurse is there as a backup system." [P5]

When the group was asked directly if there were any circumstances, for example, the type of surgery or a diagnosis of cancer, that would influence a future choice, the opinion of the group was indecisive (an example was given to the group by the facilitator).

> "I think if I had something very serious, I'd rather see the doctor." [P1]

> "I think I'd ask for a second opinion if it was something that, you know ..." [P4]

> "I think I'd be like the person you described." [P3]

During the group discussion that followed, P3 changed her mind, as the quote below illustrates:

> "If it's for pre-op assessment, I don't mind. It's already been decided that I'm going to have it and it's just a general check – well, that's OK. I'm quite willing to see the nurse for that; I would like to start with the nurse..." [P3]

The distinction of wanting to "start with the nurse" illustrates that there is blurring at the boundaries

when the participants were uncertain about the kind of choices they would make in the future.

The discussion progressed to the future of nursing and the possibility of extending roles further:

> "It depends on the individual nurse – they know their own limitations, so to speak." [P6]

There was general agreement from the group on this point:

> "There are things that they wouldn't tackle, or at least so you would have thought." [P6]

> "The doctor wouldn't allow a nurse to do something she's not qualified to do." [P4]

Logged comments

As described above, a log was kept of the comments, if any, that patients made when they were recruited to the trial. There was an emphasis on whether the proposed changes to the service were prompted by financial considerations or were to reduce junior doctors' hours. The issue of nurses' preparation for the role was seen as important and questions were asked about the training that the nurses had received, including a query about a formal qualification.

Discussion

Patients were interviewed who had already been recruited to an RCT of ATNs and PRHOs in pre-operative work-up. It is implicit that these patients started from a position of indifference to doctors or nurses in this role. With hindsight, valuable information may have been gained if ethical approval had been obtained to interview those patients who refused to be recruited to the study. That said, the refusal rate was less than 10%. It may be that the design of the study, with its emphasis on patient safety, influenced decisions to take part. The pre-operative assessment visit is a means of exchanging information between heathcare professionals and patients. It is essential that the information given by the patient is recorded accurately and passed on appropriately, and that the patient is given adequate information about the planned operation. Although participants were specifically asked about information-giving in pre-operative counselling, the emphasis on this aspect of communication in their responses was not expected. Some were worried that their information would not be passed on correctly or that they would have to go over it all again. Concern was expressed that pre-operative clerking was "not just taking a medical history, it's getting to know me as a person!" This topic was frequently mentioned in different contexts and was almost the only area where there were consistent complaints. Complaints included information leaflets being out-of-date or ambiguous, little or no meaningful explanation of what activities could be resumed post-operatively, and what to expect as the 'normal' or 'average' recuperation period. Participants were generally positive about their experience of nurses undertaking pre-operative clerking. Most participants would have been happy for either a nurse or a doctor to clerk them for any future admission. It is noteworthy that some interviewees were unable to remember who had clerked them pre-operatively. As illustrated, this does not imply total acceptance of nurses in new roles, as a small minority held the view that doctors should continue to be available to allow patients a choice. When making use of qualitative data, it is important to also give attention to the minority opinion.[34]

Conclusions

The study suggests that patients will expect a high standard of technical care from nurse-led services, while also expecting their caring role to continue. This implies that nurses should not abandon their traditional strengths when dealing with patients. The main results from the trial showed that the ATNs became very quick and efficient at seeing patients and, indeed, were often quicker than the PRHOs. Although no evidence was found to show that nurses had changed their style of approach, it is not inconceivable that if nurses continue in this role then patients may begin to see them as having less time for them and being more technical.

Some participants perceived the team as still being hierarchical, with the consultant at the top directing the actions of those below. Some participants were aware of the changes within nursing and saw nurses as being more independent and less under the rule of the consultant. The developments were seen by some as a threat to teamwork between doctors and nurses, which may interfere with the delivery of good patient care. Appropriate training was also an issue for many of the participants. When they were recruited to the trial, they were all aware that the nurse who would see them was undertaking a higher degree. They were aware that efforts had been made to ensure that high standards of care were maintained. While most patients were satisfied with the standard of care they received during pre-operative assessment, they were aware of the changes in service provision and had clear views on the risks and benefits of these changes.

Chapter 6

Staff perceptions

In this chapter, the secondary hypothesis (iii) is addressed.

- The quality of communication between senior medical staff and the staff carrying out the pre-operative assessment is improved by the introduction of ATNs.

Background

The introduction of ATNs into surgical units to carry out pre-operative assessment is a potentially significant move towards redrawing the boundaries between the clinical work of doctors and nurses in the acute sector. It has been argued that a nurse practitioner can substitute for junior doctors in various ways.[36–38] However, there is disagreement about the potential impact of these role changes on both the work environment and relationships within multi-disciplinary teams. For example, the role of nurse practitioner has been seen to be "strengthening team cohesion and increasing opportunities for shared problem solving".[39] On the other hand, egos, territoriality and power struggles have all been identified as barriers to successful relationships between the nurse practitioner and other nursing staff, which can only be overcome through an emphasis on communication, collaboration and collegiality in the workplace.[40]

In this part of the study, the focus was on the interpersonal psychosocial context of the trial, in the context of a multidisciplinary team within surgical units, to explore ways in which the ATN role impacts upon the way the team functions. It provided an opportunity for the interrelationships between the professional groups to be explored in depth, with the discussion of the ATN role, and extended roles for nurses in general, acting as the catalyst.

The issue of how the role of the ATN is perceived by others within the team is important, as it has clear implications for the quality of communication and interprofessional relationships, staff well-being, career progression, training and education. Evidence is provided for the quality of communication among and between the surgical teams evaluated.

The aim of the psychological evaluation was to undertake an in-depth, qualitative psychological examination of these issues to provide data on the **context** in which the trial took place and, thus, the impact of quality of communication. It was expected that these issues would:

(a) impact upon the success of the trial
(b) have implications for the future development of such roles within multi-disciplinary surgical teams
(c) inform strategic planning in the NHS accordingly.

The intention was to elicit the subjective perceptions of staff, at all levels, on how the extended scope of nursing practice might influence the boundaries between the roles of doctors and nurses. This included both current and future impact, the training needs of junior doctors and nurses, and job satisfaction for both medical and nursing staff at all levels of the hierarchy.

Methods

Sampling

A series of 43 in-depth, semi-structured interviews were carried out with a purposive sample of key professionals at each of the four sites involved in the study.[41] The sample comprised a cross-section of practitioners and opinion leaders in the professions (*Tables 11* and *12*), including consultant surgeons, anaesthetists, PRHOs and nursing staff of all grades, including the ATNs, as well as those staff responsible at regional level for the training of PRHOs and nursing staff.

Procedure

A core interview guide was developed (see appendix 7), with built-in flexibility to enable some variation in questions for different grades.

TABLE 11 *Profession and gender distribution of respondents*

	Nursing staff	Medical staff
Men	5	14
Women	16	8

TABLE 12 *Professional grade of respondents*

	Number
Nurses	9
Trial staff	6
Specialist nurses	5
Academic staff (medical)	2
Academic staff (nursing)	2
Junior doctors	13
Surgical and anaesthetic consultants	2
Postgraduate Deans	2
Medical and nursing managers	2
Total	**43**

All interviews were tape-recorded and transcribed verbatim. Full ethical approval was obtained. Informed consent for each respondent, including the option of dropping out at any subsequent time, was incorporated into the interview procedure. Interviews varied in length according to the available time, enthusiasm and personal interest of each respondent. They ranged from 30 minutes to 1.5 hours.

Data analysis

The transcripts were analysed as follows.

1. They were **coded as themes** identified from the transcripts. Initially, this was done by both researchers independently. A consensus was then reached by discussion.
2. The data were then extracted to address the research question specified above.

Results

Thematic analysis

Eight themes, which are not mutually exclusive, were identified from the interrogation of the transcripts in the manner specified.

1. General issues about pre-operative assessment.
2. The impact of taking part in a clinical trial.
3. Communication and inter/intra-professional relationships.
4. Training and education.
5. Stress, well-being and job satisfaction.
6. Developments and changes in the NHS.
7. Patient care.
8. Gender relationships and professional power.

Within each of these themes, a range of views, beliefs and perceptions were expressed. There is no overall 'general' point of view and the data draw upon the variety of responses. Here the focus is specifically on the data relating to quality of communication and professional relationships, which were identified as the key potential barriers to good practice. In what follows, a brief description of each theme is presented, with some extracts as evidence. In the space available, a few illustrative quotations have been extracted as representative of the full data set.

1. General issues about pre-operative assessment

While the **overt** discussion focused upon the value of pre-operative assessment and how it is perceived by each of the professional groups involved, issues of rivalry and scepticism were expressed by nurses and doctors about each other.

> "They [house officers] take us so much for granted. **They** aren't doing blood pressures but they expect us to have clerked someone."
>
> [Specialist nurse]

> "I don't see any reason why nurses can't be trained to do that [pre-operative assessment] but they won't necessarily be able to interpret their findings."
>
> [Consultant anaesthetist]

> "With a medical degree you can put it all together."
>
> [Clinical academic]

The message here is clear. Doctors see their role and their training background as superior to that of the nurses. Nurses feel that their skills and abilities are taken for granted by doctors. Such perceptions recur throughout the interviews and in each of the other themes.

2. The impact of taking part in a clinical trial

Some irritation was expressed about the impact of the trial itself because it altered the routine for the teams. What was interesting here, though, is information expressed **indirectly** about inter- and intra-professional difficulties. For example, one junior doctor clearly believed that the pre-operative assessment was not part of his/her role, so it was dismissed accordingly.

> "It [the trial] matters to me only inasmuch as I think it would be useful for nurses to assess patients and clerk the patients. [PRHOs] have extremely busy jobs ... [we] cannot afford to take the time off to assess patients prior to an operation."
>
> [PRHO]

There was also **ambivalence** on the part of nurses towards the ATN role itself:

> "I don't know what the future holds. I think about [the ATN] and what [the ATN] is going to do when the trial finishes ... I don't have a problem with the role – just what it takes away from me."
>
> [Specialist nurse]

However, this was not how the ATNs themselves viewed the role, particularly in the context of the trial where they were the focus of attention:

> "If anything, the study has probably got me more respect."
>
> [ATN]

The view that, in general, the 'ordinary' nurse is not respected is thus reiterated. It takes specialist expertise for nursing to be viewed seriously, it seems. This point emerges strongly again in themes 5 and 6 reported below.

3. Communication and inter/intra-professional relationships

The nurse–doctor relationship in the surgical teams throughout all four sites appeared to be a close one, particularly between PRHOs and nurses. Appreciation of one another's work and a sense of teamwork and collaboration comprised the **overt** message.

> "At our stage [of training], they [the nurses] are better at assessing an ill patient than we are, so it's good to get that sort of feedback from them."
>
> [PRHO]

> "Some nurses really are a gift ... It will mean that you won't be woken up at 4 o'clock in the morning because a good nurse will be able to deal with things – a lot of nurses are like that."
>
> [PRHO]

Nurses also showed a good understanding of the pressures that PRHOs are under. They often found themselves playing a supportive role and showed considerable empathy.

> "I feel very sorry for them [PRHOs], because they have an awful lot of pressure and they don't know how to do everything."
>
> [Nurse]

> "Some consultants really have a go at them [PRHOs] and they lose confidence. We have to build it up again really, so that's **our** job. We nurses do cope, we have to, and we build their confidence back up – say 'Yes, you can do it'."
>
> [Nurse]

Significantly, the nurse–consultant relationship appeared very different from the PRHO–consultant relationship. Many nursing staff perceived themselves to have built up a close relationship with senior medical staff. They spoke of the clear channels of communication between the two groups.

> "At the end of the day, we don't work for them [consultants], we work **with** them. But they [PRHOs] rely on them for references. So they don't want to do anything that will upset them, whereas we're not bothered."
>
> [Nurse]

> "I've worked very closely with consultants for years and years, so I know them all on first name terms. I know them all very well and I know that I can rely on them. It's a lot easier for me to go and talk to one of the consultants than it is for a house officer because they are a bit wary of them ... I think the consultants like them to be wary of them because it's a power thing, isn't it? Whereas they know they can't win with us – it doesn't work."
>
> [Nurse]

> "One of them [consultants] will come and negotiate things with me, and ask me things and ask my opinion about things."
>
> [Nurse]

However, on closer inspection, it is noticeable that these positive messages all came from the nurses. There was little evidence of senior doctors reciprocating. Indeed, it was recognised that some treated nurses' skills with disrespect.

> "Nurses are expendable; if one goes you just get another. I have a colleague who worked on the urology ward. She'd been here for 13 years. She handed in her notice. The consultant said, 'Do you think your F grade would go for your job then?' That's how it works."
>
> [Nurse]

Some nursing staff indicated that the introduction of ATNs may have had a detrimental impact on their relationships with doctors. Some felt "fobbed off" with unwanted medical tasks and "taken for granted".

> "Taking on new roles isn't increasing respect for us from medical staff. It's not going to aid the relationship. It's just about taking on jobs that they don't want to do."
>
> [Nurse]

> "They [surgeons] want to be in total control of their patients. They don't like nurses being the innovators in their patient care. They want their own house officers to be doing it. They don't like the nurses making decisions."
>
> [Nurse]

Not all medical staff perceived the changes in a negative or cynical light but considered that increasing skills would increase respect for the nursing profession and even out the previous balance of power:

> "I think it will get them more respect. If they want their profession to be respected, then they've got to go for it."
>
> [PRHO]

The majority of nurses, however, remained clear about where the power lay:

> "The doctors are still in control. I think we've got a long way to go before we ever stand united and get anything done. I think it's always been that way. I think it might change slowly but maybe that would only be possible because there are more advanced nursing roles coming up."
>
> [ATN]

4. Training and education

There were issues for specialist medical and nurse educators about the impact of the ATN role. The different status of the tasks undertaken by medical and nursing staff was identified in these discussions. Other issues, brought up by both medical and nursing staff in relation to training and education, were conflict between the need for education and the demands of the job, and lack of contact and open communication between teaching colleges and the hospitals. For example:

> "There are so many going off and taking study leave, that there's nobody on the wards."
>
> [Nurse]

> "I really do think the university lecturers should actually come down [to the ward]. We've asked them but they don't have the time ... they are taught by people who haven't hit a ward in a long time."
>
> [Nurse]

> "My personal chat with the postgraduate deputy ... she didn't really know what was going on with education ... I don't know whose fault that is."
>
> [PRHO]

Senior doctors responsible for the training and supervision of PRHOs perceived nurses to be competent in carrying out the whole of the pre-operative assessment procedure. However, they all expressed concern about the impact of taking away the clerking role from PRHOs. They viewed the clerking role as an intrinsic part of PRHO training – a valuable opportunity to get to know patients and to improve both their communication and diagnostic skills, which would prove of immense value in their future careers:

> "I think it's of immense educational value; it doesn't matter that it is repetitive because no two patients are ever the same. I don't know that they're not going to end up feeling unfulfilled – and at what stage are you actually going to have to know about a patient?"
>
> [Consultant anaesthetist]

> "I think that house officers do have to do some because, to a certain extent, it is good training, dealing with patients and making sure that they do have the communication skills to detect problems and get the patients' confidence."
>
> [Consultant anaesthetist]

Some PRHOs themselves shared these views to a certain extent, particularly those just beginning their surgical rotation. They expressed the desire to "get to know their patients" at the pre-operative assessment stage. This was deemed to be an important part of their training, particularly in terms of gaining confidence and increasing communication skills:

> "You need the experience of doing it to get better at doing it, and that's been taken away ... we do feel as though we are missing out on our education. I've only got a month [here] and I've not seen many surgical patients ... you know, I don't do this again."
>
> [PRHO]

5. Stress, well-being and job satisfaction
6. Developments and changes in the NHS

Not everyone understood the reasons for the introduction of specialist nurses or ATNs. This reduced job satisfaction for the nurses. The changes in their role were understood as being for the benefit of junior doctors and, thus, only the mundane elements were added to the nurses' work.

> "He [the ATN] is a dogsbody."
>
> [Nurse]

Nurses considered that they did not have all the professional advantages of doctors:

> "If a doctor makes a mistake, it's often covered up; they close ranks ... nurses don't close ranks."
>
> [Nurse]

The position of nurses is confusing. It is different from that of the medical profession and many doctors were not particularly clear about the way in which nurses dealt with complaints, mistakes and remuneration for extra responsibility.

> "I think a lot of them [nurses] have got enough to do as it is and a lot of them are unhappy; they don't get paid much and being expected to take on things that are new to them and go through training for it without being properly compensated ... I'm not totally surprised that they begrudge it."
>
> [PRHO]

The developments and changes in the nursing role were not seen necessarily to be beneficial by those nurses who identified strongly with their profession:

> "... nursing is very different from medicine and I have a problem with taking on more roles because essentially what happens is that we lose the essence of what nursing is all about."
>
> [Nurse]

> "It seems to me that you'd also feel as though you'd be losing ... yes, I'm an enrolled nurse. I trained as an enrolled nurse and I was an enrolled nurse for 10 years and never wanted to do anything else."
>
> [Nurse]

Some nurses also believed that they had been doing many of the tasks now considered to be part of the 'extended roles' as a matter of routine. The changes that have taken place have impacted on their professionalism and brought about task differentiation that has militated against both teams working together and nurses' professional autonomy.

> "I've given i.v. drugs for years – you wouldn't have dreamt of asking a doctor, you always did it. You wouldn't have dreamt of asking a doctor to take blood, that was your job and you did it. But now I think people are more 'jobsworths' ... you know, that's your job and this is my job ... and whether that's a good thing or not, I don't know. Maybe they should have more doctor support workers, rather than passing things on to nurses."
>
> [Nurse]

Respondents were all interested in the future of the NHS and looked for positive ways of developing and changing working practices. Thus both nurses and doctors actively sought the most efficient way to improve patient care. There were, however, concerns over the development of the respective professions. Nursing, in particular, was seen to be changing. Although many individuals could see the advantages and disadvantages in current changes, some were unclear as to what changes were going to be implemented and felt they had received mixed messages.

> "To be quite honest, I'm not sure where nursing is going; this 'super nurse' that Tony Blair [the Prime Minister] wants – I think a lot of nurses will vote against it."
>
> [Nurse]

There was cynicism about who was gaining an advantage from NHS changes:

> "I think they [senior medical staff] are glad really [about nurses having extended roles] because it means the doctors can sleep – they don't get called out at night. We had a memo come round quite a while back saying not to call the doctor but to call the nurse practitioners for things like IVS [intravenous infusions]."
>
> [Nurse]

So how far does increased responsibility and broader roles mean that doctors can avoid work, and how far does it mean an enhancement in the nurses' professional status? Two comments were:

> "Well, for everybody, the more skills you take on the more highly you're thought of. You need to get people maximising. I worked in America for a while and, where I worked, I didn't do bloods ever; we didn't even put in cannulas – it was all done by nursing staff."
>
> [PRHO]

> "I've come across hostility to taking on extended roles; they [other nurses] say, 'Why should we take jobs off doctors?' but, at the end of the day, it's for the benefit of the patients and it would make our jobs easier as well. They're not rubbish jobs, they're essential."
>
> [Nurse]

There was also sadness that the traditional role and expertise was being lost, and that the traditional nursing role was disappearing.

> "I do think it [nursing] has changed – people used to be more involved in care of patients; it's becoming a bit more technical and a bit more involved."
>
> [Nurse]

> "I think it [nursing] is becoming more specialised ... this ward, for example, will be purely vascular and I'm a vascular nurse and, unless I go somewhere else, that's all I'll do for a while. ... What rankles is that if I were to upgrade, to an E grade vascular nurse, and then I wanted to move on to become a gastroenterology nurse, I would have to drop back down a grade to D. It's not so good for nurses."
>
> [Nurse]

7. Patient care

Nurses and doctors considered that their basic approaches towards patients were different from each other. However, there was no obvious consensus on exactly what characterised these differences.

> "Doctors look at patients slightly differently from nurses – they have a more scientific approach, whereas we have a more aesthetic approach and see them as people as opposed to just organs and chemistry firing off. It's just a different way of looking at people."
>
> [Nurse]

> "Well, it maybe sounds arrogant to say that I know my patients well."
>
> [Surgeon]

> "I think it's easier for a house officer than a consultant because you spend much more time on the ward. I have more time for every patient. So I'll sit next to them and explain to them."
>
> [PRHO]

> "I think it depends on their personality but I think it tends to be that nurses are more compassionate and more tactile ... like in the textbooks really. Doctors are more factual."
>
> [PRHO]

8. Gender relationships and professional power

Men and women and doctors and nurses had very different perceptions of gender in relation to professional power in the surgical team. Male nurses felt that they had more respect from both male and female doctors:

> "They don't tend to be disrespectful to another man. I have known instances in nursing when it has been beneficial to be a man. It's because you stand up to them."
>
> [Male nurse]

Women doctors are more likely to stand up for themselves than nurses, while denying that gender itself is a relevant professional issue, as indicated in this extract from an interview by one of the authors (CH) with a female consultant.

> "I know the professor refers to me as 'the dragon'." [Female consultant]
>
> "Why?" [CH]
>
> "Well, he always says that I have to have everything absolutely right."
>
> "Do you think he would call you that if you were a man?"
>
> "I'm not sure ... I'd like to think that it wasn't an issue of gender. I guess it's his personal opinion."

However, some male doctors **do** see gender discrimination in their profession very clearly:

> "They [male surgeons] tend not to take them [female surgeons] seriously. It's very much a boys' club ... rugby playing and beer drinking, and the girls aren't quite up to it – which isn't necessarily true ... There are some very accomplished female surgeons ... but I think that it will take a while before it gets better ... I think now that more than two-thirds of recruits into medicine are women, things are going to have to change."
>
> [Male anaesthetist]

Female nurses will admit to feeling aggrieved about gender within their own profession, particularly when they see their male colleagues doing well in their careers.

> "Men have got this ethos that they do climb the ladder much faster than females – and without any experience at all!"
>
> [Female nurse]

Some female nurses realise, however, that the divisions of power cross professional as well as gender boundaries. Doctors are seen as believing that they have the right to discuss nursing and patronise nurses during discussions of clinical medical issues.

> "We go into clinical meetings now and we try and have a voice. But it is very intimidating to sit with every surgical consultant and doctor. We listen to their presentation and then it's, 'Oh, there's a nurse in the room! What do you think?' But they still discuss nursing care as if the nurses aren't there, and we don't think they have a right to discuss it. We generally sit right in the corner and it's sort of, 'Why are you here?' It's awful – it's all men."
>
> [Female nurse]

This is at odds with the overt view of inter-professional respect and harmony – but it was not a lone voice. The other side of this coin was put by a senior medical consultant, who considered that:

> "[Nurses] are all extremely fragile ... they are easily upset. I mean, [introduce] the most minor changes and virtually all react in the same way – all of them in tears over something which seems to be so minor it's not worth thinking about."
>
> [Male consultant surgeon]

Power and authority remain vested in senior doctors, most of whom are male. Senior female doctors are seen as 'difficult' in certain ways, and women more than men consider that they have to negotiate a position in the team hierarchy beyond that associated with their professional role.

Discussion

Overall, the introduction of the ATN role *per se* had little direct impact upon the quality of the perceived relationships between senior medical staff and the nurses and doctors carrying out the pre-operative assessment in this study. This is for two main reasons. First, the perception is that there have been so many changes in the nursing role in recent years that this appears to be 'just another one'. Second, there is a pre-existing, intriguing inter-professional rivalry between doctors and nurses, which is brought into focus when each profession is asked to discuss potential changes to the *status quo* – in this case, changes that potentially rearrange the traditional power structures.

The relationship between doctors and nurses in the context of the surgical team are, however, becoming more problematic as politically-driven

changes in nursing roles are implemented. This is not so much because nurses are moving into medical territory as because of the rationale behind the changes: concern about junior doctors' hours, the shortage of medical staff and changes in postgraduate medical education. As many of the nurses in this study indicated, the extended roles comprise tasks that doctors see as mundane, repetitive and having little training value.

The introduction of ATNs did highlight some of the problematic relationships among the surgical nurses within the team. Some considered their specialist roles were being eroded, others felt sorry for the restricted role placed on the ATN. There was also a view that nursing itself was being undermined, with failure by the government and the nursing profession itself to acknowledge the importance of traditional nursing.

The **quality** of communication between doctors and nurses was central to understanding the relationships between these professional groups. There were parallel stories being told – the superficial public one in which the team members coexisted in a climate of mutual respect, and the private one, not very far under the surface, which was one of a power struggle, disrespect and gender imbalance. Nurses either considered that they were undervalued or that they were respected and valued by senior doctors. There was ambivalent and contradictory evidence that ultimately doctors were loyal to their own profession, while nurses experienced a higher degree of intraprofessional conflict.

These ambivalent relationships reflected **pressure points**, which potentially could impact upon the quality of communication and the working environment for the multidisciplinary teams. The implicit need for **professional harmony**, for the sake of patient care and good working relationships, however, supplants the private perceptions of the individuals in each professional group.

Conclusions

The introduction of ATNs into surgical units is likely to impact upon the working lives of practitioners **at all levels**. Change is stressful. When change is politically or economically driven, rather than a motivation to improve practice, it inevitably precipitates anxiety and expectations of poor decision-making. Nurses seem sceptical about extended roles. These both challenge the traditional nursing role and represent the residual work that doctors do not want. Doctors seem unperturbed about changes in the nursing role, with some fleeting reservations about PRHO training. What is significant about doctors' perceptions here, though, is that the value they place on nurses is less than many experienced nurses would have predicted. The issue of ATNs and extended roles, while unproblematic in itself, has highlighted traditional rivalries and conflicts both between and within professional groups.

Chapter 7

Implications for nursing practice, education and management

Introduction

The OpCheck project has come at the close of a decade of change in the way in which healthcare is delivered in the UK. These changes have been driven by three main forces – the health policies of governments of different persuasions but facing similar problems (how to meet increased needs and expectations within a limited budget), NHS management, and the healthcare professions.[42,43] In an attempt to solve the chronic resource problems of the NHS, the Conservative government established an internal market in healthcare and, soon after, in 1991, committed itself to improving conditions of work and training for junior medical staff through the publication of the 'new deal' agreement.[2,44] Some 2 years later, implementation of the Calman report[1] on the training of specialist hospital doctors was begun. The effect of these policies was to reduce progressively the contribution of doctors in training to service provision in the NHS, and to cause managers to look for other ways of delivering care. While consultants and non-training grades of doctor undertook some extra responsibilities, nurses and the professions allied to medicine were also asked increasingly to bear some of the load. Many 'new' nursing roles began to emerge at the interface between nursing and medicine, often stimulated by 'pump priming funds' from regional task forces.[7,38,45–48] Roles for nurses in pre-operative assessment were included in these innovations.

The establishment of such roles was facilitated to some extent by the publication in 1992 of the *Scope of professional practice* document by the UK Central Council (UKCC), the nursing professions' statutory body.[48] This emphasised the attributes of knowledge, judgement and skill required by nurses. The UKCC acknowledged that, in the context of changing developments in healthcare, nursing practice must be sensitive, relevant and responsive to patient need, and have the capacity to adjust, where and when appropriate, to changing circumstances. The UKCC document further stated that education must keep pace with such change, in both pre- and post-registration areas.[48] Nurses must, at all times, satisfy their *Code of professional conduct* and recognise their own accountability for their practice.[49] In order to bring the professional responsibility and consequent accountability of individual practitioners into proper focus, the UKCC's principles for practice rather than certificates for tasks (previously termed extended roles) should form the basis for adjustments to the scope of practice. Simultaneously with the issue of the UKCC documents, the Chief Nurses of the UK Health Departments withdrew earlier guidance on the extended role of nurses and asked all nurses and managers to act in accordance with the new UKCC statements.[50]

As the introduction of new roles related to the reduction in junior doctors' hours began to have an impact on the interface between medicine and nursing, NHS management initiatives linked to government ministerial imperatives also had an impact on the service, and stimulated new role creation during the 1990s. These initiatives included tackling surgical waiting lists, shortening lengths of stay and increasing the proportion of surgical day-cases.

When professional roles change rapidly, there is frequently a time lag in the provision of appropriate educational preparation, as clearly illustrated by Read and Graves.[6,45] This time lag was probably heightened early in the 1990s because of the effect of the internal market on arrangements for the purchasing of non-medical education and training, starting with the NHS Working Paper 10 and progressing through to the current arrangement established in 1995.[51–53] These changes have created a wide variety of approaches to purchasing 'post-basic' or 'continuing professional education'. Consortia representing hospital trusts, health authorities, general practice, Social Services and the independent medical sector were established to purchase non-medical education and training to meet local workforce requirements, and these have evolved since 1995 to independent status. As late as June 1996, consortia and regional education and development groups were being guided to focus rather narrowly on the priorities of basic

preparation, mental health, intensive and high-dependency care and cancer care.[54]

However, following the change of government, the publication of the White Paper, *The new NHS: modern, dependable*,[55] saw the beginning of consideration, in policy terms, of the preparation of nurses to enable them to strengthen the contribution of nursing to future healthcare. The government stated that it wished to "encourage and extend the recent developments in the roles of nurses working in acute and community services. The government is committed to encouraging and supporting the development of nursing practice in these ways".

The publication of *The new NHS: modern, dependable* was soon followed by a consultation paper, *A first class service: quality in the new NHS*,[56] which set out plans for improving and maintaining standards of excellence for clinical care, using a process of clinical governance as the means for exacting accountability.[57] It is encouraging that this publication pays great attention to continuing professional development and lifelong learning for all health service professionals as an essential factor in achieving quality assurance. This theme is carried further in the new NHS human resources strategy paper, *Working together: securing a quality workforce for the NHS*.[57] This document highlights the importance of workforce planning, skills development, improving the quality of working life and providing adequate management support.

These developments have been followed by clear policy statements in the new nursing strategy for England, *Making a difference: strengthening the nursing, midwifery and health visiting contribution to health and healthcare*.[58] The term 'nurse-led care' received a new boost from the publication of this strategy, which refers to increased levels of decision-making and gives a number of examples, although not mentioning pre-operative assessment specifically.

The role of the UKCC in recognising higher levels of nursing practice

Throughout the past decade the statutory body for the nursing professions has been trying to clarify the differing levels of practice. As long ago as 1990, the UKCC announced the setting up of the Post-Registration Education and Practice (or PREP) project aimed at raising standards for practice and education beyond registration.[59]

In 1994, the UKCC described three levels of practice which may follow registration as a nurse: primary, relating to the period immediately after registration, specialist and advanced nursing practice.[60] In the same policy document, the UKCC said:

> "Specialist practitioners will exercise higher levels of judgement, discretion and clinical decision making. They will be able to monitor and improve standards through supervision of practice, clinical audit, provision of skilled professional leadership, and the development of practice through research, teaching and support of professional colleagues."[60]

The UKCC also said that such specialist practitioners should be educated to first degree level.

In a statement in 1995, the UKCC referred to advanced nursing practice, differentiating it from specialist practice, but denying any hierarchical relationship between the two:[61]

> "Advanced practice is not an additional layer of practice to be added to specialist practice. Advanced nursing practice is concerned with:
>
> - adjusting the boundaries for the development of future practice
> - pioneering and developing new roles which are responsive to changing needs
> - advancing clinical practice, research and education to enrich nursing practice as a whole
> - contributing to health policy and management and the determination of health needs
> - continuing the development of the professions in the interests of patients, clients and health services."[61]

The UKCC recognised that many practitioners were acquiring advanced skills and undertaking studies that were likely to be at second degree (Masters and PhD) level. The UKCC promised to review these developments regularly with a view to considering the recording of such qualifications in due course.

Following these statements, the UKCC continued their efforts to produce a set of standards for both levels of practice. However, in March 1997, it decided to set standards only for specialist and not advanced practice.[62] The UKCC then set up another working group to see how the existing framework for specialist practice could embrace nurse practitioners and clinical nurse specialists.[63] The group issued a paper stressing the need to develop appropriate assessment strategies to enable recognition of clinical practice and to provide an award that is practice-led with underpinning

supportive education.[64] Recommendations were made to the UKCC to take forward a work programme to articulate more clearly the level of practice, how to assess it, how to regulate it and how to communicate its meaning more clearly as well as evaluate its evolution. That work has progressed to the stage of a pilot study to test the recognition for higher-level practitioners. Since 1 November 1998, all those intending to record a specialist practitioner qualification must have completed a programme that is at no less than first degree level over a duration of no less than an academic year, made up of 50% theory and 50% practice, and designed to meet specialist practitioner learning outcomes.[65]

Recent research on nurses in innovative roles

Two recent nationally funded studies have separately identified issues relating to post-registration nursing education for nurses in innovative roles, such as nurse practitioners, clinical nurse specialists and pre-operative assessment nurses. Both studies were funded by the Department of Health Human Resources Initiative and began in 1996. The first of these, *Exploring new roles in practice: implications of developments within the clinical team* (the ENRiP study),[43] lasted almost 3 years. The second, *Realising specialist and advanced nursing practice: establishing the parameters of and identifying the competencies for 'nurse practitioner' roles and evaluating programmes of preparation*,[66] took 27 months. Issues of importance to health-care educators and managers revealed in the studies included the following.

- The relevance of and necessity for at least degree level qualifications for these roles.
- The need for preparation for the roles to include a planned and assessed clinical component.
- The necessity for continuing professional development following initial preparation and for a period of preceptorship following education.
- The presence of mismatches between the training required and the courses selected.
- The failure of managers both to plan training around their service development strategies and to evaluate it following investment in training for staff.
- Marked regional differences in the support given to funding the training required in order to prepare practitioners for many of these roles; this led to inequitable access to courses.

Implications of findings for nursing practice, education and management

The results of this study show an approximate equivalence of performance between PRHOs and ATNs as far as the safety of patients is concerned (at least where enough clinical experience was available to consolidate competence), and also approximate cost neutrality. Patient acceptance of pre-operative assessment by nurses has also been demonstrated, with some reservations regarding preparation for surgery in potentially life-threatening conditions. Staff acceptance appears to vary; if the practice becomes more widespread, there will need to be very careful local and national preparation to ensure a receptive climate for change. In view of the need to reduce the amount of PRHO time spent on repetitive procedures, it is clearly justified to suggest an increase in the number of schemes to provide 'nurse-led' pre-operative assessment. However, these must be clearly differentiated from schemes in which physical examination is still a medical responsibility, as the educational requirements are much greater.

Centres considering such schemes should look closely at the supply of well-trained and experienced nurses in the local areas where such schemes are to be introduced, in order to maintain staffing levels for existing services and to preserve standards of nursing care. They should also consider the provision of educational courses, together with sufficient funding for such courses, including the provision of cover for nurses while they are seconded to them.

This study demonstrates clearly the need for sufficient workload to allow nurses to maintain their skills in taking histories from and examining patients. However, at centres where true 'nurse-led' pre-operative assessment is carried out, there must still be opportunities for junior doctors to learn and practice these skills; this learning should be properly structured and assessed.

It is also very important for management arrangements to ensure maximum collaboration and communication between the medical and nursing professions. While to some extent ATNs will need to integrate with their surgical teams, so that continuity of care for patients may be improved, the ENRiP study[43] also showed the need for nurses who work in close partnership with medical teams to preserve and keep alive professional relationships within nursing.[67,68]

This avoids the danger of such nurses being shunted into a professional cul-de-sac that leads to loss of job satisfaction and problems with career progression.[69] Although some nurses may wish to continue in the role long term, many will wish to do it for a time, to consolidate their history taking and physical examination skills, before moving into nurse practitioner roles in accident and emergency or primary care. Others will become clinical nurse specialists in surgical specialities and it is likely that some will view it as part of the career progression to becoming a nurse consultant.[58]

Last, a strategic approach to the introduction of new nursing roles must be taken, in order to maintain quality of care and to prevent disagreements relating to areas of responsibility between different professional groups.

Chapter 8
Conclusions

This study is the first substantive randomised trial of nurse-led pre-operative assessment. The question of safety has been examined and a robust health economic evaluation has been performed. Although the trial did not reach its desired size, this does not impact upon the results obtained. The likely effect of under-recruitment would have been to introduce wider CIs around percentage differences, leading to uncertainty in equivalence: in only one instance, discussed below, did this happen. The results, therefore, stand.

This study demonstrates that the ATN and PRHO can conduct pre-operative assessment to an equivalent standard. This is the case whether or not the clinical research fellow's first assessment was used for the analysis or the clinical research fellow's assessment as altered by expert panels. Within this generalisation, however, there are some interesting differences. First, with regard to the history taking there was some uncertainty concerning equivalence. Although this might be explained by the low recruitment at one study site (only 236 of the 1874 patients in the study), meaning that the desired sample size was not achieved, examination of the data provides a better explanation. There was clearly variation in the ability of ATNs to take patient histories, one site being markedly different to the other two. This variation in competence should come as no surprise. Doctors vary in their ability to communicate and take histories, so it should not be surprising that the same applies to nurses.[70] The site in question was also the only non-teaching hospital; it is important to consider that the ability of ATNs to perform well at history taking and assessment may be affected by their workload and environment, as well as their basic competencies and quality of training. Based on these data, however, it is a reasonable conclusion that there is no reason to believe that the history being taken by ATNs is inferior, although variation in ability between nurses is inevitable.

With the exception of the variability in performance, the outcome of this part of the study was probably predictable. The history taken in this context is not aimed at making a diagnosis but rather at identifying significant problems that may be relevant to the patient's peri-operative care. As such, it is convenient to base this activity on a protocol, which it is relatively easy to learn from a background of clinical nursing. Diagnostic skill was not explicitly tested in this study.

With respect to the clinical examination, equivalence was formally established. The outcome of this aspect of the study was certainly less predictable. PRHOs take several years to acquire skills in diagnostic examination and for a nurse to reach a similar level of proficiency after a relatively short period of training may seem counter-intuitive. The explanation, in all probability, relates to the activity concerned. The aim of the examination in this setting is to identify abnormalities, specifically in the cardiovascular and respiratory systems, rather than produce a diagnostic formulation. Thus the ATN does not require the full range of clinical skills that a PRHO must have acquired in order to qualify but a more limited focused range of competencies. This study shows that such skills may be acquired during a relatively circumscribed but intense period of training.

With respect to the ordering of investigations, the omission of which would affect management, equivalence was demonstrated. However, with respect to the ordering of investigations in general, PRHOs performed significantly worse, ordering significantly more inappropriate investigation than the ATNs. The reason for this difference is easy to identify but harder to explain. Pre-operative investigations at all the centres in this study were largely determined by protocol. It is clear that the ATNs adhered to protocol, whereas the PRHOs did not. In part, the explanation for this may relate to the nature of training. Nurses are, in general, familiar with working to a protocol whereas medical undergraduates have little such experience. This outcome has cost implications, since investigations that are not indicated add to the total cost of patient care without improving its quality.

By the nature of this study, it was not possible for the clinical research fellows evaluating the assessments to be blinded to whether it was being performed by an ATN or a PRHO. It is therefore possible that there may have been bias, for instance, if the clinical research fellow, a doctor, had a preconception that PRHOs

would perform the assessment better than a nurse. The results of the study, examining the trial clinical research fellows' own assessments, do not suggest that this was the case. However, in order to exclude bias, the ATN/PRHO assessment and the clinical research fellow's assessment from a sample of the study population were given to the expert panel for assessment. The sample included all patients for whom there was an under-assessment that may have affected management, as well as a random sample in which the assessment was either considered to be either correct or to have deficiencies not affecting patient management. The expert panel reviewed the assessments from a different site and, because of the order in which they were given doctors' and nurses' assessments, bias was unlikely. The results of the expert panel suggest that there was no systematic bias. In most cases, judgement by the expert panel tended towards the conservative, cases being returned to the 'correct assessment' category more often than not.

It might be argued that neither ATNs nor PRHOs performed particularly well. Patients face a one-in-eight chance of a PRHO failing to detect something that might affect peri-operative management, and a one-in-ten chance of an ATN doing the same. There was approximately a one-in-five chance that a PRHO would order an unnecessary test and a one-in-eight chance that the ATN would do the same. The former finding means that anaesthetists cannot give up their role of being the final arbiter of patient eligibility for anaesthesia. The latter reflects a culture based on maximum sensitivity in the detection of abnormality rather than optimum performance.

One of the principal driving forces for the development of nurse assessment is the reduction in the availability of junior hospital doctors for the task of pre-operative clerking. With the emphasis in junior doctors' posts changing from service to training,[1] and the reduction in junior doctors hours,[2] there is clear pressure to reduce the number of repetitive tasks undertaken. The situation for most trusts is not whether it is optimal for doctors to perform pre-operative assessment but how the gap left by their non-availability may be filled.[3] The use of nurses to undertake these tasks is widespread already, even in the absence of formal evaluation.

In considering the implication of a change from doctor to nurse-based pre-operative assessment, it is necessary to consider the effects on the PRHOs, the nurses and the patients. Taking first the patient's perspective, there is obvious concern about removing the function of assessment from the consultant team managing the patient, as was the case in the services evaluated here. This may not be so important for routine minor and intermediate surgery but may have major implications for more complex surgical procedures. Lack of familiarity with the patient among the whole surgical team may adversely impact on patient care. In addition, the identification of an abnormality on pre-operative assessment does not guarantee that the result will be acted upon adequately; this study was not designed to show the efficiency with which information was passed downstream to the team managing the patient on the ward. It is self-evident that, unless the entire management process is integrated, the overall management of the patient is likely to be suboptimal. It is of even greater importance that the management of patients is fully planned in the outpatient setting and all significant problems identified. There may be less opportunity for problems related to the condition being treated, rather than the patient's fitness for operation, to be identified in a system that uses ATNs who are not fully integrated into the service. This is discussed further below. It is noteworthy that, in general terms, patients were happy to accept nurses conducting their pre-operative assessments.

With respect to the PRHO, there is the danger that they will lose familiarity with the patients being managed on the surgical unit and, with that, diminish their own learning experience. The pre-operative assessment of minor and some intermediate surgery certainly may be repetitive. However, knowledge and experience can be gained in a busy post that includes a lot of pre-operative assessment, and doctors also learn to become very effective in the management of their time. At centres where nurse-led pre-operative assessment is introduced, there must still be opportunity for junior doctors to learn and practise these skills. This learning should be properly structured and assessed. The PRHO may also learn a great deal from clerking patients who are undergoing complex major surgery. In addition, clerking provides an opportunity for the PRHO to develop a relationship with the patient, which may be extremely important if the postoperative stay is protracted and ward management complex.

Lastly, there are concerns for nursing staff recruited to the process of pre-operative assessment. In considering this, it is important

to emphasise again the nature of the ATNs involved in this study. There must be clear differentiation between schemes in which nurses conduct the entire pre-operative assessment with a requirement for a higher level of education and training, as in this study, and the common current model for pre-assessment clinics, at which physical examination is still a medical responsibility. The exact nature of the education required in the former case may be debated but it must approximately equate to a Masters degree level. Simply transferring a repetitive task from a PRHO to an ATN will not produce a satisfying job for a practitioner who, of necessity, is highly trained.[69] Career progression from this role is not obvious and, hence, recruitment and retention may present difficulties, bearing in mind the relative shortage of nursing staff.[8] Although some nurses may wish to continue in the role long term, many will do it for a time to consolidate their history taking and physical examination skills before moving into nurse practitioner roles in accident and emergency or primary care. Others will become clinical nurse specialists, with a wider role in the management of surgical patients that may include many tasks now commonly performed by doctors. Some will view it as part of the career progression to becoming a nurse consultant.

Economic evaluation suggests that the substitution of ATNs for PRHOs is unlikely to have significant cost implications for the NHS, even assuming that the nurses only remain in post for 1 year. Although this may well be the case for many, others may remain in post for longer and this would reduce the cost of the nurse-led service. By contrast, an important factor in the cost of the PRHO-based service is the excess of unnecessary investigations performed: cost saving could also be made by educating PRHOs to adhere to a protocol. This would act economically against ATNs. Overall, however, cost neutrality is a reasonable conclusion.

In conclusion, overall equivalence between ATNs and PRHOs in the process of pre-operative assessment has been demonstrated. There are variations in performance between ATNs that appear to mirror differences commonly observed between PRHOs. Further, it appears that it is possible, using a relatively circumscribed programme of intense training, to teach nurses the skills necessary to undertake pre-operative assessment. There is, therefore, a sufficient evidence base to say that, for all practical purposes, there is no contraindication to the development of nurse-led assessment in the UK. Whether this is a useful way of using skilled nursing staff or whether in career terms it will prove professionally satisfying is a separate issue.

Implications for practice

In this study, no reason has been found to inhibit an increase in the number of schemes providing 'nurse-led' pre-operative assessment. This, however, is subject to a number of strict criteria, as itemised below.

1. There must be clear differentiation between schemes in which nurses conduct the entire pre-operative assessment (as in OpCheck) and those in which physical examination is still a medical responsibility. The former will require a higher degree of preparation. In this study this was at Masters degree level but the precise requirements will depend on the study.
2. Logic dictates that there will need to be an adequate supply of well-trained and experienced nurses in the local areas where such schemes are to be introduced, in order to maintain staffing levels for existing services and preserve standards of nursing care.
3. Arrangements to meet the need (demonstrated in this study) for an adequate caseload for nurses undertaking this role will be necessary. It should not be an occasional function.
4. At centres where true 'nurse-led' pre-operative assessment is carried out, there must still be opportunity for junior doctors to learn and practice these skills; this learning should be properly structured and assessed.
5. Management arrangements must ensure maximum collaboration and communication between the medical and nursing professions, so that continuity of care for patients may be improved.
6. Although a substantial error rate was found among these nurses, this was no worse than that found among PRHOs. Nurses working in these roles should be subject to local clinical governance arrangements.

Recommendations for future research

Further research is needed in the following areas:

- the extent and type of training needed for nurses undertaking the pre-operative assessment role
- the use, costs and benefits of routine pre-operative testing.

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Appendix 1

Consort statements for the OpCheck trial

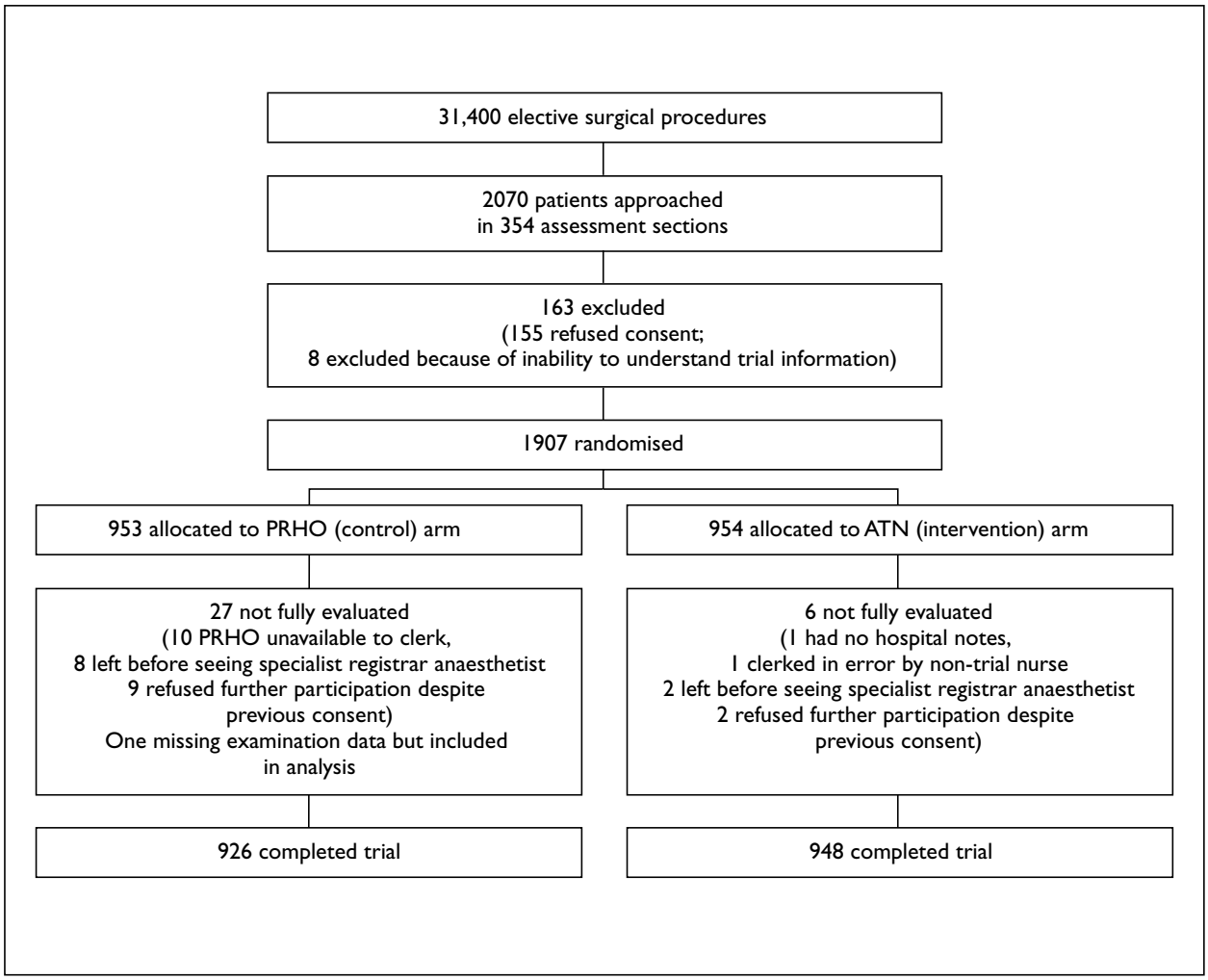

FIGURE 4 *Consort statement for the OpCheck trial (all patients)*

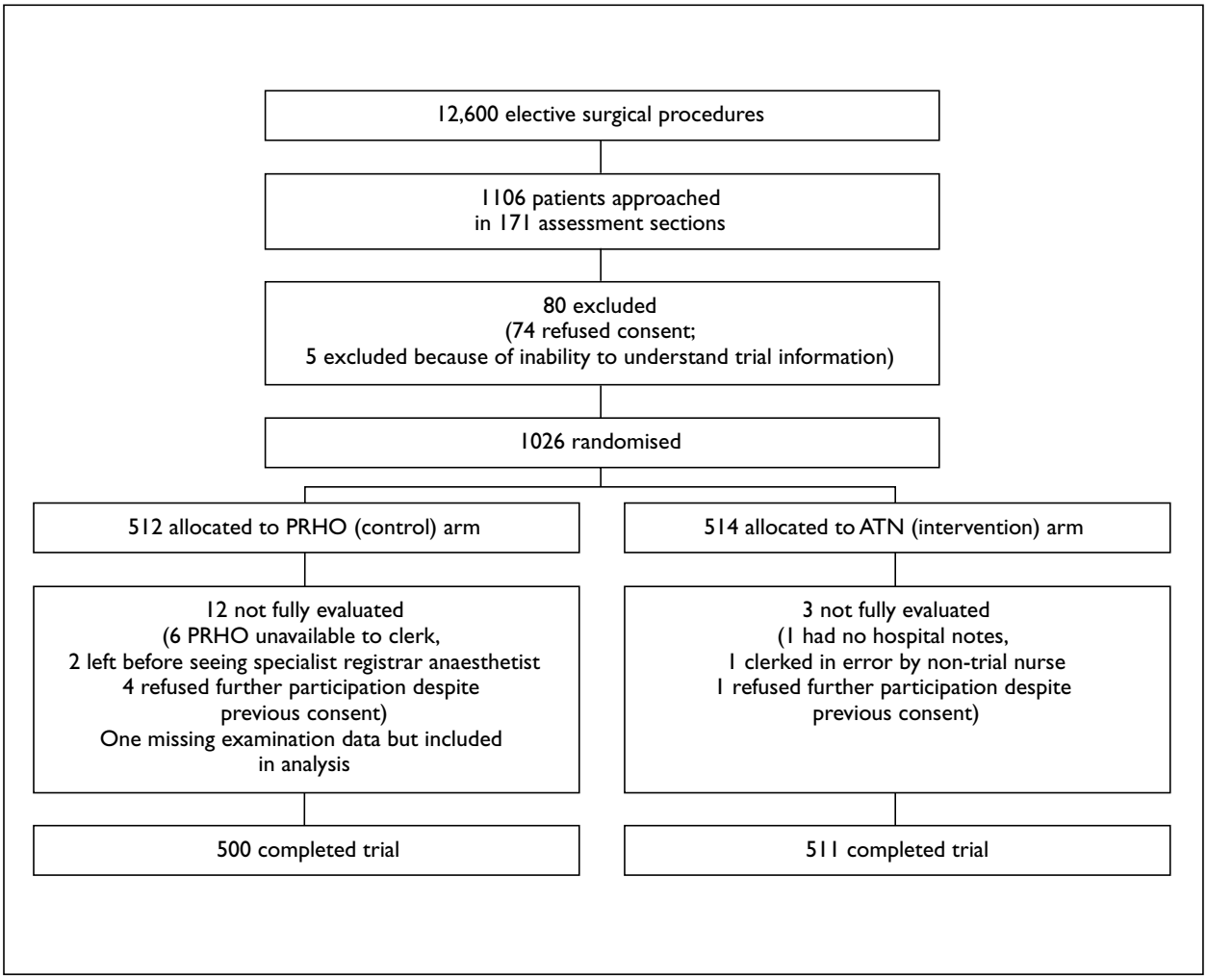

FIGURE 5 *Consort statement for OpCheck trial (Southampton patients)*

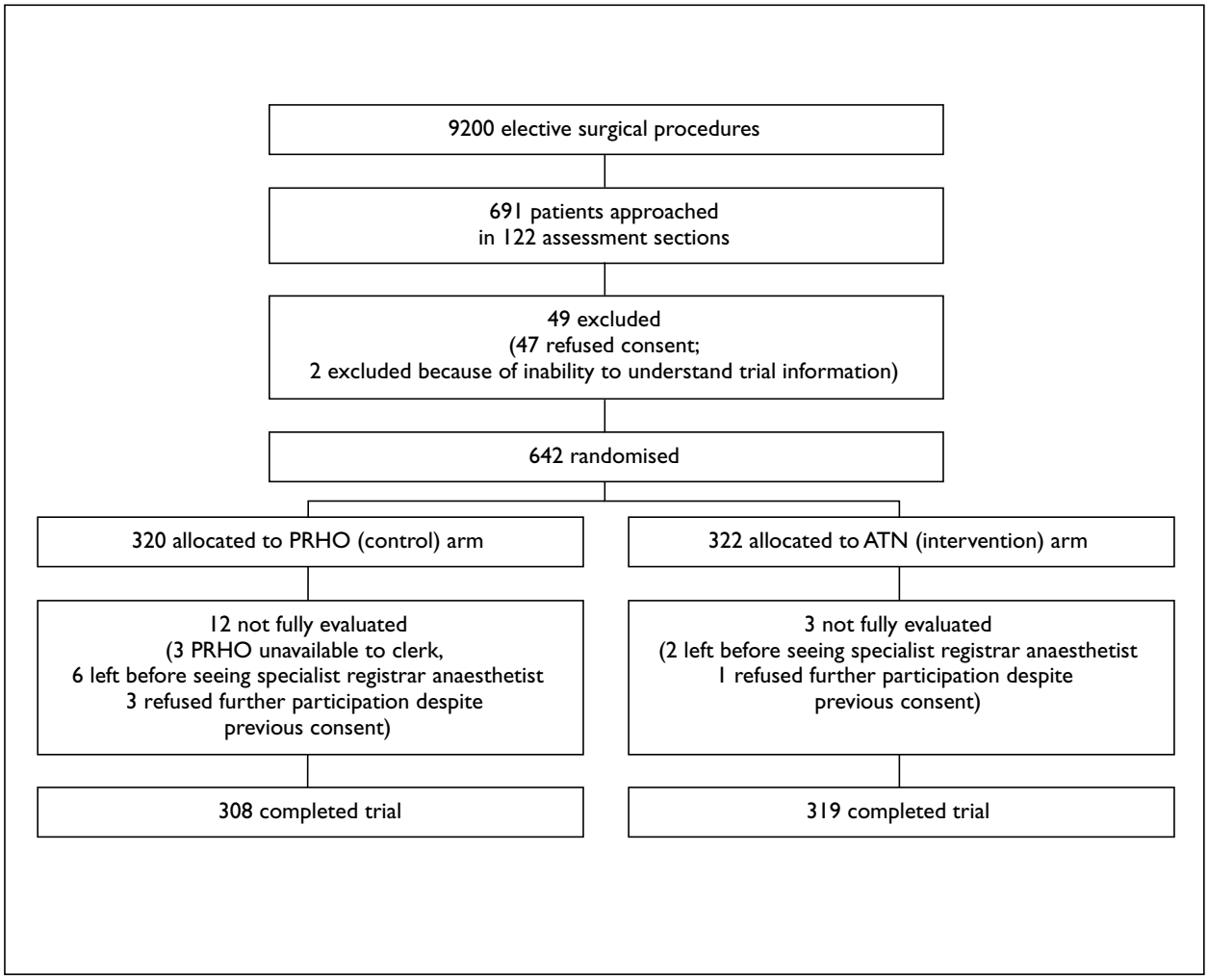

FIGURE 6 *Consort statement for OpCheck trial (Sheffield patients)*

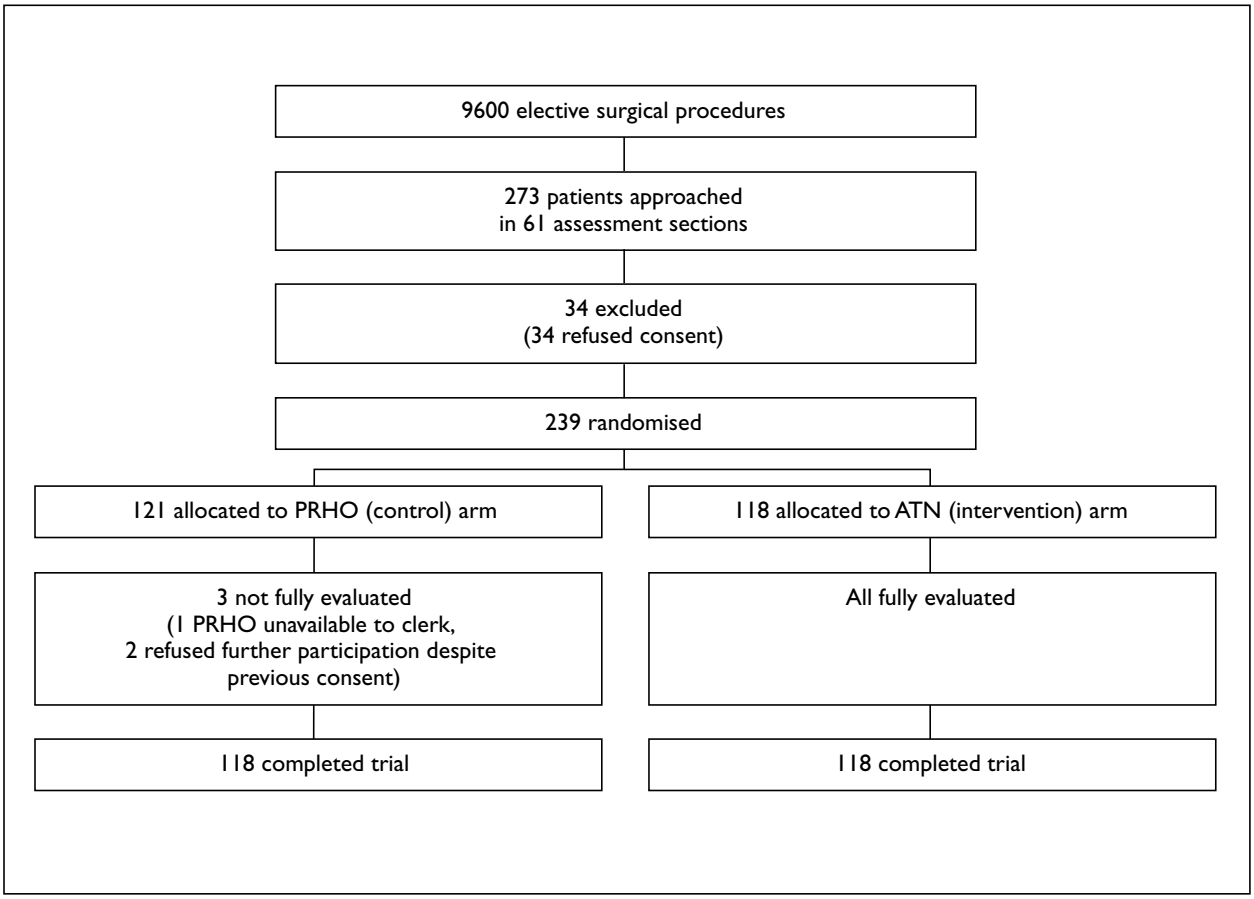

FIGURE 7 *Consort statement for OpCheck trial (Doncaster patients)*

Appendix 2

Raw data

Results before review by expert panel

TABLE 13 *Numbers of cases in each of four categories according to history taking (judged by clinical research fellow) by study arm: all centres*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	2	2
Correct	820	847	1667
Under-assessed, not affecting management	53	35	88
Under-assessed, possibly affecting management	53	64	117
Total	**926**	**948**	**1874**

TABLE 14 *Numbers of cases in each of four categories according to examination (judged by clinical research fellow) by study arm: all centres*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	1	6	7
Correct	826	879	1705
Under-assessed, not affecting management	52	23	75
Under-assessed, possibly affecting management	46	40	86
Missing	1	–	1
Total	**926**	**948**	**1874**

TABLE 15 *Numbers of cases in each of four categories according to diagnostic tests ordered (judged by clinical research fellow) by study arm: all centres*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	206	113	319
Correct	576	685	1261
Under-assessed, not affecting management	79	91	170
Under-assessed, possibly affecting management	71	65	136

*Note: The total number of cases is more than 1874, since it was possible for tests to be both over- **and** under-ordered in an individual case*

TABLE 16 *Numbers of cases in each of four categories according to history taking (judged by clinical research fellow) by study arm (Southampton ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	2	2
Correct	426	471	947
Under-assessed, not affecting management	42	12	54
Under-assessed, possibly affecting management	32	26	58
Total	**500**	**511**	**1011**

TABLE 17 *Numbers of cases in each of four categories according to examination (judged by clinical research fellow) by study arm (Southampton ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	1	6	7
Correct	465	482	947
Under-assessed, not affecting management	11	8	19
Under-assessed, possibly affecting management	22	15	37
Missing	1	–	1
Total	**500**	**511**	**1011**

TABLE 18 *Numbers of cases in each of four categories according to diagnostic tests ordered (judged by clinical research fellow) by study arm (Southampton ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	127	65	192
Correct	311	386	697
Under-assessed, not affecting management	36	37	73
Under-assessed, possibly affecting management	32	29	61

*Note: The total number of cases is more than 1011, since it was possible for tests to be both over- **and** under-ordered in an individual case*

TABLE 19 *Numbers of cases in each of four categories according to history taking (judged by clinical research fellow) by study arm (Sheffield ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	–	–
Correct	283	286	569
Under-assessed, not affecting management	8	15	23
Under-assessed, possibly affecting management	17	18	35
Total	**308**	**319**	**627**

TABLE 20 *Numbers of cases in each of four categories according to examination (judged by clinical research fellow) by study arm (Sheffield ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	–	–
Correct	261	297	558
Under-assessed, not affecting management	30	10	40
Under-assessed, possibly affecting management	17	12	29
Total	**308**	**319**	**627**

TABLE 21 *Numbers of cases in each of four categories according to diagnostic tests ordered (judged by clinical research fellow) by study arm (Sheffield ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	57	33	90
Correct	186	217	403
Under-assessed, not affecting management	34	46	80
Under-assessed, possibly affecting management	31	23	54

*Note: The total number of cases could have been more than 627, since it was possible for tests to be both over- **and** underordered in an individual case*

TABLE 22 *Numbers of cases in each of four categories according to history taking (judged by clinical research fellow) by study arm (Doncaster ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	–	–
Correct	111	90	201
Under-assessed, not affecting management	3	8	11
Under-assessed, possibly affecting management	4	20	24
Total	**118**	**118**	**236**

TABLE 23 *Numbers of cases in each of four categories according to examination (judged by clinical research fellow) by study arm (Doncaster ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	–	–
Correct	100	100	200
Under-assessed, not affecting management	11	5	16
Under-assessed, possibly affecting management	7	13	20
Total	**118**	**118**	**236**

TABLE 24 *Numbers of cases in each of four categories according to diagnostic tests ordered (judged by clinical research fellow) by study arm (Doncaster ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	22	15	37
Correct	79	82	161
Under-assessed, not affecting management	9	8	17
Under-assessed, possibly affecting management	8	13	21

*Note: The total number of cases could have been more than 236, since it was possible for tests to be both over- **and** under-ordered in an individual case*

Results after review by expert panel

TABLE 25 *Numbers of cases in each of four categories according to history taking (judged by clinical research fellow) by study arm: all sites*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	2	2
Correct	831	859	1690
Under-assessed, not affecting management	51	37	88
Under-assessed, possibly affecting management	44	50	94
Total	**926**	**948**	**1874**

TABLE 26 *Numbers of cases in each of four categories according to examination (judged by clinical research fellow) by study arm: all sites*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	1	6	7
Correct	821	881	1702
Under-assessed, not affecting management	56	26	82
Under-assessed, possibly affecting management	47	35	82
Missing	1	–	1
Total	**926**	**948**	**1874**

TABLE 27 *Numbers of cases in each of four categories according to diagnostic tests ordered (judged by clinical research fellow) by study arm: all sites*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	205	116	321
Correct	585	695	1280
Under-assessed, not affecting management	73	85	158
Under-assessed possibly affecting management	69	59	128

*Note: The total number of cases is more than 1874, since it was possible for tests to be both over- **and** under-ordered in an individual case*

TABLE 28 *Number of cases in each of four categories according to history taking, (judged by clinical research fellow) by study arm (Southampton ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	2	2
Correct	433	477	910
Under-assessed, not affecting management	40	16	56
Under-assessed, possibly affecting management	27	16	43
Total	**500**	**511**	**1011**

TABLE 29 *Numbers of cases in each of four categories according to examination (judged by clinical research fellow) by study arm (Southampton ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	1	6	7
Correct	462	482	944
Under-assessed, not affecting management	14	11	25
Under-assessed, possibly affecting management	22	12	34
Missing	1	–	1
Total	**500**	**511**	**1011**

TABLE 30 *Numbers of cases in each of four categories according to diagnostic tests ordered (judged by clinical research fellow) by study arm (Southampton ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	126	67	193
Correct	311	387	698
Under-assessed, not affecting management	32	35	67
Under-assessed, possibly affecting management	37	28	65

*Note: The total number of cases is more than 1011, since it was possible for tests to be both over- **and** under-ordered in an individual case*

TABLE 31 *Numbers of cases in each of four categories according to history taking (judged by clinical research fellow) by study arm (Sheffield ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	–	–
Correct	285	288	573
Under-assessed, not affecting management	8	14	22
Under-assessed, possibly affecting management	15	17	32
Total	**308**	**319**	**627**

TABLE 32 *Number of cases in each of four categories according to examination (judged by clinical research fellow) by study arm (Sheffield ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	–	–
Correct	260	298	558
Under-assessed, not affecting management	31	10	41
Under-assessed, possibly affecting management	17	11	28
Total	**308**	**319**	**627**

TABLE 33 *Number of cases in each of four categories according to diagnostic tests ordered (judged by clinical research fellow) by study arm (Sheffield ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	57	34	91
Correct	194	223	417
Under-assessed, not affecting management	32	42	74
Under-assessed, possibly affecting management	25	21	46

*Note: The total number of cases is more than 627 since it was possible for tests to be both over- **and** under-ordered in an individual case*

TABLE 34 *Number of cases in each of four categories according to history taking (judged by clinical research fellow) by study arm (Doncaster ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	–	–
Correct	113	94	207
Under-assessed, not affecting management	3	7	10
Under-assessed, possibly affecting management	2	17	19
Total	**118**	**118**	**236**

TABLE 35 *Number of cases in each of four categories according to examination (judged by clinical research fellow) by study arm (Doncaster ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	–	–	–
Correct	99	101	200
Under-assessed, not affecting management	11	5	16
Under-assessed, possibly affecting management	8	12	20
Total	**118**	**118**	**236**

TABLE 36 *Number of cases in each of four categories according to diagnostic tests ordered (judged by clinical research fellow) by study arm (Doncaster ATN)*

	Assessor		Total
	PRHO	**ATN**	
Over-assessed	22	15	37
Correct	80	85	165
Under-assessed, not affecting management	9	8	17
Under-assessed, possibly affecting management	7	10	17

Note: The total number of cases could have been more than 236 since it was possible for tests to be both over- ***and*** *under-ordered in an individual case*

Appendix 3

Parameter distributions used in the Monte Carlo simulation (Chrystal Ball report)

Forecasts

TABLE 37 *Forecast: PHRO cost per patient*

Summary			
Display range: £5.00–45.00			
Entire range: £5.14–56.70			
After 25,000 trials, standard error of the mean (SEM) = £0.05			
Statistics		***Percentiles***	***Cost per patient (£)***
Number of trials	25,000	0%	5.14
Mean cost	£19.03	10%	10.52
Median cost	£16.66	20%	12.11
Mode	–	30%	13.43
Standard deviation (SD)	£8.66	40%	14.90
Variance	£75.00	50%	16.66
Skewness	1.27	60%	18.89
Kurtosis	4.23	70%	21.32
Coefficient of variability	0.46	80%	24.27
Range minimum	£5.14	90%	32.47
Range maximum	£56.70	100%	56.70
Range width	£51.56		
SEM	£0.05		

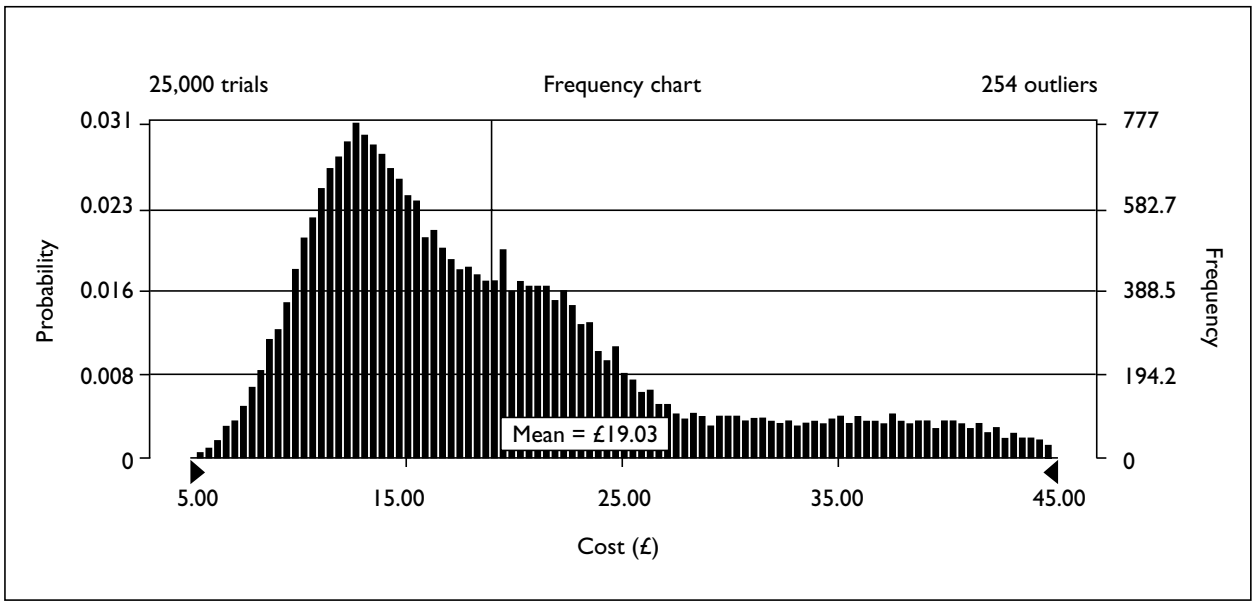

FIGURE 8 *Forecast: PRHO cost per patient*

TABLE 38 *Forecast: ATN cost per patient*

Summary			
Display range: £0.00–40.00			
Entire range: £3.23–50.42			
After 25,000 trials, SEM = £0.05			
Statistics		***Percentiles***	***Cost per patient (£)***
Number of trials	25,000	0%	3.23
Mean cost	£19.04	10%	11.17
Median cost	£17.38	20%	13.07
Mode	–	30%	14.52
SD	£7.56	40%	15.97
Variance	£57.14	50%	17.38
Skewness	1.12	60%	19.03
Kurtosis	4.06	70%	21.05
Coefficient of variability	0.40	80%	23.89
Range minimum	£3.23	90%	30.42
Range maximum	£50.42	100%	50.42
Range width	£47.18		
SEM	£0.05		

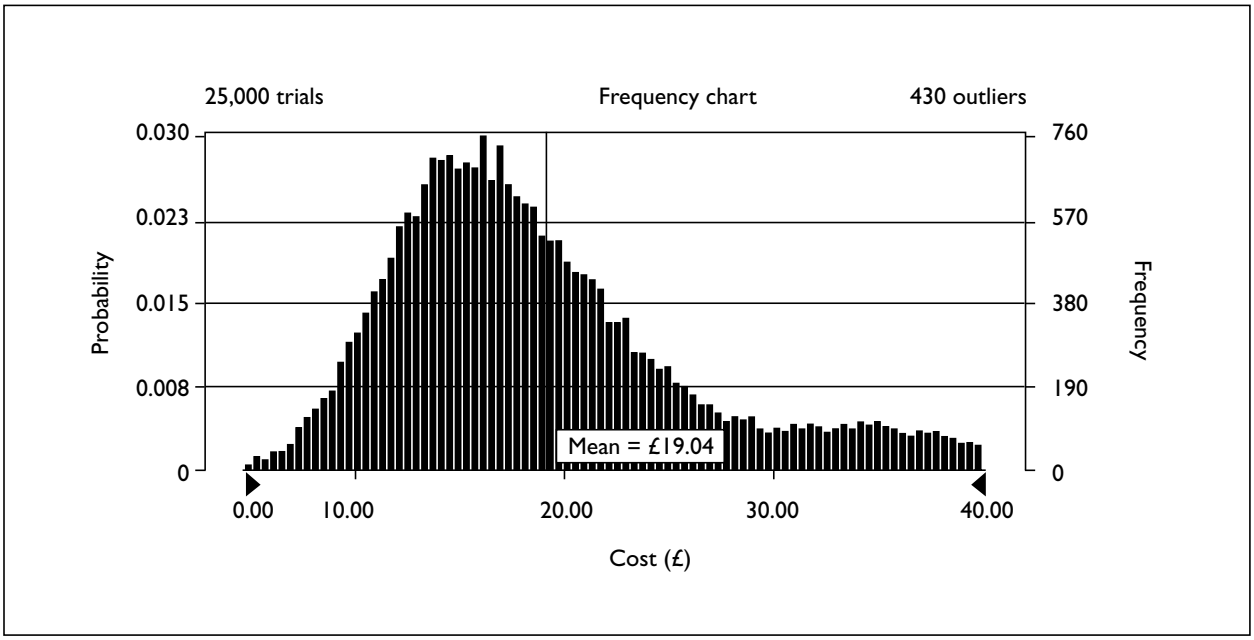

FIGURE 9 *Forecast: ATN cost per patient*

TABLE 39 *Forecast: cost difference*

Summary			
Display range: –£50.00 to £30.00			
Entire range: –£45.95 to £41.82			
After 25,000 trials, SEM = £0.07			
Statistics		***Percentiles***	***Cost difference (£)***
Number of trials	25,000	0%	–45.95
Mean cost difference	£0.02	10%	–14.78
Median cost difference	£0.49	20%	–8.18
Mode	–	30%	–4.58
SD	£11.51	40%	–1.83
Variance	£132.50	50%	0.49
Skewness	–0.21	60%	2.78
Kurtosis	3.59	70%	5.30
Coefficient of variability	707.27	80%	8.41
Range minimum	–£45.95	90%	13.73
Range maximum	£41.82	100%	41.82
Range width	£87.77		
SEM	£0.07		

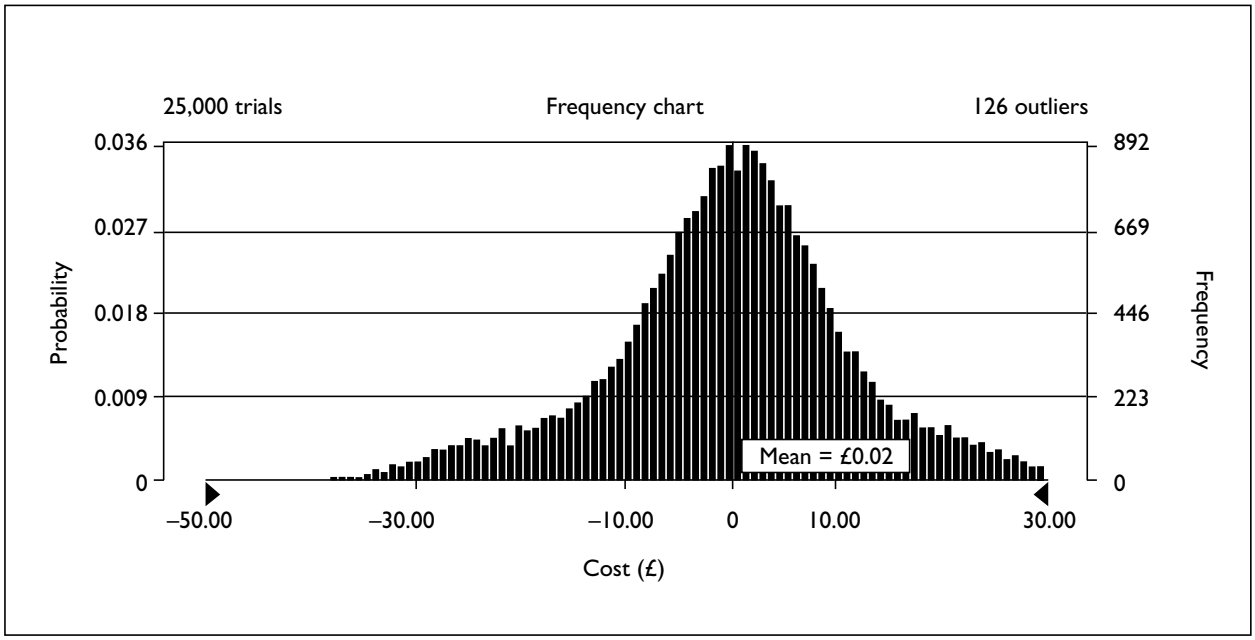

FIGURE 10 *Forecast: cost difference*

Assumptions

TABLE 40 *Assumption: expected cost of operations – ATN*

	Cost (£)	Relative probability
Custom distribution with parameters		
Single point	548.93	0.064693
Single point	556.10	0.093202
Single point	651.83	0.015351
Single point	765.61	0.046053
Single point	774.03	0.190789
Single point	803.34	0.099781
Single point	993.97	0.054825
Single point	1253.00	0.063596
Single point	1438.66	0.047149
Single point	2000.73	0.210526
Single point	2938.00	0.003289
Single point	3431.95	0.032895
Single point	3990.97	0.043860
Single point	4374.57	0.033991
Total relative probability		1.000000
Mean value in simulation: £1433.76		

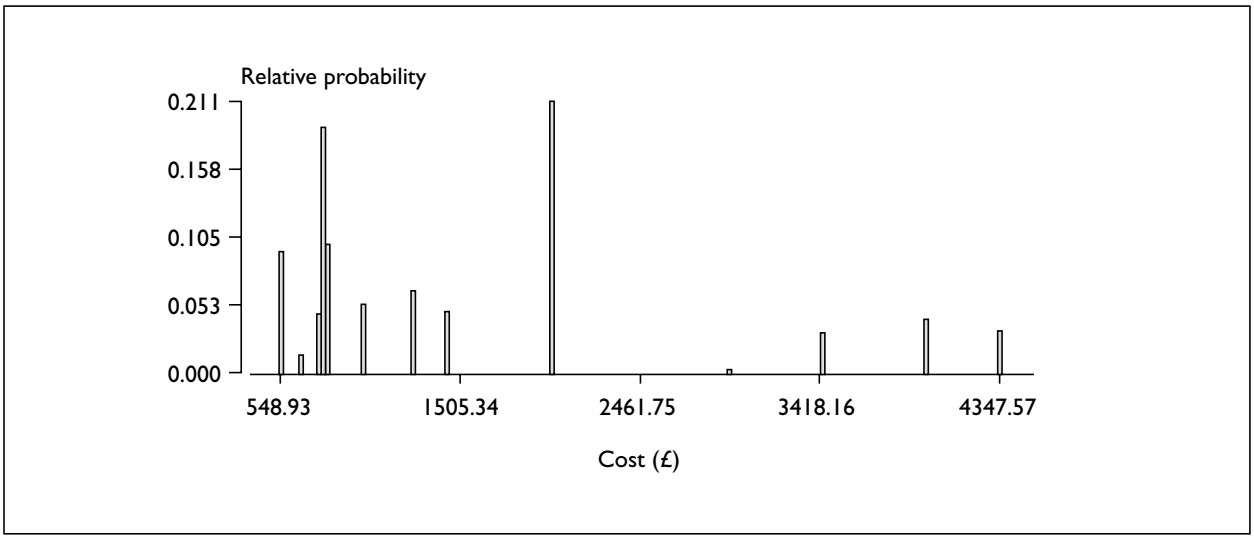

FIGURE 11 *Assumption: expected cost of operations – ATN*

TABLE 41 *Assumption: expected cost of operations – PRHO*

	Cost (£)	Relative probability
Custom distribution with parameters		
Single point	548.93	0.073171
Single point	556.10	0.104984
Single point	651.83	0.008484
Single point	765.61	0.034995
Single point	774.03	0.177094
Single point	803.34	0.102863
Single point	993.97	0.056204
Single point	1253.00	0.075292
Single point	1438.66	0.038176
Single point	2000.73	0.208908
Single point	3431.95	0.032874
Single point	3990.97	0.039236
Single point	4374.57	0.047720
Total relative probability		1.000000
Mean value in simulation: £1443.93		

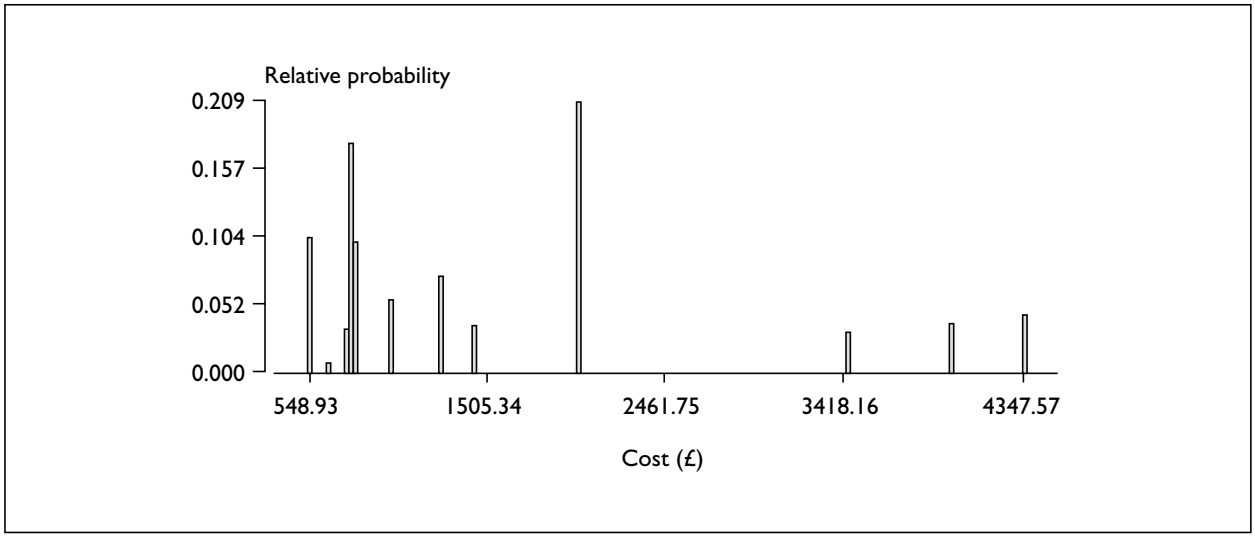

FIGURE 12 *Assumption: expected cost of operations – PRHO*

TABLE 42 *Assumption: duration of examination – anaesthetist*

Normal distribution with parameters: mean (SD) (minutes)	31.20 (12.81)
Selected range (minutes)	0.00–56.82
Mean value in simulation (minutes)	30.78

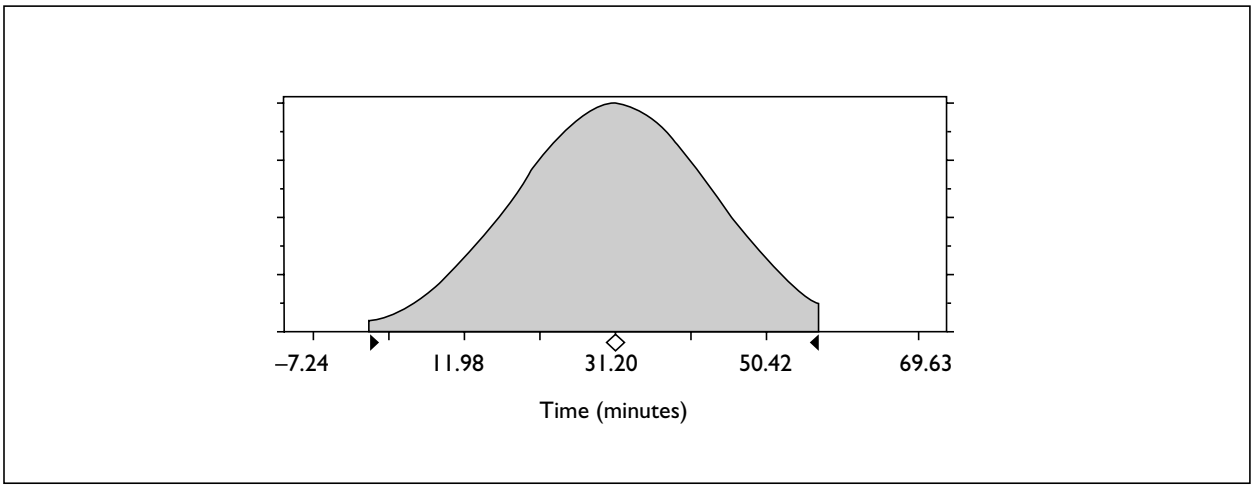

FIGURE 13 *Assumption: duration of examination – anaesthetist*

TABLE 43 *Assumption: duration of examination – ATN*

Normal distribution with parameters: mean (SD) (minutes)	31.20 (12.81)
Selected range (minutes)	0.00–56.82
Mean value in simulation (minutes)	30.78

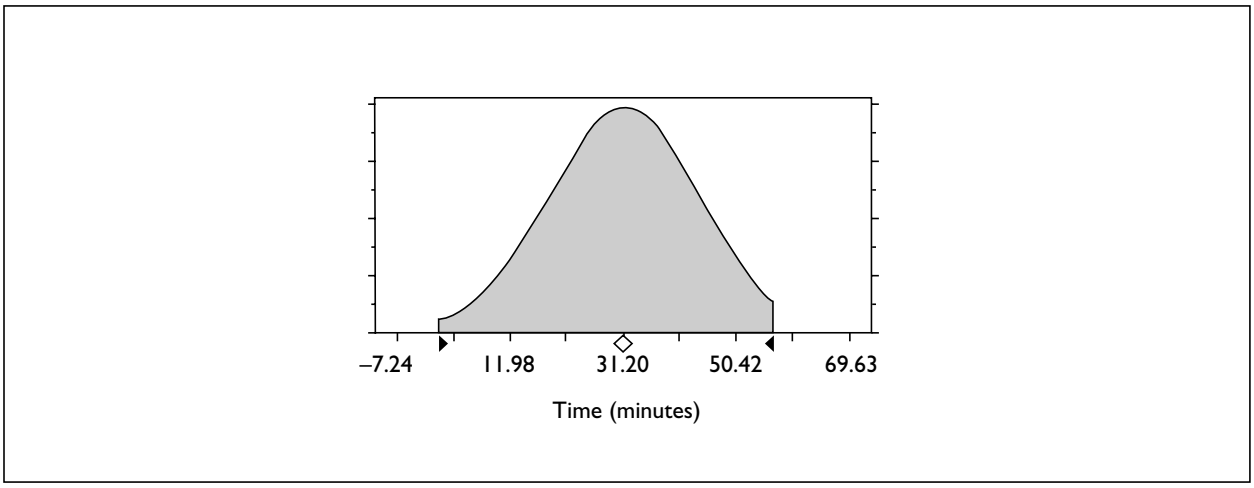

FIGURE 14 *Assumption: duration of examination – ATN*

TABLE 44 *Assumption: duration of examination – PRHO*

Normal distribution with parameters: mean (SD) (minutes)	28.98 (13.20)
Selected range (minutes)	0.00–55.38
Mean value in simulation (minutes)	28.70

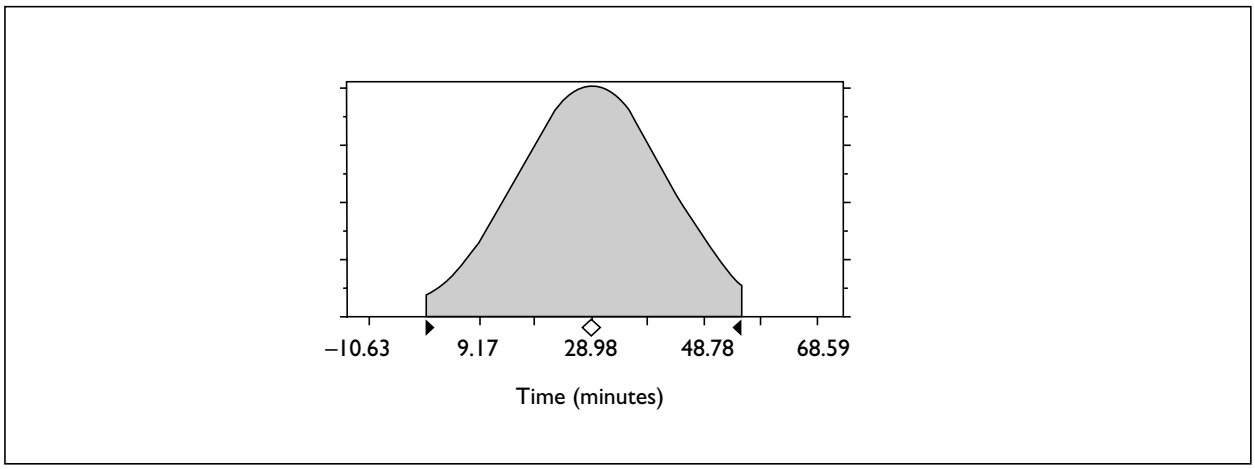

FIGURE 15 *Assumption: duration of examination – PRHO*

TABLE 45 *Assumption: expected cost of unnecessary tests – ATN*

	Cost (£)	Relative probability
Custom distribution with parameters		
Single point	1.58	10.00
Single point	2.64	12.00
Single point	2.90	2.00
Single point	3.20	6.00
Single point	4.22	3.00
Single point	5.11	3.00
Single point	5.75	3.00
Single point	6.44	1.00
Single point	7.03	3.00
Single point	7.75	1.00
Single point	9.55	1.00
Single point	13.19	5.00
Single point	36.00	9.00
Single point	37.58	2.00
Single point	40.22	1.00
Total relative probability		62.00
Mean value in simulation: £10.78		

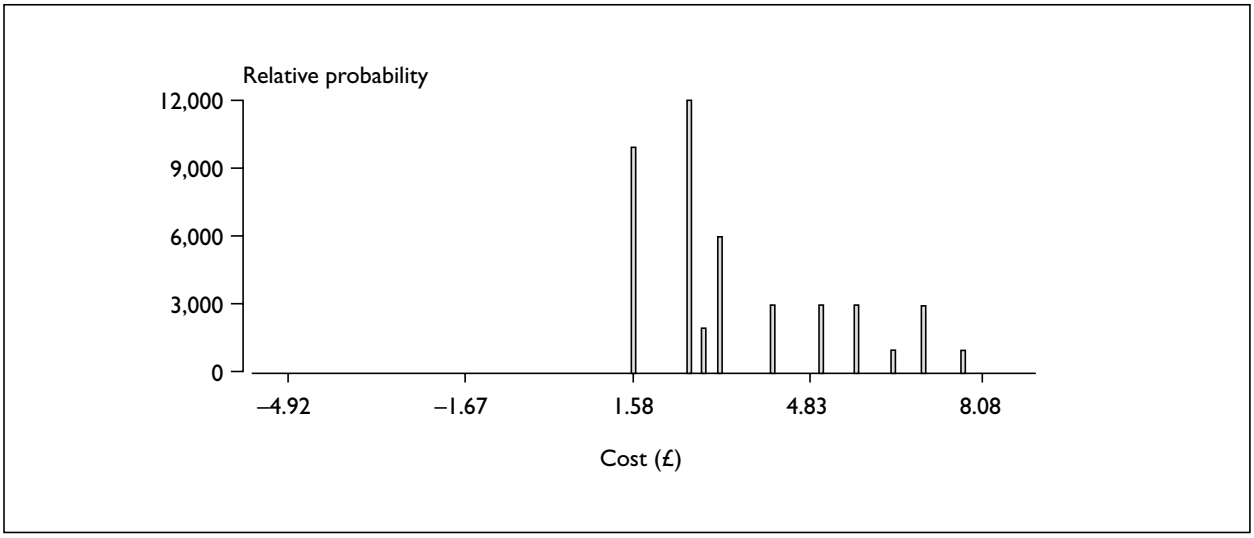

FIGURE 16 *Assumption: expected cost of unnecessary tests – ATN*

TABLE 46 *Assumption: expected cost of unnecessary tests – PRHO*

	Cost (£)	Relative probability
Custom distribution with parameters		
Single point	1.58	0.114943
Single point	2.64	0.080460
Single point	2.90	0.091954
Single point	3.20	0.022989
Single point	3.80	0.034483
Single point	4.22	0.126437
Single point	4.97	0.011494
Single point	5.11	0.011494
Single point	5.53	0.011494
Single point	5.75	0.068966
Single point	5.84	0.011494
Single point	6.44	0.011494
Single point	6.55	0.022989
Single point	7.03	0.034483
Single point	7.42	0.034483
Single point	7.75	0.022989
Single point	8.02	0.011494
Single point	8.39	0.011494
Single point	8.61	0.011494
Single point	9.67	0.022989
Single point	9.97	0.011494
Single point	10.83	0.011494
Single point	12.57	0.011494
Single point	13.19	0.022989
Single point	15.42	0.011494
Single point	18.94	0.011494
Single point	25.33	0.011494
Single point	36.00	0.068966
Single point	38.64	0.068966
Total relative probability		1.000000
Mean value in simulation: £10.09		

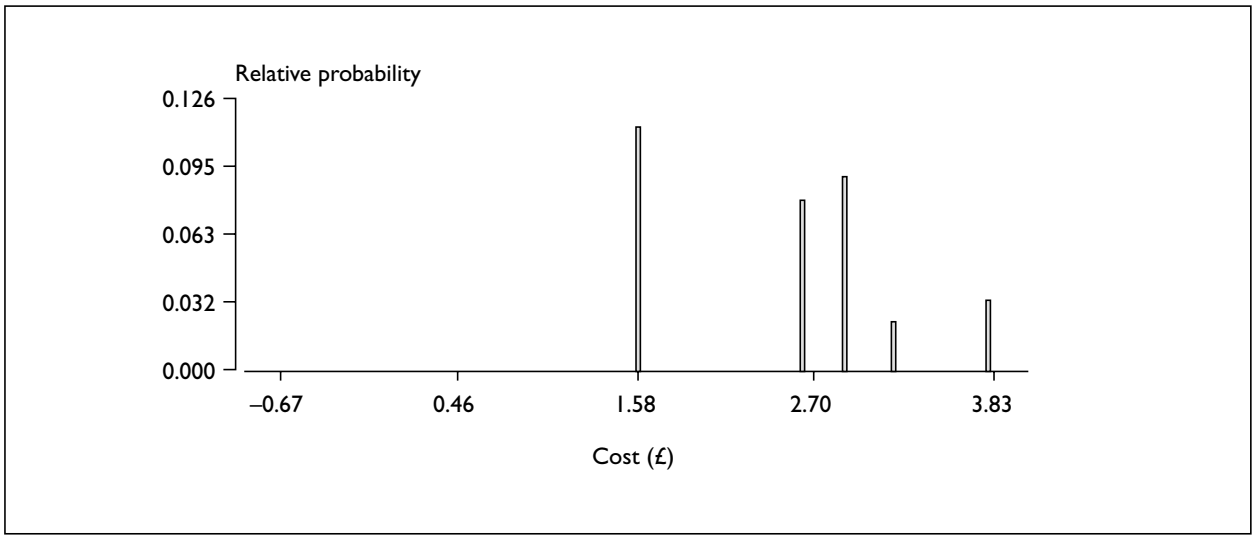

FIGURE 17 *Assumption: expected cost of unnecessary tests – PRHO*

TABLE 47 *Assumption: expected costs of tests not ordered – ATN*

	Cost (£)	Relative probability
Custom distribution with parameters		
Single point	1.58	0.111111
Single point	2.33	0.022222
Single point	2.64	0.055556
Single point	2.90	0.033333
Single point	3.20	0.055556
Single point	3.80	0.188889
Single point	4.22	0.011111
Single point	5.11	0.011111
Single point	5.53	0.011111
Single point	5.75	0.100000
Single point	5.84	0.011111
Single point	6.13	0.011111
Single point	7.03	0.011111
Single point	8.95	0.011111
Single point	13.19	0.055556
Single point	16.99	0.011111
Single point	18.75	0.022222
Single point	36.00	0.144444
Single point	37.58	0.022222
Single point	38.33	0.011111
Single point	39.20	0.011111
Single point	39.80	0.055556
Single point	41.11	0.011111
Single point	49.19	0.011111
Total relative probability		1.000000
Mean value in simulation: £13.91		

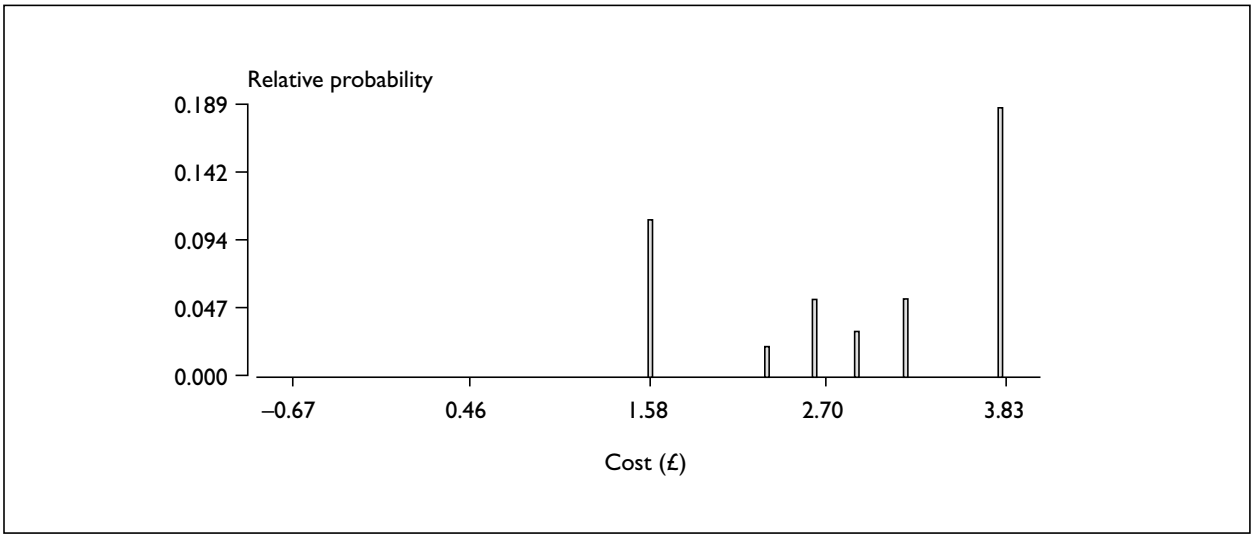

FIGURE 18 *Assumption: expected cost of tests not ordered – ATN*

TABLE 48 *Expected cost of test not ordered – PRHO*

	Cost (£)	Relative probability
Custom distribution with parameters		
Single point	1.58	0.085366
Single point	2.33	0.036585
Single point	2.64	0.048780
Single point	3.20	0.060976
Single point	3.80	0.109756
Single point	4.22	0.060976
Single point	4.97	0.012195
Single point	5.11	0.036585
Single point	5.38	0.012195
Single point	5.75	0.048780
Single point	7.03	0.036585
Single point	7.42	0.012195
Single point	8.02	0.012195
Single point	10.83	0.102195
Single point	10.95	0.012195
Single point	13.19	0.073171
Single point	18.75	0.012195
Single point	21.27	0.012195
Single point	28.65	0.012195
Single point	36.00	0.207317
Single point	39.80	0.048780
Single point	39.91	0.012195
Single point	41.11	0.012195
Single point	41.75	0.012195
Total relative probability		1.000000
Mean value in simulation: £15.36		

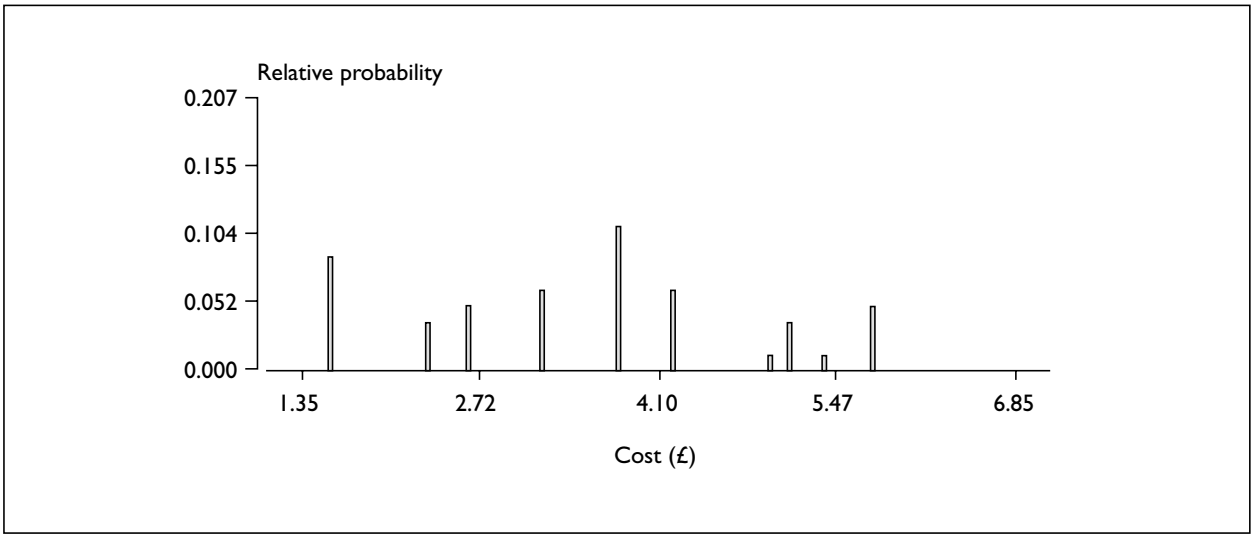

FIGURE 19 *Assumption: expected cost of tests not ordered – PRHO*

TABLE 49 *Assumption: probability of over-ordering tests – PRHO*

Triangular distribution with parameters	
Minimum	0.19
Likeliest	0.22
Maximum	0.24
Selected range	0.19–0.24
Mean value in simulation	0.22

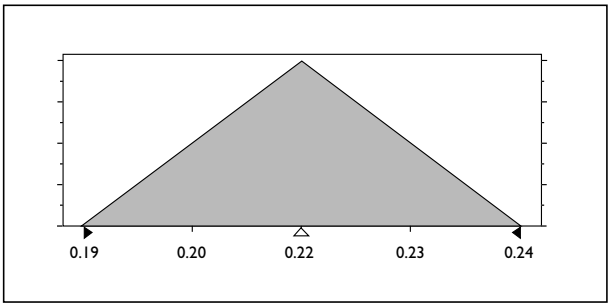

FIGURE 20 *Assumption: probability of over-ordering of tests – PRHO*

TABLE 50 *Assumption: probability of under-ordering tests – PRHO*

Triangular distribution with parameters	
Minimum	0.06
Likeliest	0.08
Maximum	0.09
Selected range	0.06–0.09
Mean value in simulation	0.08

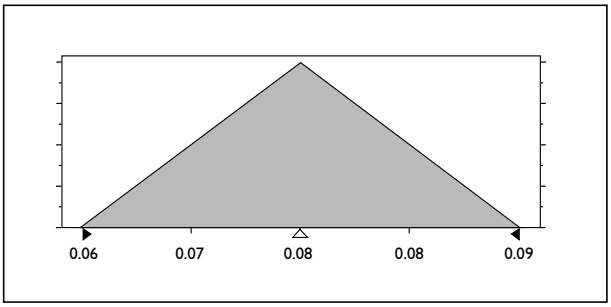

FIGURE 21 *Assumption: probability of under-ordering of tests – PRHO*

TABLE 51 *Assumption: probability of over-ordering tests – ATN*

Triangular distribution with parameters	
Minimum	0.10
Likeliest	0.12
Maximum	0.14
Selected range	0.10–0.14
Mean value in simulation	0.12

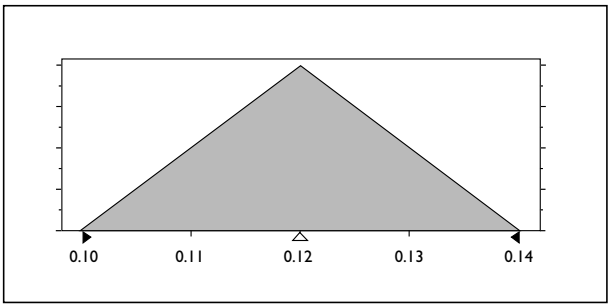

FIGURE 22 *Assumption: probability of over-ordering of tests – ATN*

TABLE 52 *Assumption: probability of under-ordering of tests – ATN*

Triangular distribution with parameters	
Minimum	0.05
Likeliest	0.06
Maximum	0.08
Selected range	0.05–0.08
Mean value in simulation	0.06

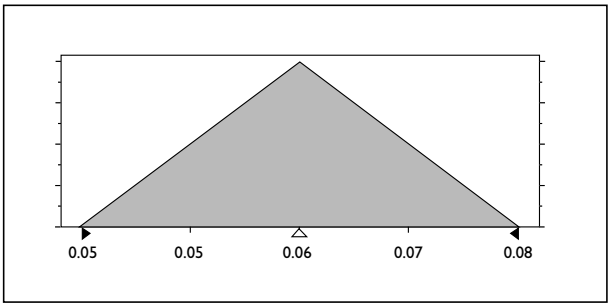

FIGURE 23 *Assumption: probability of under-ordering of tests – ATN*

TABLE 53 *Assumption: probability of inadequate examination/history taking – ATN*

Triangular distribution with parameters	
Minimum	0.05
Likeliest	0.07
Maximum	0.09
Selected range	0.05–0.09
Mean value in simulation	0.07

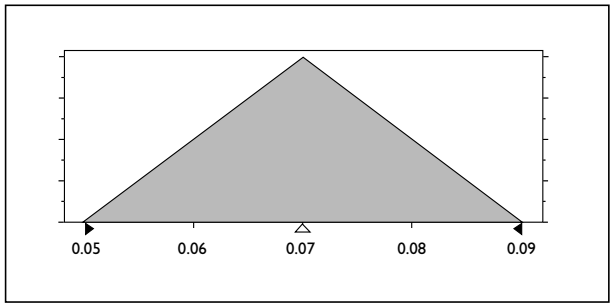

FIGURE 24 *Assumption: probability of inadequate examination or history taking – ATN*

TABLE 54 *Assumption: probability of inadequate examination/history taking – PRHO*

Triangular distribution with parameters	
Minimum	0.07
Likeliest	0.09
Maximum	0.11
Selected range	0.07–0.11
Mean value in simulation	0.09

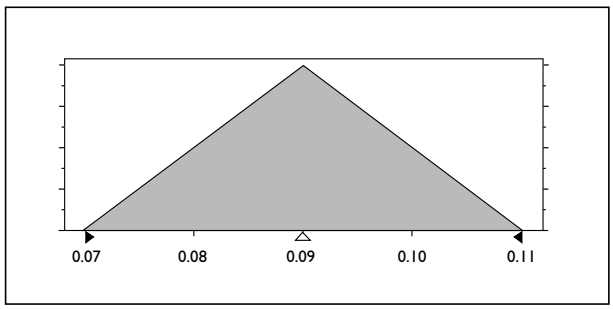

FIGURE 25 *Assumption: probability of inadequate examination or history taking – PRHO*

Appendix 4

Patient satisfaction interview guide

General background information

- When was pre-assessment visit?
- When were you admitted?
- When was your operation?
- How long ago?
- Any previous hospital admissions (how many/what for)?
- Any health problems unrelated to surgery, i.e. heart or chest problems?

Pre-operative assessment visit

- Previous pre-admission experience – what expectations/what memory of it? Can you remember how you felt before the visit?
- Any memories of the visit and events during visit?
- Exposure to a number of different staff? Any confusion over roles and objectives?

Impact of the study conditions

- Seen by ATN or PRHO? Reactions to randomisation? Perceptions of the nurse?
- Perceptions of level of preparation for surgery after pre assessment? More or less confident about impending surgery?
- Perception of any benefits from attending pre assessment?
- Future choices – nurse or doctor? Any influences on that choice?

Perceptions of the roles of nurses and doctors

- Any surprise at the extended nursing role? Any limitations on the future role of nurses in pre assessment?
- Perception of the role of nurses – what would a good nurse be like?
- Perceptions of the role of doctors – what would a good doctor be like?
- Patient's experience of interactions between nurse/patient/doctor/ – is there a different approach?

Supplementary questions

- What would you tell a friend?
- What did you find useful?
- What didn't you want to know?
- Information overload?

Appendix 5

Invitation letter to focus group

May 1999

Dear .....

You may remember that when you came into hospital in ..... you agreed to take part in the **OpCheck study**, which was looking at giving nurses more responsibility in pre-operative assessment. We have now interviewed many patients who took part in the study.

As a next step we would like to invite you to a group meeting with 7 or 8 other patients who, like yourself, have been in hospital in the last 3 months. We would like to give you the chance to talk with us and other patients about your views on nurses taking more responsibility.

This will be a very friendly meeting and we hope that you will enjoy talking with the other patients.

We are planning to hold this group meeting in the evening. It will last for about an hour. All travel expenses will be refunded at the time. The study team will hold this meeting at a hotel in the centre of Sheffield, and a buffet tea will be provided.

..... will telephone you soon to check if you will take part in the discussion, and will then sort out a date towards the end of May that will suit you and the other patients taking part.

Thank you for your help in the past. Please remember that **your view** is important and helpful to the study.

Yours sincerely

Appendix 6

Questions for the focus group

Meeting on 8 June 1999

1. What were your expectations of the pre-admission visit?
2. Before you came to the pre-admission clinic, how were you feeling about your operation?
3. Did you get to see the doctor or the nurse?
4. What actually happened in the clinic?
5. What do you think about nurses doing jobs previously done by doctors?
6. Have you found that doctors and nurses speak to you differently?
7. What would influence any future choice in seeing the nurse or the doctor in pre-admission clinic?

Appendix 7

Core interview guide for psychological evaluation of health professionals

View of the role of ATNs and how it has influenced developments in their unit

- What kinds of changes have occurred? Their perceptions of effects.

Communication within unit

- Their understanding of how the organisation of their unit works and its main tasks and functions.
- The impact of this structure upon patient care.
- What structural changes would improve things for the patients?
- What would make things better for staff (all grades)?
- How does the interdisciplinary structure work?
- Cooperation/conflicts/line of commands?
- Perceptions of patterns and degree of effectiveness of communications for them personally and for all levels and disciplines within unit.
- What helps and hinders communication? What ideal changes would make it more effective? How do they believe it compares with other units?

Staff well-being

- Perceptions of what makes for a sense of well-being at work.
- Perceptions of how this unit compares with others. Any individuals or procedures or developments that stand out for any reason?

Training

- Perceptions of patterns and degree of effectiveness of communications with medical and nursing schools.
- Achievements/needs/problems of staff in their own unit. Comparison with other units they have worked in.

Staff motivation/morale/attrition/ career prospects

- In their own unit (including self), and perception in other units.
- Perceptions of the past, present and future. How do changes compare with those perceived in other units? The impact of changes on individual staff/self/patient – staff relationships.

Views of the trial

- The impact that participation in the trial and the possible introduction of ATNs more generally will have on their service, their unit, their staff/colleagues and themselves.
- Perceptions of the past, present and future. How do the changes compare with those they perceive in other units? The impact of changes on individual staff/self/patient – staff relationships.

General questions about the individual respondent

- How long in their unit? Details of career/ this post.
- Other experience of employment. How do they feel about their career development? How does this relate to their current post?
- Views of their peers, seniors, juniors and those in other disciplines – both in terms of their current unit and other people they know.

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We look forward to hearing from you.

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