

Promoting research in nursing and the allied health professions

Technical annexe



Centre for Policy in
Nursing Research



Research Forum
for Allied Health
Professions



Association of
Commonwealth
Universities

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Executive summary

- 1 This report presents mapping information on the research undertaken in nursing, midwifery, health visiting and the 12 allied health professions (AHPs). Because of the difficulties found in obtaining data in previous studies we adopted an approach of using several routes. This included a bibliometric analysis of publications held in the Wellcome Trust's Research Outputs Database and a questionnaire survey of 121 departments in universities.
- 2 Unfortunately the response to the questionnaire was only 50% because its appearance coincided with the preparation of submissions for the Research Assessment Exercise, and for some departments with preparation for the re-tendering with the NHS for nursing education. Nonetheless the trend data and qualitative information it provided has proved very useful.
- 3 In general the AHPs are 'invisible' in most of the classifications and categories used by HESA, HEFCE and others. This means that data on them are aggregated with other disciplines, and it is difficult to determine accurate trends in many aspects of research. As soon as they come together into the Health Professions Council there must be a case for revisiting the designations and categories now used so as to obtain clearer operational and planning data.
- 4 We recorded the main sources of funding for nursing and AHPs, but found it very difficult to trace detailed information on funding by discipline. However, our bibliometric analysis shows that the Department of Health is the largest supporter of published nursing research, while the MRC and BBSRC are the biggest sources for dietetics and occupational therapy research respectively.
- 5 There is evidence that nursing, midwifery and AHPs departments are generating increasing research income, since the 50 departments responding to our survey showed an increase from £3m in 1996–97 to £9.7m in 1999–2000. HEFCE support for research has been £3m a year of QR funding to 11 departments in Unit of Assessment 10 (UOA), which covers nursing and midwifery. Some of the £7m a year which has gone to UOA 11 will have reached AHP departments, although we do not know the proportion.
- 6 The capacity to do research has been increasing: over the five-year period to 1998–99, nursing and AHPs research staff in universities have grown in number from 97 to 240; however, this represents only 3.9% of the total staff of 6,174. Comparable figures for other disciplines are education at 7.6% and social studies at 13.3%.
- 7 In the RAE submissions for 2001 the number in UOA 10 increased by 19%, the second highest of any discipline. In addition the number of Category A and A* staff increased by 50% over the 1996 figure; this is the second highest percentage of any discipline. However, the number of such staff at 623 is still low in comparison to the total of full-time teaching staff. In UOA 11 the submissions were 10% higher than in 1996 but the number of academic staff increased dramatically by 57% (the highest of any discipline) to 1,066. However, we do not know what part of this increase can be attributed to the AHPs disciplines.
- 8 Postgraduate student numbers in nursing have also grown over the same timescale by 94% and amounted to 3,700 in 1998–99; all but 435 of these are part-time.

- 9 The bibliometric analysis we commissioned has shown a matching increase in published papers over the last ten years, although the outputs for nursing and midwifery have not increased since 1995. Authors from hospitals and practice account for a substantial minority of the papers in all disciplines.
- 10 In dietetics, midwifery and speech and language therapy we found that one in six of the papers had a foreign author (as a sign of international collaboration) and the same disciplines had a high number of authors from different addresses, indicating inter-university collaboration within the UK.
- 11 A high proportion of papers revealed no funding source, implying they were self-funded: this percentage was 83% for occupational therapy, 73% for nursing, 57% for midwifery, 46% for speech and language therapy and 38% for dietetics. In the NHS as a whole 47% of funding of published papers is unacknowledged, which means largely unfunded. In biomedicine the UK government provides funding for the research behind 33% of publications.
- 12 Respondents to our questionnaire gave us information on their research outputs, which averaged out at only 1.8 papers over the whole of the last four years for 1900 staff. They also told us the present number of PhDs among their staff, which was an average of 16% of the total number.
- 13 Our survey enquired about the number and type of links which nursing and AHPs departments had with other departments or institutions. In nursing and midwifery it was usual to have two formal links with other disciplines, and two with other institutions, but to have more than five collaborative arrangements with NHS-related organisations. These figures were lower for all the AHP disciplines.
- 14 Part of our study involved visits to ten institutions as a result of which we commissioned three case studies. These helped us to identify the different institutional strategies in building research capacity and the key factors which can help it to grow. The three main drivers of this change are: the attitude of the NHS region to research; the institution's central strategy to funding capacity development; and the financial arrangements with the then Education and Training Consortia, which funded the teaching contract.
- 15 One case study reports on how a network of collaborative links was established, and two others show how it is possible to reach practitioners in a region which does not fund much research – and how research capacity can be rapidly developed, given a benevolent central strategy from the university.
- 16 Although the quantitative evidence is patchy and incomplete, we can draw some conclusions:
- i. We have seen an increase in the capacity for research, the numbers of postgraduates and the research outputs in the period since the last RAE.
 - ii. This growth is recognisable in nursing and midwifery, but less so in the AHPs, many of which have still a long way to go to develop their capacity.

- iii. The Department of Health and the NHS regions are the biggest funders of research and their support has been growing over the period, although it is not given to all the AHP disciplines.

1 Introduction

Terms of reference

- 1.1 In October 2000 the Association of Commonwealth Universities (ACU) and the Centre for Nursing Policy Research (CNPR) were contracted by HEFCE to undertake a mapping study of research in nursing and the professions allied to medicine (AHPs). The team comprised:
- John Fielden, formerly of CHEMS at the ACU, but now of CHEMS Consulting.
 - Dr Anne Marie Rafferty and Dr Michael Traynor of the CNPR.
 - Allan Schofield, Head of the Higher Education Consultancy Group.
 - Dr Irene Ilott and Dr Elizabeth White from the Research Forum for Allied Health Professions.
- 1.2 The team was helped by Dr Grant Lewison of the Bibliometrics Research Group in City University and by Dr Steve Hanney of the Health Economics Research Group, Brunel University.
- 1.3 This annexe aims to produce the following desired outcomes shown in the tender specification for our study:
- 'Descriptive data and commentary on the levels of the current (project and infrastructure) funding programmes for nursing and AHPs research in the UK.
 - Description of and commentary on nature and extent of research outputs.
 - Description of and commentary on the funding agendas of major funders.
 - Map the extent and nature of existing nursing and AHPs research-related links between HEIs and the health sector.
 - Identify those links with the greatest potential for development.
 - Identify areas where improved research capacity could enhance practice, perhaps using a small number of case studies to illustrate the principles at work and their relation to funding policy.'
- 1.4 There are three central strands: identifying what research is taking place, where, and by whom it is funded; exploring the scale and style of research collaboration between universities and the various parts of the NHS; and studying the capacity of staff in nursing and AHPs departments to undertake the research that the NHS requires. The main report then considers benchmarking against other disciplines and a review of possible funding models by which research could be strengthened.
- 1.5 Discussions at an early stage with HEFCE established that our enquiries were to be limited to England rather than the UK as suggested in the original brief.
- 1.6 Throughout this report we have used the term AHPs to mean all those allied health professions (sometimes referred to as professions allied to medicine or PAMs) that will shortly be members of the Health Professions Council.

Study methodology

- 1.7 It was clear from previous work undertaken by the CNPR and David Thompson in studying nursing research that it would be hard to obtain reliable information on the scale and extent of research for a range of reasons – that data on research was either not collected, or that it was not analysed according to discipline, or that there were definitional problems (see below) in defining what research in nursing and AHPs was, and who undertook it. For this reason we proposed to carry out a range of surveys and data-collection exercises from different sources. Our hope was that if one route failed we might be able to triangulate the information from another source. Thus, for example, if we were unable to obtain information on nursing and AHPs research from the Association of Medical Research Charities, we could gather it from each university department's RAE returns.
- 1.8 Our mapping has used the following routes to seeking information:
- a bibliometric analysis commissioned from the Bibliometrics Research Group at City University (formerly at the Wellcome Trust) of the entries in the Wellcome data base of medical research publications for six professions: nursing, midwifery, dietetics, speech and language therapy, occupational therapy and physiotherapy
 - a comprehensive questionnaire sent to 121 nursing and AHP departments in English HEIs
 - visits to ten institutions comprising interviews with researchers and university policy makers. Those visited were the universities of Central Lancashire, Northumbria, Nottingham, Leeds, Manchester, Salford, Sheffield, Southampton, and, in London, City University and King's College London
 - meetings with representatives of most of the allied health professions (through attendance at the AHPs Research Forum) and a statistical survey of their research activities
 - searches of public information on research funded by the main charities and research councils
 - interviews with selected charities, members of the Task Group and selected officials (see Appendix I).
- 1.9 The timing of our study overlapped with the work that institutions are doing on their research assessment returns to HEFCE. We had hoped that this would have allowed us to see the completed returns for all the departments, but this has not happened; however most of the data we requested has been obtained for the RAE returns and these have proved most helpful, when we have received them.
- 1.10 The questionnaire (see Appendix II) was devised in October 2000 by the project team in the light of the project brief. A list of all university departments offering either undergraduate or graduate nursing courses and similar courses within the allied health professions was obtained from the UCAS web site. A total of 121 departments was identified. The telephone number of every department was obtained and each was contacted by a member of the research team who explained the background to the study and asked for the name and email address of an individual to whom our questionnaire could be sent. At this stage some individuals told us that their research responsibility spanned more than one discipline. In many cases the respondent was the person with designated responsibility for their department's RAE entry.

- 1.11 We sent the questionnaire as an email attachment to 57 individuals with responsibility for nursing research, 23 for physiotherapy, 13 for occupational therapy, 3 for radiotherapy, 10 for speech and language professions, 7 for podiatry/chiropractic and 12 for nutrition/dietetics. Questionnaires were sent out between 19 December 2000 and 15 January 2001. Incorrect email addresses were followed up by telephone and corrected. Due to a slow return rate, email and telephone reminders and further copies of the questionnaire were sent out on four occasions up to the end of February 2001. 50 completed responses have been received and the analysis is based on them.
- 1.12 The response rate was less than we had expected, particularly in view of the fact that departments may stand to gain from any policy decisions following this study. The main reason for delay was that institutions have been very heavily committed to RAE completion and to negotiation of NHS teaching contracts, and our request has had to take second place. In order to cover our needs the questionnaire was also comprehensive and involved co-ordination of inputs from various people in the institution.
- 1.13 In other areas it has been very hard to collect information. Although we have carried out many similar studies for HEFCE before, we have found that the time pressures on people and institutions at this time appear to be greater than ever before. Despite the good intentions of HEFCE's Accountability Review, academic and administrative staff have great difficulty in giving time to requests for data or information. We investigated to see whether non-responses came from departments which tended not to be research active, and who perhaps considered (rightly or wrongly) that the issue of research was not of relevance for them. To do this we examined which non-responders had entered the previous RAE. Among the AHPs, there were 47 non-responders and 19 of these were 1996 RAE entrants. However, only two of these scored 4 or higher. Among nursing, there were 24 non-responding departments and of these 10 entered the 1996 RAE. Among them, two scored a 4 rating. Thus, if high RAE scoring departments can be considered 'major research players', it could be said that we failed to collect data from 4 such players.
- 1.14 Despite the poor response, the spread of institutions completing our questionnaire combined with the range of our visits has, we believe, given us a broad enough base of evidence from which we have developed proposals.

Definitions

- 1.15 One of the endemic problems of research in this field is that of definition and classification. The following points illustrate some of the difficulties we have faced in identifying data:
- i. Institutions will enter research-active staff in both UOA 10 and 11 who do not come from either nursing or AHPs departments. Indeed, in one institution just under a half of nursing/AHPs research projects were carried out in other departments.
 - ii. HESA statistics on postgraduate students suffer from a similar problem. Their Category 2 (labelled 'Subjects Allied to Medicine') identifies 20,942 students, with as

many as 9,799 put in a category called 'other medical subjects' which includes, but is not restricted to, all the AHPs postgraduates.

- iii. When analysing statistics on AHPs disciplines, the lines with other professions are often blurred, for example between nutritionists and dietitians. Some AHPs do not merit their own academic department and fit in with others: thus, speech and language therapists may be within a languages/communications discipline with linguists.

1.16 At the start of the study it was necessary to agree with HEFCE what definition to use for the professions allied to medicine. Our tender document referred to the 'therapy professions' which would have been narrower than the traditional AHPs spread. Thus, we decided to base our survey on the 12 members of the Council for Professions Supplementary to Medicine (CPSM) and the future Health Professions Council. This means that the following professions are covered by this report:

	Registered Numbers 1.6.2000
Arts Therapists	1,455
Chiropodists	8,447
Dietitians	4,999
Medical Laboratory Scientific Officers	21,174
Occupational Therapists	21,006
Orthoptists	1,287
Physiotherapists	30,602
Prosthetists and Orthotists	734
Radiographers	19,696
Speech and Language Therapists	*
Clinical Scientists	*
Paramedics	*

(* These professions had not established registers at 1 June 2000.)

1.17 Requests for information on nursing and AHPs research funded by charities and research councils face the problem of classification. It is not common to analyse projects by the discipline of the project leader, and in many cases the nurse researcher is not among those first named because of the absence of a strong research record. Since NHS research is becoming increasingly multi-disciplinary and projects more disease or problem-focused, the difficulty of identifying nursing/AHPs-led projects will grow.

The structure of this annexe

1.18 The shape of this annexe is that we begin in Chapter 2 with a survey of the flows of funds into nursing and AHPs research, by source. We follow this in Chapter 3 with a summary of the trends of the research workforce and student numbers in the disciplines we are studying. Chapter 4 then summarises what we have found by the main research outputs from an analysis of the returned questionnaires and the bibliometric analysis.

- 1.19 Chapter 5 reports what the questionnaires tell us about the scale of collaborative links between the NHS and institutions and includes comments on the potential for further development in this area. Chapter 6 starts with a discussion of the key issues we found on our visits to institutions and presents three case studies, from which lessons are drawn, particularly about the institutional conditions required to support research in this area.
- 1.20 In the Appendices we list those we interviewed and present the text of the questionnaire which was sent to institutions, as well as the full report we commissioned from Dr Steve Hanney.

2 The flow of funds to research in nursing and AHPs in England

- 2.1 In this chapter we seek to map the main funding flows supporting nursing and AHPs research in England. We provide factual evidence where we have been able to obtain detailed information; the best source has proved to be the universities as recipients of the funds, rather than the NHS or the other grantors. In some areas the data is not analysed in a form that enables us to draw any conclusions, while in other areas we did not obtain the information we sought from our sources. Thus, this chapter is less complete than we would have hoped.
- 2.2 We start by describing the NHS, then cover UK charities, HEFCE, Research Councils and finally the professional bodies. We summarise the position at the end.

Funding from the NHS

- 2.3 The Director of Research and Development for the Department of Health is responsible for determining the strategy and priorities to be applied to the DH R&D budget. The total amount of funding in this budget is approximately £500m. A survey of funding allocated to research conducted by, or of specific relevance to, nursing and the allied health professions has shown that a relatively small amount of this total is spent in these fields.
- 2.4 The organisation of funding is currently in transition. The DH R&D budget was hitherto divided into two sub-budgets. The R&D support for NHS providers (budget 1) was available to NHS providers to enable them to host R&D within their institutions – which was funded either by external non-commercial funders, or was conducted within the institution but did not receive external funding. The NHS R&D programme sub-budget (budget 2) was used to fund the centrally commissioned and regionally funding programmes.
- 2.5 The new systems, which will be introduced by stages over the next three years, have been designed to ensure that the NHS continues to be able to meet its obligation to house research funded by external non-commercial partners, as well as responding to the government and the NHS's needs for research in priority areas. Two new sub-budgets will be created. The first of these 'Support for Science' (SfS) will be introduced in April 2002. It will provide support funding to NHS providers for meeting the costs of housing that research which is funded by a defined group of organisations that enter into partnership arrangements with the NHS/DH. Partnerships will be open to a wide range of funding organisations. They will, however, be required to satisfy the Department of Health that they can meet a range of criteria relating to quality, ethics and governance, and will sign a formal partnership agreement. The mixture of funding components that is necessary to support the externally funded work in a NHS trust is complex. A major costing exercise has therefore been undertaken, using data already available within the NHS to model these costs, and a formulaic method of allocation will be developed. This will take into account the necessary infrastructure costs within an organisation as well as the actual volume of activity that it supports.
- 2.6 The second sub-budget will be called NHS funding for Priorities and Needs (PNF). It will be created in April 2002, when it will support the central and regional programmes, as well as those activities within NHS providers currently supported by the old budget 1, but

now outside the scope of SfS funding. It is planned that over a three-year period, the PNF funding will be progressively channelled towards the support of multi-centre, multi-professional research programmes and research centres, rather than (as at present) towards single provider initiatives.

- 2.7 Trusts and NHS providers in receipt of budget 1 funding are expected to publish details in an annual research report. These reports are analysed, but unfortunately the reporting method does not allow the identification of the exact amounts of money allocated to research in either nursing and midwifery or the allied health professions.
- 2.8 Elements of funding from the old budget 2 will be carried forward into funding for NHS PNF. These will include the national programmes in Health Technology Assessment (HTA), Service Delivery and Organisation (SDO), New and Emerging Applications of Technology (NEAT), and Research Workforce Capacity Building. In addition, some elements of the regional R&D programmes will also be taken forward. All of these elements have in the past, and will in the future, be open to access from individuals in nursing, midwifery and the allied health professions.
- 2.9 The SDO, which only began work in October 2000, has made three allocations, of which one relates to nursing.
- i. The HTA is meant to evaluate interventions of various kinds (alongside the National Institute for Clinical Excellence (NICE) and the Commission for Health Improvement (CHI)). It was established in 1993 and in the period to 1999 commissioned over 200 projects, eight of which related to nursing.
 - ii. The second central fund, the New and Emerging Applications of Technology (NEAT) – again with links to NICE and CHI – aims to promote and support, through applied research, the use of new or emerging technologies. Nine projects have been funded to date and a further tranche will be announced shortly.
 - iii. The final national fund is the Policy Research Programme (PRP) which consists of a series of directly commissioned projects from institutions. These amounted to £30m in 2000–01. Thirteen of these projects relate to nursing or nurse-led R&D and have been placed in King's College London. The PRP also oversees a research programme managed by the English Nursing Board (ENB).
- 2.10 Whilst the recent study undertaken by David Thompson and Ali Wilson¹ was unable to define the amount of money allocated by trusts to nursing and allied health profession research, we did obtain some information from the responses to questionnaires and visits to institutions. For example, in the London Region, two university institutions (King's College and City University) have received £2.6m in research funding from their local trusts in the last four years. Data received from the 50 institutions that returned our questionnaire showed that, in total, they had received £4.1m for research from NHS regions and trusts in the last four years. However, it is clear that the picture is very uneven between regions. One university referred to the 'anti-

¹ David Thompson, 'A Mapping Exercise of Current Nursing Research (January 1995–December 1999)', Department of Health, October 2000.

intellectual culture' of the region as a barrier to their getting any funds. Yet at least three regions were thought to be very supportive. This variety is an issue to which we return later.

2.11 We have obtained figures from the 50 questionnaire responses received to date (see Chapter 4) which show that the nursing and AHPs departments concerned had received a total of research funding from the DH/NHSE of £7.8m over the last four years. This is by far their largest source of external funding.

2.12 The NHSE Regional Offices can fund research from two sources:

- i. Indirect funding from the contracts which the Workforce Development Confederations (formerly Education and Training Consortia) negotiate with institutions for teaching students in nursing, midwifery and the AHPs. However, only some Consortia accepted that university staff should spend some time on scholarship and research in order to refresh their teaching. Thus, they made allowances in the costings, or in the assumptions about the weekly workload of teaching staff. In one case we found that a specific (but small) contribution was made to a central fund for supporting research in the department, but we believe this to be uncommon. The report of the National Audit Office (NAO) on Non Medical Education and Training contracts (March 2001)² has identified this as an issue and reported that "a lack of research funding is undermining higher education institutions' ability to recruit and retain high quality teaching staff". The NAO found that three HEIs were receiving funding for research from Consortia in relation to their teaching contract,³ but this approach was the exception. This topic is discussed further in Chapter 7.
- ii. The second source is the funding for Priorities and Needs, under which NHSE Regional Offices can commission research against the national priorities of the NHS. Under the new funding arrangements from April 2002, it is expected that the sums available for this will be greater than under the old levy/budget 2 system. It is up to regions to decide how to finance projects under this heading, but they are usually allocated in response to bidding from providers, HEIs or consortia of both.

2.13 Regions have also supported research infrastructure and workforce capacity building in universities with their budget 2 money in several ways, which are likely to continue under the new funding systems:

- by direct support for staff undertaking fellowships or postgraduate studies in universities through bursaries or training awards
- by jointly funding research posts/chairs with universities. We found several examples of these on our visits to institutions or in the questionnaire responses
- by supporting innovative joint appointments with HEIs of posts such as researcher/practitioners or lecturer/practitioners. The researcher/practitioner positions have a role of undertaking and then disseminating action research to colleagues in practice. The NAO report found (paragraph 4.22) that 'nearly two out of three of the institutions surveyed in both the nursing and the allied health professions had one or more

² National Audit Office (2001) 'Educating and Training the future health professional workforce for England', HC 277, Session 2000–2001, 1 March 2001.

³ *ibid.* Para 3.27.

joint appointments with the NHS'. Their report highlighted the University of Brighton, where there are currently 22 such joint appointments.

Charities

- 2.14 Charities are now the third largest funder of research in HEIs after HEFCE and the Research Councils and their contribution has been increasing every year. In 1998–99 the UK-based charities gave universities in the UK £429m. Their funding is primarily medical and for the bio-sciences, and as much as 87% of their support goes to universities with medical schools. However, data on the funds they give to particular problems or disciplines is not collected consistently, nor is it necessarily structured by discipline. Discussions with the Association of Medical Research Charities have shown that they do not have any data which can be of help to us.
- 2.15 In parallel with this study HEFCE are funding a mapping study of charity research. We have contacted the consultants, JM Consulting Ltd, and have found that they are sending out questionnaires to a large number of medical charities. It has been agreed that this will include questions allowing us to get information on their support for nursing and PAM research. However, the answers from this will not be available until this report has been submitted.
- 2.16 Our visits to institutions have identified the following charities as funding some research in nursing and AHPs departments: Wellcome Trust, Joseph Rowntree Foundation, Leverhulme Trust, British Heart Foundation, Stroke Association, Mencap, Sense, RNIB, UK Thalassaemia Society.
- 2.17 Discussions with the Wellcome Trust confirmed that, although they have funded relatively little research in nursing, they have given substantial support in the field of nutrition and dietetics (see Table 4.11 from our bibliometric analysis in Chapter 4) and have also funded research in multi-disciplinary teams which have included AHPs researchers. It is likely that their new corporate plan will encourage nursing and AHPs as it supports a move into promoting patient-oriented and health services research
- 2.18 Responses to our questionnaire showed that the 50 departments received £3.6m from charities over the period of the last RAE. This should be seen in the context of the annual grant expenditure in 1998–99 of £429m cited earlier, and a cumulative expenditure over the RAE period of approximately £1.5bn. Our bibliometric analysis in Chapter 4 shows that charities have funded between 8% and 23% of published papers in four of the disciplines we are studying.
- 2.19 The Stroke Association confirm that they have a multi-disciplinary R&D Committee which provides core funding for two research units at Nottingham and Manchester/Salford Universities respectively, and also gives bursaries for members of the allied health professions. In addition they have funded a programme for £250,000 and given a project grant of £80,000. The Hospital Savings Association has recently started to fund postgraduate training awards in some of the AHPs.

HEFCE

- 2.20 HEFCE allocated £855m of research funds to its HEIs in 1999–2000. The bulk of this was given to departments with scores above 3A in the 1996 RAE exercise. In Unit of Assessment (UOA) number 10 (for nursing and midwifery) 11 departments received a total of £3.066m in 1999–2000 for their category A research-active staff, and in UOA 11 (other studies allied to medicine) 18 departments were funded with a total of £7.731m. In 1996 the total staff in Category A and C in the two UOAs amounted to 1,197. (A fuller analysis of these figures is given below in Table 4.1).
- 2.21 In the 2001 RAE exercise the number of staff in UOA 10 classified as category A or A* showed an increase of 50% over the 1996 figures, the second largest in any of the UOAs. In addition, the number of submissions made in UOA 10 increased by 19%.
- 2.22 There is no data on the proportion of staff in UOA 11 that would fall within our definition of AHPs, since many other disciplines submit under this heading. It is also possible that institutions may be tempted to place some researchers from disciplines such as social sciences in UOA 10, as it attracts a higher weighting when the allocations are calculated.
- 2.23 In the 1996 exercise there were 398 research active staff in UOA 10. These can be analysed into three categories:
- i. 151 staff in departments which received QR funding, as they scored 3B or above.
 - ii. 98 in 'old' university departments which got no QR funding.
 - iii. 149 in post-1992 or 'new' university departments which were entitled to receive CollR funding.
- 2.24 HEFCE allocated some research funds under the category of CollR funding to post-1992 institutions for them to allocate to departments with RAE scores below 3A. This would have brought the post-1992 institutions an annual allocation of approximately £580,000.⁴ The funds were given on a formula basis in order to help the institutions build up the capacity of staff in these departments. However, we do not know how many departments in UOAs 10 and 11 actually received this funding, as HEIs were free to allocate CollR funds as they wished.

Research Councils

- 2.25 The MRC, ESRC and EPSRC (Engineering and Physical Sciences Research Council) fund some research in nursing and AHP disciplines. The MRC is not funding any projects where the Principal Investigator is a member of the professions we are studying, although a midwife is a co-grant holder and a physiotherapist is a co-applicant on a major back exercise trial. The MRC does however support the professions in other ways:
- by funding research nurses as scientific assistants on MRC grants
 - by reimbursing the costs of research nurses in general practice through the General Practice Research Framework

⁴ This assumes that each of the 149 staff received the standard per capita allocation of £3,000 weighted by 1.3.

- through Special Training Fellowships in Health Services Research and Health of the Public: there are 19 of these each year for all clinical professions. In the last four years 10 nurses or midwives have gained such fellowships (the largest group) and two from the allied health professions
- at a more senior level, two Clinical Research Training Fellowships are offered each year. Five have been gained by the professions we are reviewing, four of these in AHPs
- finally, the Clinical Scientist Fellowship is available to experienced researchers. One such fellowship has just been awarded to a podiatrist.

2.26 The MRC has submitted evidence to this project affirming its commitment to building research capacity in nursing and AHPs, and it is keen to develop joint solutions and programmes with the DH and HEFCE. Their submission is covered more fully in Chapter 5 of the Main Report.

2.27 A review of the ESRC's database 'Regard', using nursing as a keyword, found 14 awards and showed that 16 articles and books had been published as a result of ESRC-sponsored work in the last four years. One of their programmes (No. 36) entitled 'The Nation's Diet' is likely to have involved inputs from dietitians.

2.28 The 50 departments responding to our questionnaires revealed that they had received a total of £1.3m from research councils in the last four years. The beneficiaries included nursing departments at King's College London, Brighton, Leeds, York, Hertfordshire and a nursing/AHPs department at the University of the West of England.

Professional bodies

2.29 Another source of research funding is the professional bodies, which have in some cases created research funds (or established research foundations) from their members' subscription income. The annual sums currently allocated by four of the bodies are:

Royal College of Nursing	£800,000
Society of Physiotherapists	£200,000
College of Occupational Therapists	£45,000
British Dietetic Association	£2,000

Summary

2.30 We summarise below the evidence we have been able to collect for each category of research funder. The figures given in the right hand column are the sums received in 1999–2000 and then (in brackets) the total over the four year period since 1996–97. The most useful source has become the university departments themselves.

Table 2.1
Research funds by donor

	Evidence from Providers	Evidence from Recipients (n=50)
Department of Health/NHSE	23 funded projects from PRP, HTA, SDO and NEAT projects	14 of the 50 departments received funding of £3.4m in 1999–2000 (total £7.8m)
Regions and NHS Trusts	Not available	14 of the 50 departments received funding of £1.4m in 1999–2000 (total £4.1m)
Charities	Details not identified by discipline or by AMRC	18 had funding of £1.5m in 1999–2000 (total £3.6m)
HEFCE	Nursing depts get QR funding of approx £3m pa. AHP depts get some of the QR funding for UOA 11 of £7.7m pa. Depts may have received CollR funding of c£600k pa	
Professional Bodies	£1m pa from four bodies	
Research Councils		6 received funding of £879,000 in 1999–2000 (total £1.3m)

- 2.31 The conclusion that the Department of Health has been the largest funder is not supported by our bibliometric analysis later in Chapter 4, which shows a more complex picture when it looks at the funding of publications. For nursing research the DH is indeed the largest backer (327 out of 2,096 papers), but for dietetics it is the Medical Research Council (MRC) and the Biotechnology and Biological Sciences Research Council (BBSRC) (789 out of 3,104 papers), while for occupational therapy it is also the MRC (22 out of 715 papers).
- 2.32 Finally, our questionnaire returns can be analysed to show the discipline to which the research income relates. The results for each of the last four years are given in Table 2.2. Trends in research income can be judged from the first returns to our questionnaire. The Table below shows that over a four-year period the research income in the 24 departments which have completed this part of our questionnaire has increased by 203%. The main growth has been in nursing and midwifery, although there are also signs that the income for disciplines such as physiotherapy may also be more consistent.

Table 2.2
Research income received by discipline (except HEFCE)

	Total Funds in each of four years (£'000)			
	1996–97 n=50	1997–98 n=50	1998–99 n=50	1999–2000 n=50
Nursing and midwifery	2285	2784	4190	8029
Combined AHPs	3	10	2	81
Physiotherapy	-	95	801	475
Occupational Therapy	12	-	-	-
Speech Therapy	638	563	670	623
Radiography	-	-	198	70
Nursing and AHPs combined	38	263	156	439
Total	3049	3715	6025	9717

[Source: 50 questionnaires returned by departments.]

3 Sector-wide trends and the research workforce

- 3.1 Nurses, midwives, health visitors, and those in the AHPs sector represent two-thirds of staff responsible for direct patient care. For the purposes of this chapter we adopt the phrase 'health care workforce' used by the recently published National Audit Office Report on Education and Training for the Future Health Professional Workforce. The research workforce relies heavily, but not exclusively, upon recruitment from the health professional workforce. In September 2000 there were 50,000 nursing and midwifery students and 14,000 student therapists and scientists on NHS funded pre-registration training programmes for the above health professions. Pre-registration training and education was provided in 73 higher education institutions.
- 3.2 The chapter presents and interprets data from four tables compiled from HESA data for the period 1994–95 to 1998–99:
- Table 3.1: Staffing Numbers, 1994–95 to 1998–99
 - Table 3.2: Postgraduate Student Numbers in HESA Category 2 'Students Allied to Medicine', 1994–95 to 1998–99
 - Table 3.3: Full-time Academic Staff in HESA Cost Centre 6 Nursing and Paramedical Studies, 1994–95 to 1998–99
 - Table 3.4: Total Higher Degree Qualifications Obtained in HESA Category 'Subjects Allied to Medicine' by HEI, 1994–95 to 1997–98.

Research staff as a proportion of academic staff

- 3.3 The discussion that follows focuses upon the trends in postgraduate education to be inferred from the available evidence. The first point to note is that in relation to staffing, research staff, as a proportion of total academic staff, show a significant increase in nursing, midwifery and AHPs – but from a small base. Staff recruited to HEIs between 1994–5 and 1999 rose from 2,000 to 4,486, or by 124% (see Tables 3.1 and 3.3). The rise in the number of research-only staff financed from institutional sources was even more substantial, rising from 32 to 115 (259%). However, the percentage of research-only staff as a proportion of all HEFCE-funded academic staff is very small, being less than 3% in 1999. Similarly, the funding of research staff from other sources has remained static at around 7% of all staff. This compares unfavourably with a comparable discipline, health and community studies, where research funding from other sources has hovered between 50% and 60%. More worrying still for nursing and AHP's is the proportion of research staff to total academic staff – at 3.9% in 1999. This contrasts markedly with groups such as clinical medicine, where almost half the staff in 1999 (45.2%) were identified as researchers. The closest analogous groups to nursing, midwifery and AHPs, in terms of the numbers of research staff, are social studies and education whose concentration of researchers levels out at a stable 13% and 7% respectively (see Table 3.1). Finally, although the humanities share a low proportion of research staff, the number of research staff funded from other sources is much higher, averaging around 65%.

- 3.4 One more positive figure on research capacity is the recently announced statistic of research-active staff for the 2001 RAE submissions. In UOA 10 there were 623 staff in category A and A*, a large increase on the figure of 415 in 1996 (although the category of A* did not exist for that exercise).

Postgraduate student numbers (Table 3.2)

- 3.5 The subject classification at postgraduate level used by HESA differs from that applied to academic staff and it would be helpful if consistency could be maintained. Table 3.2 shows the analysis of the postgraduates currently classified in Category 2 called 'Subjects allied to medicine'. Almost half the total is placed in a group called 'other medical subjects' which we take to denote the majority of AHPs, although some confusion about classification is to be expected, for example: some dietitians are likely to be included in nutrition, while nursing has its own stand-alone category.
- 3.6 The most apparent trend has been the rapid expansion of postgraduate enrolment across the sector of some 62% over the four-year period, but the analysis reveals significant variations. The expansion for nursing has been marked at almost 95%, compared with just under 60% for 'other medical subjects'. In comparison, ophthalmics has shown no growth at all.
- 3.7 There has been significant expansion of higher degrees in most categories within nursing, but expansion has been greatest in part-time degrees, rising by 100% from 1,634 to 3,271. Growth in 'other medical subjects' in post-graduate numbers overall has been at 57% from 6,210 to 9,799, but this masks a slight fall in full-time higher degrees from 643 to 627 (2.5%) and a large rise in part-time postgraduate degrees of just under 70% from 4,923 to 8,308. Nursing has experienced an increase in higher degrees by research, from 357 to 596 (67%) and taught, from 1,105 to 2,130 (93%). The picture is the reverse for 'other medical subjects' where the proportion of degrees by research, rising from 862 to 1,321 (53%) has increased over taught: 3,985 to 5,482 (38%). Both nursing and 'other medical subjects' have the largest proportions of part-time postgraduate degrees of all groups included in the 'Subjects Allied to Medicine' return.
- 3.8 This pattern contrasts markedly with a field such as Pharmacy, where there appears to have been a significant shift in policy in favour of full-time degrees: rising from 71 to 283, or by almost 300%. Part-time degrees declined in Pharmacy by over 90% from 107 to 10.

Higher degrees by higher education institutions

- 3.9 Data in Table 3.4 suggest an interesting pattern regarding the distribution of higher degrees by institution. Although growth in numbers has occurred in many HEIs, a small number of departments has experienced particular expansion over the period 1994–5 to 1997–8, for example, Birmingham, Kings College and Sheffield Universities. (However, the leap for Kings from 2 to 168 raises some concerns about the accuracy of the 1994 HESA data.) Conversely, enrolment in a small number of HEIs appears to have declined (in particular City, Surrey, Keele, Manchester, and West of England), although this may be due to specific factors associated with the last year for which data is available.

Census of the teaching workforce

- 3.10 The research workforce is also part of, and in some cases, indistinguishable from the teaching workforce. Data collected from the English National Board for Nursing Midwifery and Health Visiting on the Teaching Census⁵ is also revealing. Regrettably, the Board ceased collection of data beyond 1998 due to a change in its remit, but its summary statistics are interesting. For example, it shows that in 1998 22% of the total 4,596 teaching workforce had a first degree only, with a further 25% with a Masters and only 3% (161) with a doctorate. Regions vary in the numbers of staff with doctorates with Anglia and Oxford and Trent having the lowest returns at 2% and 2.1% respectively, compared with almost 5% in North West.
- 3.11 Overall, the expansion in staff and postgraduate numbers is impressive but predominates at the part-time postgraduate level. This has significant implications for the development of research careers and leadership. For research leaders to emerge from the teaching workforce a significant expansion in numbers would be required.

⁵ National Audit Office, 'Educating and training the future health professional workforce for England', HMSO, 2001.

Table 3.1
Staffing numbers 1994–95 to 1998–99

a	b	c	d	e	f	g	h	i	j	k	l
HESA No	HESA Subject Categories by Academic Department		Wholly Institutionally Financed: All Staff	Wholly Institutionally Financed: Research Staff only	Wholly Institutionally Financed: % Research Staff as Proportion of Total	All Sources of Funding: All Staff	All Sources of Funding: Research Staff only	All Sources of Funding: % Research Staff as Proportion of Total	Total for all Staff	Total for Research Staff Only	% Total Research Staff as Proportion of Total All Staff
6	Nursing and AHPs	1994–95	2000	32	1.6%	821	65	7.9%	2821	97	3.4%
		1998–99	4486	115	2.6%	1688	125	7.4%	6174	240	3.9%
		+/- as % over time	124%	259%		105%	92%		118%	147.4%	
1	Clinical medicine	1994–95	3644	399	10.9%	8372	4438	53%	12016	4837	40.1%
		1998–99	4008	703	17.5%	10420	5824	55.9%	14428	6527	45.2%
		+/- as % over time	9.1%	76.2%		24.5%	31.2%		20.1%	34.9%	
4	Veterinary science	1994–95	362	41	11.3%	346	293	84.7%	708	334	47.1%
		1998–99	411	44	10.7%	385	321	83.4%	796	365	45.8%
		+/- as % over time	13.5%	7.3%		11.3%	9.5%		12.4%	9.3%	
7	Health and community studies	1994–95	1385	50	3.6%	208	125	60.1%	1593	175	11%
		1998–99	1499	80	5.3%	458	243	53.1%	1957	323	16.5%
		+/- as % over time	8.2%	60%		120.2%	94.4%		22.8%	84.6%	
8	Psychology and behavioural science	1994–95	1464	132	9%	557	497	89.2%	2021	629	31.1%
		1998–99	1999	170	8.5%	633	560	88.5%	2632	730	27.7%
		+/- as % over time	36.5%	31.8%		13.6%	12.7%		30.2%	16.1%	
30	Social studies	1994–95	7279	303	4.2%	1217	822	67.5%	8496	1125	13.2%
		1998–99	7481	291	3.9%	1225	871	71.1%	8706	1162	13.3%
		+/- as %	2.8%	-3.9%		.7%	5.9%		2.5%	3.3%	

		over time									
33	Humanities	1994-95	4340	67	1.8%	346	247	71.4%	4686	314	6.7%
		1998-99	4003	116	2.9%	410	261	63.7%	4413	377	8.5%
		+/- as % over time	-7.7%	73.1%		18.5%	5.7%		-5.8%	20.1%	
35	Education	1994-95	4844	173	3.6%	326	177	54.3%	5170	350	6.7%
		1998-99	4195	151	3.6%	359	194	54%	4554	345	7.6%
		+/- as % over time	-13.4%	-12.7%		10.1%	9.6%		11.9%	-1.4%	
	All academic departments	1994-95	71811	4574	6.4%	29471	21522	73%	101282	26096	25.8%
		1998-99	76346	5376	7%	35195	25415	72.2%	111541	30791	27.6%
		+/- as % over time	6.3%	17.5%		15.4%	18.1%		10.1%	18%	

(Source: HESA Statistical Tables)

Table 3.2

Postgraduate student numbers in HESA Category 2 'Subjects Allied to Medicine', 1994–95 to 1998–99

a	b	c	d	e	f	g	h	h	i	j	k	l	m	n
			Total all PG	Total all Higher Degree by Research	Total all Higher Degree Taught	Total Other PG	Total all Full-time PG	Total all Full-time Higher Degree by Research	Total all Full-time Higher Degree Taught	Total Full-time Other PG	Total all Part-time PG	Total all Part-time Higher Degree by Research	Total all Part-time Higher Degree Taught	Total Other Part-time PG
	Total Subjects Allied to Medicine	1994–95	12922	3744	6570	2698	3567	1938	1144	575	9355	1806	5426	2123
		1998–99	20942	4802	10188	5953	4497	2159	1584	754	16445	2643	8604	5198
		+/- as % over time	62.1%	28.3%	55.1%	120.6%	26.1%	11.4%	39.3%	31.1%	75.8%	46.3%	58.6%	144.8%
	Anatomy and Physiology	1994–95	1146	968	148	30	692	614	70	8	454	354	78	22
		1998–99	1338	1048	273	17	709	603	103	3	629	445	170	14
		+/- as % over time	16.8%	8.3%	84.5%	-43.3%	2.5%	-1.8%	47.1%	-62.5%	38.5%	25.7%	117.9%	-36.4%
	Pharmacology	1994–95	840	542	278	20	450	336	110	4	390	206	168	16
		1998–99	998	519	402	77	438	311	117	10	560	208	285	67
		+/- as % over time	18.8%	-4.2%	44.6%	285%	-2.7%	-7.4%	6.4%	150%	43.6%	.9%	69.6%	318.7%
	Pharmacy	1994–95	1812	737	532	646	524	449	71	107	1288	288	461	539
		1998–99	3093	954	870	1269	846	553	283	10	2247	401	587	1259
		+/- as % over time	70.7%	29.4%	63.5%	96.4%	61.4%	23.2%	298.6%	-90.6%	74.5%	39.2%	27.3%	133.6%
	Nutrition	1994–95	363	92	134	126	240	56	77	107	123	36	68	19
		1998–99	429	91	212	126	270	42	126	102	159	49	86	24
		+/- as % over time	18.2%	-0.8%	58.2%	0%	12.5%	25%	63.6%	-4.7%	29.3%	36.1%	26.5%	26.3%
	Ophthalmics	1994–95	187	119	39	29	67	60	7	0	120	59	32	29
		1998–99	185	112	36	37	71	62	9	0	114	50	27	37
		+/- as %	-1.1%	-5.9%	-7.7%	27.6%	6%	3.3%	25%	0	-5%	-15.2%	-15.6%	27.6%

		over time												
	Audiology	1994-95	140	14	116	10	51	6	45	0	89	8	71	10
		1998-99	312	60	153	99	80	24	44	12	232	36	109	87
		+/- as % over time	122.8%	328.6%	31.9%	890%	56.9%	300%	-2.2%	-	160.7%	350%	53.5%	770%
	Nursing	1994-95	1904	357	1105	442	270	87	86	97	1634	270	1019	345
		1998-99	3706	596	2130	980	435	96	192	147	3271	500	1938	833
		+/- as % over time	94.6%	66.9%	92.7%	121.7%	61.1%	10.3%	123.3%	51.6%	100.2%	85.2%	90.2%	141.4%
	Medical technology	1994-95	409	52	222	135	75	28	35	12	334	24	187	123
		1998-99	1049	68	630	351	137	31	83	23	912	37	547	328
		+/- as % over time	156.5%	32.7%	183.8%	160%	82.7%	10.7%	137.1%	91.7%	173.1%	54.2%	192.5%	166.7%
	Other medical subjects	1994-95	6210	862	3985	1363	1287	301	643	343	4923	561	3342	1020
		1998-99	9799	1321	5482	2996	1491	417	627	447	8308	904	4855	2549
		+/- as % over time	57.8%	53.2%	37.6%	119.8%	15.8%	38.5%	-2.5%	30.3%	68.8%	61,1%	45.3%	149.9%
	Balanced combinations with subjects allied to medicine	1994-95	1	1	0	0	1	1	0	0	0	0	0	0
		1998-99	33	33	0	0	20	20	0	0	13	13	0	0
		+/- as % over time	-	-	-	-	-	-	-	-	-	-	-	-

(Source: HESA Statistical Tables)

Table 3.3
Full-time academic staff in HESA Cost Centre 6 Nursing and Paramedical Studies, 1994–95 to 1998–99

a	b	c	d	e	f	g	h	i	j	
Year	Wholly Institutionally Financed: All Staff	Wholly Institutionally Financed: Research Staff only	Wholly Institutionally Financed: % of Research Staff as Proportion of Total	All Sources of Funding: Staff	Other of All	All Sources of Funding: Research Staff only	Other of Funding: % Research Staff as Proportion of Total	Total for all Staff:	Total for Research Staff Only	% Total Research Staff as Proportion of Total All Staff
1994–95	2000	32	1.6%	821		65	7.9%	2821	97	3.4%
1995–96	3479	46	1.3%	1189		100	8.4%	4668	146	3.1%
1996–97	4202	65	1.5%	1539		109	7.1%	5741	174	3.0%
1997–98	4368	87	2.0%	1517		121	8.0%	5885	208	3.5%
1998–99	4486	115	2.6%	1688		125	7.4%	6174	240	3.9%

(Source: HESA Statistical Tables)

Table 3.4
Total higher degree qualifications obtained in HESA Category 'Subjects Allied to Medicine' by HEI, 1994–95 to 1997–98

(Note: Only HEIs with more than 20 students are included.)

Institution	1994–95	1997–98	% Change
Birmingham U	23	114	395%
Bradford U	51	51	0%
Bristol U	22	22	0%
Brunel U (inc. West London Inst)	58	45	-22%
Cambridge U	20	28	40%
City U	146	84	-42%
Derby U	32	22	-31%
East London U	24	9	-62%
Exeter U	22	28	27%
Greenwich U	2	27	1250%
Inst of Advanced Nursing Education	24	-	-
Keele U	65	23	-65%
Kings College London	2	168	8300%
Leeds Met U	27	39	44%
Leeds U	19	53	179%
Leicester U	18	43	139%
Liverpool John Moores U	11	23	109%
Liverpool U	28	48	71%
Manchester Met U	24	27	12%
Manchester U	89	28	-69%
Newcastle U	18	41	128%
Northumbria U	0	24	-
Nottingham U	31	37	19%
Oxford U	37	43	16%
Portsmouth U	49	44	-8%
School of Pharmacy	32	35	9%
Sheffield U	101	117	16%
Sheffield Hallam U	25	15	-40%
South Bank U	14	60	329%
Southampton U	7	60	757%
Surrey U	83	49	-41%
University College London	5	92	1740%
Warwick U	21	15	-29%
West of England U	42	11	-74%
Westminster U	11	31	182%
Wolverhampton U	1	38	-
Total England	1370	1944	42%

(Source: HESA Statistical Tables)

4 The nature and extent of research outputs

- 4.1 Measuring the quantity and quality of research publications is one way to assess research capability and quality as well as capturing trends over time. This chapter attempts to characterise the outputs, in terms of publications, of nursing and AHPs research. It does this in two ways: in Section A by means of a bibliometric analysis of published nursing and AHPs research, and in Section B by analysis of our survey results in which we asked respondents about their department's research outputs. We begin, however, with a summary of the position in 1996 as regards the ratings in HEFCE's Research Assessment Exercise, since this gives us a baseline against which to assess the improvement in research outputs.
- 4.2 The bibliometric analysis examines a period between 1988 and 1998, while our survey asks about publications over a five-year period prior to 2001. Bibliometrics places nursing and AHPs outputs in the context of biomedicine as a whole, where it forms a very small proportion, but one which is growing rapidly. Our survey analysis compares outputs across the disciplines represented and makes a tentative attempt to estimate research publications per member of staff in each of those disciplines.
- 4.3 The following table illustrates the ratings achieved by English institutions in the two Units of Assessment (UOAs) which relate to nursing and the AHPs.

Table 4.1
Analysis of 1996 RAE results (in England)

	UOA 10 Numbers of submissions	UOA 10 Numbers of Category A staff	UOA 11 Numbers of submissions	UOA 11 Numbers of Category A staff
In 5* rating			1	7
In 5 rating	1	32	2	30
In 4 rating	2	33	10	115
In 3a rating	4	38	5	47
In 3b rating	4	47	5	56
In 2 rating	7	59	21	144
In 1 rating	10	108	9	73
Totals	28	317	53	472

- 4.4 These statistics show that the research profile in UOA 10 for nursing was weighted to the bottom of the ratings scale, with 60% of the submissions and 53% of the staff with RAE ratings of 1 and 2. In comparison, the spread in UOA 11 was better with a particularly strong representation at grade 4.
- 4.5 In UOA 11 it is hard to tell what the AHPs profile was, since there were so many other disciplines included in the UOA: for example, submissions were included from departments of biomedical sciences, health policy, gerontology, nutrition and toxicology. However, some of the AHPs can be clearly identified such as the Department of Radiography at City University

and the Departments of Occupational Therapy and Physiotherapy at the Universities of Southampton and East Anglia.

Section A: Bibliometric analysis

Objectives and methodology

4.6 The objectives of the analysis were to examine and analyse the published outputs of English research from 1988 to 1998. The outputs were based on articles, notes and reviews contained in refereed journals covered by the Science Citation Index (SCI) and the Social Sciences Citation Index (SSCI), © The Institute of Scientific Information, as identified and contained in the Wellcome Trust's Research Outputs Database (ROD). The following six sub-fields were selected:

- Dietetics (DIETS)
- Midwifery (MIDWI)
- Nursing (NURSE)
- Occupational therapy (OCCTH)
- Physiotherapy (PHYTH)
- Speech and language therapy (SPLTH)

4.7 In each sub-field, the following were to be determined:

- the numbers of papers from England each year, and a comparison with the UK
- the setting of the papers (academic, clinical, or both; in eponymous departments or not)
- the geographical distribution of the papers (by postcode area)
- the extent of collaboration as shown by the distribution of numbers of authors and addresses
- the amount of foreign collaboration
- the funding of papers (by main sector and with leading funding bodies listed in each).

4.8 During the study it became apparent that in two of the sub-fields (occupational therapy and physiotherapy) the coverage of UK research by the SSCI was seriously deficient and data from additional journals were collected and used for the analysis.

4.9 In order to identify papers in each of the six sub-fields, 'filters' were developed by experts in the particular areas. These people kindly gave their services to the study and their help is appreciatively acknowledged. They are listed in Table 4.2.

Table 4.2
List of sub-field filters and the experts who helped to define them

Sub-field	4	Cod	Expert(s)	Affiliation
Dietetics	DIETS		Dr Angela Madden	Univ. of North London
Midwifery	MIDWI		Dr Anne-Marie Rafferty	London School of Hygiene and Tropical Medicine
Nursing	NURSE		and Dr Michael Traynor	
Occupational therapy	OCCTH		Dr Irene Ilott and Dr Elizabeth White	St Bartholomew's and Royal London School of Medicine
Physiotherapy	PHYTH		Ms Sue Madden	Keele University
Speech & language therapy	SPLTH		Dr Paul Carding	Freeman Hospital, Newcastle-upon-Tyne

- 4.10 For all the filters except dietetics, the main source of data was the SSCI rather than the SCI, and this index was used by the experts to create a filter.⁶ However the ROD contains papers from both indexes and therefore the list of papers will have included some from each. In addition, for two of the filters, the experts considered that the SSCI gave inadequate coverage of UK output and additional journals were covered (see below). The following paragraphs describe how the filters were developed for each sub-field.
- 4.11 **Dietetics.** This filter was developed with respect to the SCI as the sub-field is fairly typical of biomedical research in general. It was then 'translated' into SQL+, the language used to interrogate the ROD database, and 3,841 UK papers were retrieved, of which 3,104 had addresses in England (81%).
- 4.12 **Midwifery and nursing.** The nursing filter was originally developed for an earlier study. Papers retrieved from the ROD by means of this filter were examined individually at the CPNR and classified as either midwifery, nursing (including health visiting, a small sub-speciality), or not relevant – mainly because they were too 'medical'. Thus, the midwifery and nursing papers formed a mutually exclusive set. There were 174 English papers out of 230 UK ones in midwifery (76%) and 2,096 English papers out of 2,540 UK ones in nursing research (83%).
- 4.13 **Occupational therapy.** The filter, when applied to the SSCI, retrieved only 201 papers from the database. It was notable that the journal most used by British occupational therapy researchers, published by the College of Occupational Therapists, and well regarded by the two sub-field experts, namely 'British Journal of Occupational Therapy', was not covered. It was therefore decided that this omission should be rectified, and bibliographic data (authors, title, source, addresses, funding) on all the 666 UK papers in this journal were manually entered into the database in the same format as that used in the SSCI.
- 4.14 Many of the addresses of the earlier papers were deficient in that they did not contain a UK postcode. These addresses were compared with later ones, looked up in postcode directories or in the 'Directory of Hospitals and NHS Trusts, 1997–98' (Pearson Professional, London, 1997) in order to ascertain the postcode. Funding data were taken from the addresses (for intramural funding) or from the acknowledgements, and entered in the same format as is used for the ROD. Additionally, data were entered on the seven UK papers in the 'Journal of Occupational Science of Australia'. The resulting database therefore contained 874 UK papers of which 723 (83%) were from England.
- 4.15 **Physiotherapy.** When the SSCI was examined for physiotherapy papers, several journals in the sub-field that were held in the library of the Chartered Society of Physiotherapy and regarded by staff members as relevant, were found not to be covered. They were the 'Australian Journal of Physiotherapy', 'Journal of Manual and Manipulative Therapy', 'Manual Therapy', 'Physiotherapy', 'Physiotherapy Canada', 'Physiotherapy Research International' and 'Physiotherapy Practice' / 'Physiotherapy Theory and Practice' (1990+). Of these, 'Australian Journal of Physiotherapy' and 'Physiotherapy Canada' had no UK papers during the period 1988–98, but the others all had some, especially 'Physiotherapy' which was estimated to contain about 500 UK papers. The four others were estimated to contain about 110 UK papers during the 11-year period. However, it was by no means clear whether these

⁶ A description of the filter development process is given in Lewison G (1999) 'The definition and calibration of biomedical sub-fields', *Scientometrics*, vol 46, pp 529–37.

additional journals, not covered in the SSCI, should be regarded as comparable in quality and therefore that their papers should rank side by side with the SSCI ones.

- 4.16 In order to investigate this matter, a questionnaire was devised and sent to some 50 UK physiotherapy researchers, identified from SSCI physiotherapy papers (there were only 143 of these, after the initial list had been vetted by Sue Madden). They were asked to rank 20 physiotherapy journals and a few others used by UK physiotherapy researchers (such as 'BMJ', 'J Advanced Nursing') on a four-point scale where 4 = excellent, 3 = very good, 2 = good, and 1 = ordinary. Although after two weeks only seven responses had been received, it was very clear that 'Physiotherapy' was highly regarded (it was ranked equal third with 'Manual Therapy' in the list) and that the others were at least as well-regarded as several of the SSCI journals. It was therefore decided to include the UK papers in all these five journals.
- 4.17 Initially, the bibliographic data from four of the journals were downloaded from the British Library's AMED (Alternative and Complementary Medicine Database) on CD-ROM. The papers were then inspected in order to check that they were from the UK and to record the addresses in SCI format (not present in AMED) and the funding, if any, in the standard ROD format. The journal 'Journal of Manual and Manipulative Therapy' was not covered in the AMED and so all bibliographic details of six UK papers in this journal were entered manually into the additional database.
- 4.18 **Speech and language therapy.** For this sub-field, it appeared that the SSCI provided good coverage. However the filter was also applied to the SCI and all UK papers from the two indexes were downloaded from the CD-ROMs for 1988–99, and duplicates removed. This left a file of 1,614 UK papers. However it was found on inspection that some were from 1987 or 1999 and that many of the papers were irrelevant, particularly because they dealt with speech recognition in the context of computing, or because a few other title words were used with different meanings (particularly 'fluency' and 'articulate'). These papers were deleted to leave a file of 1,295 papers. These were then matched to the papers in the ROD in order to determine details of funding (or lack of it) where the papers both existed in the ROD and had already been inspected. There were 1,145 such papers; 80 were in the ROD but not previously inspected and 70 were not in the ROD – mainly because they were in fringe journals and did not have a biomedical word in their address field. These papers were then looked up in libraries to determine their funding. The addresses of papers not in the ROD were also checked to ensure that they all had UK postcodes, which were added, reformatted or corrected as necessary.

Analysis of addresses

- 4.19 **Academic and clinical settings.** The first analysis undertaken was of whether the papers were from England; unless otherwise noted, all the results quoted in this report refer only to English papers. Within the English total, the numbers of papers each year from 1988 to 1998 were determined. The setting of the research was determined through the presence of the following address keywords:

Table 4.3
Address keywords used to determine whether AHPs papers were from an academic or hospital setting

Setting	Address keywords			
Academic	ACAD	COLL	SCH	UNIV
Hospital	CLIN	HOSP	INFIRM	NHS

Because some of the papers were from former polytechnics, the string UNIV was uniformly added to the string POLYTECH in order to ensure that papers from such institutions were credited with being in an academic setting. A further analysis was carried out of addresses to see which papers were from 'eponymous' departments, i.e., departments with the same name as the specialty under consideration.

4.20 **Numbers of addresses and authors.** Another measure of co-operation is the distribution of the numbers of addresses on each paper, and the numbers of English papers with 1, 2, 3, 4 and 5+ addresses were determined. In addition, the numbers of non-UK addresses were determined for each English paper and hence the proportion of papers that had at least one foreign co-author. Another measure of co-operation, perhaps of interdisciplinarity, is afforded by an analysis of the numbers of authors per paper, and this was also carried out in each sub-field, and the means calculated.

4.21 **Postcode areas.** The third analysis was of UK postcodes, specifically of the first one or two letters of the postcode which designate the area, eg, B = Birmingham, OX = Oxford, WC = London West Central. Care was taken to ensure that if there were two addresses on one paper from the same postcode area (eg, different departments of one hospital) then the postcode area was only counted once. The leading postcode areas, i.e. cities, for each sub-field were identified for the whole of the UK and the percentages of total UK papers listed for English postcodes only. The sum of the numbers of papers from each of the 120 postcode areas was determined and compared with the UK total to give a measure of the amount of inter-city co-authorship.

Analysis of funding

4.22 Attention was focussed on three topics:

- i. What percentage of the papers in a sub-field received explicit funding?
- ii. Which were the main sectors involved – UK government, UK non-profit, industry, other?
- iii. Who were the leading funding sources in each sector?

In this analysis, no distinction was made between the different modes of funding (eg, intramural, extramural, personal). However, persons with one funder providing multiple support were only counted once for that funder.

4.23 Several of the funding bodies involved in AHPs research, notably the NHS regions, have changed their names or boundaries during the 11 years of the study period. Papers were aggregated to the names and boundaries prevailing in the latter part of the period. Thus there were eight NHS regions in England (Anglia & Oxford, North Thames, Northern & Yorkshire, Northwest, South & West, South Thames, Trent & West Midlands). A similar aggregation was

carried out in respect of the Biotechnology and Biological Sciences Research Council (BBSRC) which subsumed the functions of the former Agriculture and Food Research Council (AFRC) and the biological work of the Science and Engineering Research Council (SERC). There has also been some amalgamation between industrial companies, notably AstraZeneca and GlaxoWellcome, each of which was taken to include the two components previously separate.

- 4.24 Although governmental and private non-profit funding sources can be attributed to a country, this is not really possible for some industrial companies. Most pharmaceutical companies are multi-national and many of the pharmaceutical industry research laboratories in the UK are foreign-owned, but nevertheless enjoy a certain degree of autonomy. Moreover, shares in some multi-national pharmaceutical companies are traded on stock exchanges in several countries, and the location of the corporate headquarters may not be the same as that of the research directorate(s).

Results:

Outputs of papers

- 4.25 Table 4.4 shows the numbers of papers in each sub-field, both in the UK and in each of the UK's countries, as annual averages. The variation in numbers of English papers per year is tabulated in Table 4.5, and shown in Figure 4.1 as moving three-year averages divided by the mean annual output, in order to smooth out annual fluctuations and show the timing of the increases. The sub-fields are ranked in these two tables in descending order of UK output.

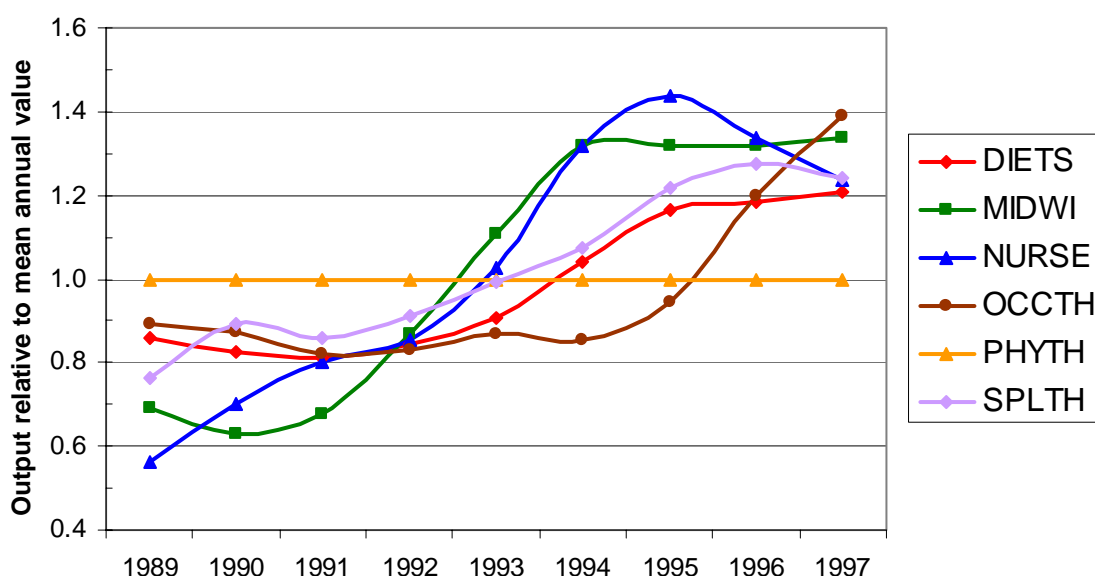
Table 4.4
Outputs of research in six PAM sub-fields, 1988–98, in the four UK territories:
papers per year and percentage of UK total

Sub-field	UK Total		%	Wales	%	Scot'd	%	N. I.	%
DIETS	349.2	282.2	80.8	9.8	2.8	62.4	17.9	11.6	3.3
NURSE	230.9	190.5	82.5	14.6	6.3	22.8	9.9	9.1	3.9
SPLTH	117.7	99.9	84.9	5.5	4.7	15.0	12.7	1.7	1.4
OCCTH	79.5	65.7	82.7	3.0	3.8	9.1	11.4	4.1	5.2
PHYTH	78.5	66.3	84.5	3.3	4.2	7.9	10.1	2.8	3.6
MIDWI	20.9	15.8	75.7	1.2	5.7	4.4	21.1	0.7	3.3

Table 4.5
Outputs of English research in six PAM sub-fields, 1988–98

Sub-field	88	89	90	91	92	93	94	95	96	97	98
DIETS	244	247	232	220	245	242	295	345	330	332	372
NURSE	98	93	143	156	156	182	264	294	245	234	231
SPLTH	52	74	106	71	96	101	98	132	125	127	117
OCCTH	57	59	59	52	53	60	55	54	85	91	98
PHYTH	62	52	72	60	59	56	54	73	81	83	77
MIDWI	8	14	7	11	16	17	22	21	18	25	15

Figure 4.1
Annual variation in English outputs of research in AHPs, 1988–98
(three-year moving averages relative to mean annual output).



Research settings

- 4.26 Table 4.6 shows the numbers and percentages of English papers in each of the sub-fields that were produced in academic settings, hospital settings, both, and neither. It also shows the numbers and percentages coming from 'eponymous' departments. The sub-fields are ranked in descending order of academic setting percentages.

Table 4.6
Settings of English research in six PAM sub-fields, 1988–98

Sub-field	Total	Acad	A, %	Hosp	H, %	A+H	AH%	Not	N,%	Epon	Ep %
SPLTH	1099	868	79.0	39	36.3	244	22.2	76	6.9	180	16.4
NURSE	2096	1578	75.3	906	43.2	527	25.6	171	8.2	623	29.7
MIDWI	174	131	75.3	79	45.4	56	32.2	20	11.5	20	11.5
DIETS	3104	2113	68.1	1493	48.1	989	31.9	487	15.7	1029	33.2
PHYTH	729	398	54.6	373	51.2	151	20.7	109	15.0	182	25.0
OCCTH	723	356	49.2	353	48.8	114	15.8	128	17.7	112	15.5

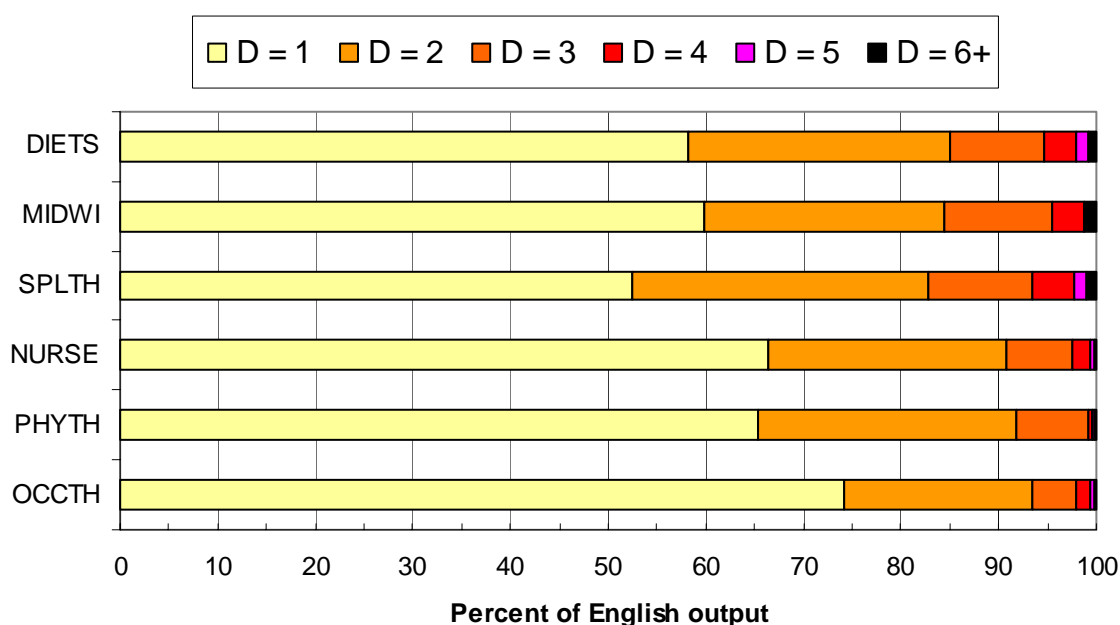
Numbers of addresses and authors

- 4.27 Table 4.7 shows the distribution of numbers of English papers in each of the sub-fields with given numbers of addresses, and also the numbers with at least one foreign address. The percentage distributions are shown also in Figure 4.2 where the sub-fields are ordered in descending order of mean numbers of addresses per paper, as they are in Table 4.7.

Table 4.7
Numbers of papers with given numbers of addresses for English research in six PAM sub-fields, 1988–98

Sub-field	Total	D=1	D=2	D=3	D=4	D=5	D=6+	Foreign	For,%
DIETS	3104	1808	832	300	102	39	23	626	20.2
MIDWI	174	104	43	19	6	0	2	29	16.7
SPLTH	1099	727	273	64	22	7	6	193	17.6
PHYTH	729	476	193	54	3	2	1	58	8.0
NURSE	2096	1392	510	141	40	9	4	106	5.1
OCCTH	723	536	139	33	10	3	2	27	3.7

Figure 4.2
Distribution of numbers of addresses per paper for six PAM sub-field research outputs, England, 1988–98

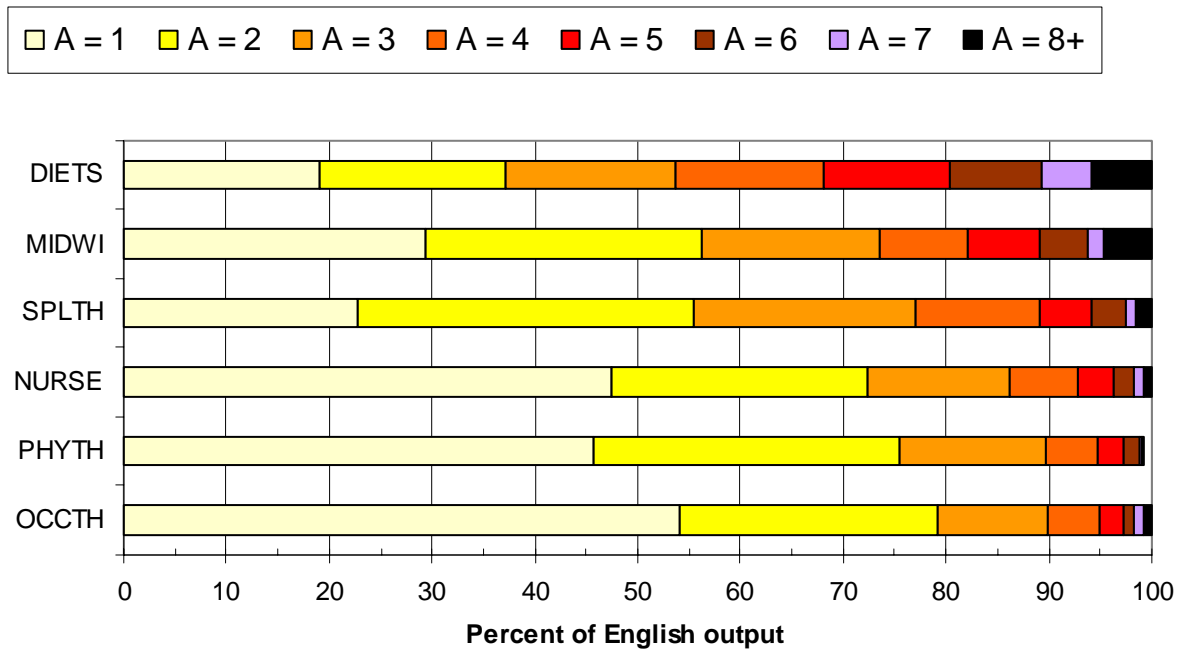


4.28 The distribution of the numbers of authors per paper (A) is shown in Table 4.8, and the percentage distribution is in Figure 4.3.

Table 4.8
Numbers of papers with given numbers of authors (A) for English research in six PAM sub-fields, 1988–98

Sub-field	Total	A = 1	A = 2	A = 3	A = 4	A = 5	A = 6	A = 7	A = 8+
DIETS	3104	594	562	508	450	382	278	150	180
MIDWI	174	51	47	30	15	12	8	3	8
SPLTH	1099	250	360	238	131	56	35	12	17
PHYTH	729	334	216	104	37	18	11	2	2
NURSE	2096	997	518	292	138	74	40	21	16
OCCTH	723	391	182	77	36	17	7	8	5

Figure 4.3
Distribution of numbers of authors per paper (A) for six PAM sub-field research outputs, England, 1988–98



Distribution by postcode area

4.29 Research in biomedicine in England tends to be very unequally distributed: the top ten postcode areas cumulatively accounted for 57% of the UK total in 1988–95.⁷ The distributions of papers in the AHPs are somewhat different, particularly where there are a relatively small number of specialist courses in academic institutions – often former polytechnics. Nevertheless, it is possible to obtain a good understanding of the way research outputs in the AHPs are geographically distributed from Table 4.9. This lists all the postcode areas in England with at least 5% of UK output in any of the six sub-fields and, at the bottom, individual postcode areas with at least 3% of UK output in each of the sub-fields.

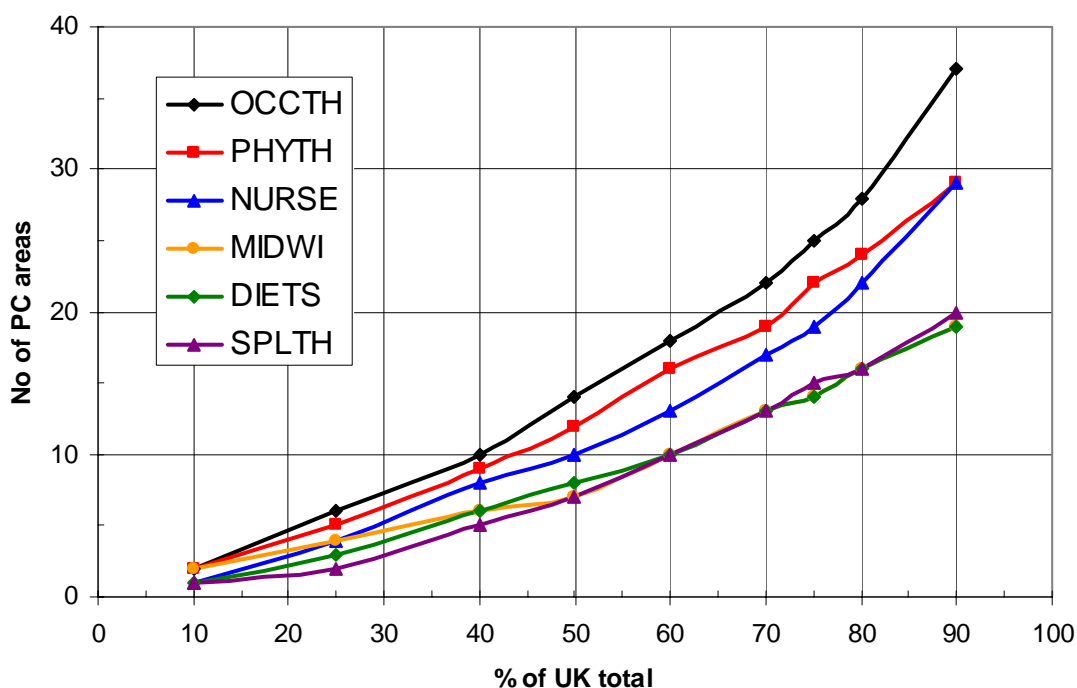
⁷ See Dawson G et al (1998) ‘Mapping the Landscape: National Biomedical Research Outputs 1988–95’, The Wellcome Trust, London, Policy Report No. 9, table 2.3.

Table 4.9
English postcode areas ranked in descending order of total output of papers in
AHPs sub-fields, 1988–98. (Percentages of UK total outputs)

Code	Postal area		MIDWI	NURSE	OCCTH	PHYTH	SPLTH	Total (out of 600)
WC	London WC	9.2	9.1	3.9	2.3	8.1	16.6	41.1
SE	London SE	5.9	7.4	10.4	6.3	3.4	4.6	34.6
CB	Cambridge	11.2	7.4	1.5	2.6	2.1	9.3	32.0
M	Manchester	3.3	5.7	6.9	3.5	3.7	6.4	25.8
OX	Oxford	5.3	3.5	4.4	3.8	3.2	4.4	21.3
W	London W	5.7	5.2	3.5	1.6	2.8	3.9	19.9
BS	Bristol	2.2	6.5	2.2	3.1	1.6	3.2	17.1
B	Birmingham	3.5	3.5	3.8	2.7	3.7	3.6	17.1
S	Sheffield	2.7	3.5	3.9	2.3	3.7	2.9	15.3
SO	Southampton	3.8	1.7	2.2	5.1	3.6	1.9	14.8
SW	London SW	3.9	2.6	4.3	1.9	4.3	1.9	14.6
NG	Nottingham	3.1	1.7	3.4	3.1	2.8	3.1	14.4
L	Liverpool	3.2	2.2	4.0	3.2	3.4	1.6	14.2
NE	Newcastle	2.7	2.2	3.1	2.1	0.6	3.0	13.1
LS	Leeds	4.7	1.7	1.8	2.6	2.9	2.1	12.9
NW	London NW	3.4	2.6	2.0	1.4	2.9	1.8	11.2
LE	Leicester	2.6	2.2	1.9	1.4	1.7	3.0	11.0
RG	Reading	3.2	2.6	0.4	0.2	0.5	3.7	10.1
YO	York	0.3	0.9	1.5	3.0	0.7	3.0	8.7
EC	London EC	2.4	0.4	1.3	0.3	0.2	3.1	7.6
E	London E	1.8	0.9	1.8	1.3	4.7	1.5	7.3
ST	Stoke-on-Trent	0.3	3.5	1.3	0.3	2.7	0.5	6.0
NR	Norwich	2.7		0.5	2.5	2.1	0.2	5.8
EX	Exeter	0.6		0.6	3.5	2.2	0.7	5.4
BN	Brighton	0.5	0.4	1.3	1.3	2.5	1.4	4.9
CV	Coventry	0.1	0.9	1.3	1.3	2.9	1.4	4.9
TW	Twickenham	0.4	0.4	0.5	2.5	2.1	0.9	4.8
GU	Guildford	2.2		1.5	0.6	0.3	0.4	4.7
PO	Portsmouth	0.3	1.3	1.3	1.1	0.8	0.2	4.4
LA	Lancaster	0.1		0.7	1.5		1.1	3.3
HA	Harrow	1.5	0.4	0.5	0.5	1.2	0.2	3.1
HU	Hull	0.1	0.4	1.7	0.3		0.4	3.0

The relative concentration of UK research within certain cities or postcode areas was judged by counting the number of postcode areas needed to include given percentages of the UK total, from 10% to 90%. These numbers are shown in Figure 4.4, overleaf.

Figure 4.4
Numbers of postcode areas needed to cover given percentages of the UK total output of papers in the six AHPs sub-fields, 1988–98.



The figure shows that occupational therapy output is the most widely dispersed around the country, and that of speech & language therapy is the most concentrated in a few areas.

Funding sectors

- 4.30 For each of the sub-fields, Table 4.10 shows the percentages of English papers with funding from the four main sectors and without funding acknowledgements. Because not all the papers could be found in libraries, for some sub-fields the total numbers of papers analysed are lower than the numbers given in the tables above. In occupational therapy research (OCCTH) the average figures quoted conceal large differences between funding for papers in the SSCI and ones in the ‘British Journal of Occupational Therapy’: this is discussed further below.

Table 4.10
Percentages of English papers in six PAM sub-fields with funding from main sectors, 1988–98

Code	Funders	DIETS	SPLTH	MIDWI	PHYTH	NURSE	OCCTH
Total	Number of papers	3104	974	174	729	2096	715
GOV	UK government	33.4	37.1	22.4	11.2	15.6	9.5
PNP	UK non-profit	23.0	16.1	19.5	17.3	11.0	8.3
IND	Industry	17.3	5.0	5.7	3.7	2.0	1.0
OTH	Other (foreign govt. and PNP)	14.4	14.5	20.1	2.5	2.1	2.1
NON	No funding acknowledged	38.2	46.5	56.9	71.3	73.2	82.8

Leading funding sources

- 4.31 In each sub-field, papers with funding from each of the four sectors have been analysed to identify the leading individual sources of support from each sector. Because for some sub-fields there are rather few papers with funding, the lists of leading funders are often rather short. They are given for the six sub-fields as composites in Tables 4.11– 4.16. The contracted forms used for the names of the organisations are explained in Appendix III.

Table 4.11
Leading individual funders (numbers of papers acknowledging support) for English papers in dietetics (DIETS), 1988–98 (N = 3104)

UK Gov't	N	UK PNP	N	Industry	N	Other	N
Total	1036	Total	713	Total	538	Total	448
Med Res C	549	Wellcome Tr	178	Nestlé sa	32	Eur Comm.	51
BBSRC	239	Br Heart Fdn	80	Hoffman LaR	27	Nat Inst Hlth	45
Dept Health	66	Imp Canc RF	33	Nutricia, C&G	26	W H O	41
N & Y Reg	21	Canc Res C	30	SK Beecham	25	Nestlé Fdn	18
A & O Reg	20	Diabetes UK	25	Glaxo Wellco.	20	Howard Fdn	16
Brit Council	15	St Thomas H	24	Kellogg Inc	20	I D R C, CA	16
N W Reg	15	Hlth Pro RT	22	Unilever plc	20	UNICEF	14
S & W Reg	11	Wessex Med	22	Kabi Pharm.	19	INSERM	13
S Thames Reg	11			Br M Squibb	15	Ghana Govt	11
				World Bank	14	Thai Gov't	10

Table 4.12
Leading individual funders (numbers of papers acknowledging support) for English papers in midwifery (MIDWI), 1988–98 (N = 174)

UK Government	N	UK PNP	N	Industry	N	Other	N
Total	39	Total	34	Total	10	Total	35
Med Res C	13	Wellcome Tr	6	Royal Bank S	1	US AID	5
Dept Int Dev	9	Hlth Pro RT	3	Wellcome plc	1	Eur Comm	4
A & O Reg	5					I D R C, CA	3
Dept Health	4					Thai Gov't	3
						W H O	3

Table 4.13
Leading individual funders (numbers of papers acknowledging support) for English papers in nursing research (NURSE), 1988–98 (N = 2096)

UK government	N	UK PNP	N	Industry	N	Other	N
Total	327	Total	230	Total	41	Total	45
Dept Health	130	London Univ	17	HG Wallace	4	W H O	4
Med Res C	42	Eng NB Nurs	13	Allen&Hanbury	2	CA MRC	2
St Thomas H	27	Roy Col Nurs	13			Max Planck	2
N Thames Reg	20	Canc Res C	11				
ESRC	19	King's Fund	11				
Trent Reg	19	Macmillan N	9				
S & W Reg	18	Imp Canc RF	9				
N & Y Reg	17	Nuffield Fdn	9				
A & O Reg	16						
N W Reg	14						

Table 4.14
Leading individual funders (numbers of papers acknowledging support) for English papers in occupational therapy research (OCCTH), 1988–98 (N = 715)

UK government	N	UK PNP	N	Industry	N	Other	N
Total	68	Total	59	Total	7	Total	15
Med Res C	22	Chest Ht Str	7	Fisons	1	MacArthur F	1
Dept Health	16	Mental Hlth F	6	Shell T&T	1		
N Thames Reg	7	Nuff. Prov H	4	Wellcome plc	1		
ESRC	4	Wellcome Tr	4				
N W Reg	4						
S & W Reg	4						

Table 4.15
Leading individual funders (numbers of papers acknowledging support) for English papers in physiotherapy research (PHYTH), 1988–98 (N = 416)

UK government	N	UK PNP	N	Industry	N	Other	N
Total	82	Total	126	Total	27	Total	18
Dept Health	23	Ch Soc Phys	27	Nomeq Ltd	3	Deut Forsch	3
Med Res C	19	Arthrit Res C	11			Con Naz Ric	2
S & W Reg	6	Chest Ht Str	11			F R S Q	2
A & O Reg	5	Inst Orthopae	9			M U R S T	2
N W Reg	5	Action Res	6				
W Mid Reg	5	R E M E D I	6				

Table 4.16
Leading individual funders (numbers of papers acknowledging support) for English papers in speech and language therapy (SPLTH), 1988–98 (N = 964)

UK government	N	UK PNP	N	Industry	N	Other	N
Total	361	Total	157	Total	39	Total	138
Med Res C	230	Wellcome Tr	35	I B M	3	Eur Comm	20
ESRC	62	Chest Ht Str	13	Hitachi Med	2	Nat Inst Hlth	13
BBSRC	40	Brit Academy	10	Laryngograph	2	C N R S	11
Dept Health	16	Nuffield Fdn	10	Mothercare	2	Max Planck	10
N W Reg	9	Leverhulme T	9			Can Gov't	9

Analysis

Selection of papers

- 4.32 Because of the lack of coverage of the SCI and SSCI in some sub-fields, it is difficult to compare outputs directly. In particular, midwifery research may be seriously under-estimated as no additional journals were considered for this sub-field.
- 4.33 Occupational therapy and physiotherapy both have the large majority of their papers added. Although the additional journals involved were all peer-reviewed, there may be some doubt as to whether they are of comparable standard to the ones covered in the SSCI. It would be desirable to check the standing in particular of the 'British Journal of Occupational Therapy' relative to the other journals used by UK researchers in this sub-field. This can be done by means of a simple survey (as was done in physiotherapy) but it is also possible to determine

the numbers of citations to papers⁸ in the journal for some sample years. It was noticeable, for instance, that only 7% of the papers in the 'British Journal of Occupational Therapy' had any funding acknowledgements, whereas 49% of the papers in the other journals did so. This suggests strongly that the research in this journal is likely to be of lower quality because of the known association between the numbers of funding bodies acknowledged on a paper and its potential impact.⁹

The six sub-fields compared

- 4.34 The tables show that there are big differences between the sub-fields. The output of England (as a percentage of the UK) varies from almost 85% in speech and language therapy down to barely 75% in midwifery (where Scotland is particularly strong). All the sub-fields have shown a significant increase in output, although it has not been consistent year-on-year. Nursing research expanded very rapidly to 1995, but seems to have declined in output after then. Dietetics has expanded the least, but even so has increased output by almost 50% over the 11-year period.
- 4.35 Speech and language therapy research is the most 'academic', with almost 80% of papers coming from a university or college setting, and barely one-third from a clinical setting. None of the sub-fields has more than half of its output from hospitals. Dietetics is the most 'scientific' sub-field and resembles biomedicine in general, with nearly all the papers in the SCI and a high proportion of them being funded. Occupational therapy is the least 'scientific', followed by physiotherapy, but as mentioned above this is largely due to the inclusion of papers in the 'British Journal of Occupational Therapy and Physiotherapy'. For example, in physiotherapy research, 87% of the SSCI papers were from an academic setting but only 49% of the non-SSCI papers (mainly in 'Physiotherapy') were academic in origin.
- 4.36 Three of the sub-fields seem to be quite international in character, with one in six papers having a foreign co-author – dietetics, midwifery and speech & language therapy. These are also the sub-fields in which there is the greatest amount of inter-city co-operation within England, as judged by the number of addresses. They may also be the most interdisciplinary, or at least they have a fairly high average number of authors per paper (dietetics, 3.7; midwifery, 2.8; speech & language therapy, 2.7: compare nursing with 2.1 and physiotherapy and occupational therapy with 1.9).
- 4.37 There are quite noticeable differences in the location of the leading centres for the different sub-fields. In dietetics, Cambridge (11%) and London WC (9%) dominate output. In midwifery, with comparatively few papers, London WC (9%) and London SE, Cambridge and Bristol (7%) are the leading centres. In nursing, London SE (10%) has a very strong position followed by Manchester (7%). In occupational therapy, output is much more evenly spread and the leading areas are London SE (6%) and Southampton (5%), followed by Oxford (4%). For physiotherapy, London WC leads with 8%, followed by London E and Glasgow (each with 5%). Finally, in speech & language therapy, the most concentrated sub-field in terms of output, London WC dominates with over 16% of UK output, followed by Cambridge with 9%. Manchester is in third place with 6% of output.

⁸ Data are only available on UK papers, but these form the vast majority of papers in this journal.

⁹ See Lewison G and Dawson G (1998) The effect of funding on the outputs of biomedical research *Scientometrics*, vol 41, pp 17–27.

Funding of AHPs research

- 4.38 The results of Table 4.10 should be compared with those for biomedicine overall, where the UK government provides about 33% explicit support (there is additional implicit support from the Higher Education Funding Councils and the National Health Service), the private non-profit sector about 28% and the industrial sector about 16%. Government support at this level is only provided in dietetics and speech & language therapy. There is a notable lack of support for AHPs research from the UK private non-profit sector and especially from industry, except, for understandable reasons, in dietetics. The analyses in Tables 4.11 to 4.16 are often of too small a number of papers to be worth much comment, but in dietetics the strong showing of the European Commission is notable. The support of the UK Department of Health is most apparent in nursing research. It is also noteworthy that, although in biomedical research generally from 1988–97 the Medical Research Council supported 1.85 times as many papers as the Wellcome Trust, in the AHPs the ratios are far higher: 3.1 in dietetics, 2.2 in midwifery, 8.4 in nursing and 5.5 in occupational therapy. The Wellcome Trust seems to have shown little interest in AHPs research except in dietetics.

Section B: Findings from the questionnaire survey

- 4.39 We now turn to the findings of our survey, which attempts to characterise research output by the alternative means of asking respondents about numbers of publications produced by staff in their departments.
- 4.40 The following table gives details of the discipline of respondents.

Table 4.17
Discipline of respondents to the questionnaire

	Number	Percent
Nursing/midwifery	26	52.0
Combined AHPs	5	10.0
Physiotherapy	5	10.0
Occupational therapy (OT)	1	2.0
Speech and language therapy (SLT)	6	12.0
Dietetics	1	2.0
Radiography	2	4.0
Nursing/AHPs combined	4	8.0
Total	50	100.0

Research output

- 4.41 Improved research output was a high priority within our sample of departments. This is hardly surprising given the importance of the Research Assessment Exercise (RAE) for potential funding as well as academic kudos. We asked our respondents to list the priority areas for the development of research in their departments. Approximately half of them wrote that increasing their output of research papers was a high priority, and some departments also stated that they had developed a publications strategy which included the targeting of high quality academic journals.

- 4.42 Nearly all respondents, when asked to name what they considered to be the three best indicators for assessing the quality of research in the nursing, AHPs, and related fields – apart from the criterion of the RAE – identified research publications in good quality journals (and/or in journals ‘relevant to the field of the research’) at the top of their list. A number of departments included writing for publication workshops, or writing mentoring, as part of their activity aimed at enhancing research capability among their staff. One of the markers of success of a research collaboration was the emergence of publications.
- 4.43 We asked how many research publications in books or refereed journals staff in each department had produced over the past four years. There was a wide variation in response. The following table shows the results for each discipline:

Table 4.18
Mean number of research publications in last four years, number of staff and ‘publications per member of staff’ by discipline

	Mean	Mean no of Staff	Departments	Publications per Staff
All departments	122.7	69.2	39	1.8
Nursing/midwifery	152.4	95.3	20	1.0
Combined AHPs	124.3	43.5	4	3.4
Physiotherapy	130.6	57.4	5	1.2
OT	26.0	21.0	1	1.2
Speech and language therapy	61.3	11.2	4	3.0
Dietetics	36.0	12.0	1	3.0
Radiography	15.5	21.0	2	1.4
Nursing/AHPs combined	125.0	86.3	2	4.2

(Missing Cases = 11)

- 4.44 There was no (or even approximate) association between numbers of publications and the length of time a department had been in higher education, numbers of staff entered for the 2001 RAE, numbers of staff with PhDs, or faculty within which the department was located. The ‘publications per person’ quotient varied across individual departments from 0.5 publications per person to 8.3, with a mean of 1.8. The apparently most productive department was a combined nursing/AHPs department – a Health and Rehabilitation Research Unit within a faculty of Medicine, Health and Biological Sciences. These results should be approached with caution because we cannot assume that staffing levels, as reported in the questionnaire, were constant during the period in which respondents summed their publications.

Postgraduate/PhDs

- 4.45 Although not a measure of output, another measure of research capacity is the number of academic staff with a doctoral qualification. The proportion of academic staff with PhDs in our sample was small, and about three-quarters of respondents stated that building up the number of staff with PhDs was a priority for development. The following table shows the mean percentage of PhD-qualified staff across the different disciplines

Table 4.19
Mean percentage of academic staff
and mean numbers of academic staff with PhDs by discipline

	Mean % of PhDs	Mean no of PhDs	Mean no Staff	Departments
All departments	16.0	7.0	69.2	45
Nursing/midwifery	14.4	8.5	95.3	24
Combined AHPs	16.7	7.2	43.5	5
Physiotherapy	7.2	5.6	57.4	4
OT	19.0	4.0	21.0	1
Speech therapy	42.9	5.8	11.1	6
Dietetics	33.3	4.0	12.0	1
Radiography	4.8	1.0	21.0	1
Nursing/AHPS combined	14.5	5.0	86.3	3

(Missing Cases = 5 or 10%)

- 4.46 Doctoral graduates 'produced' by departments can also be considered a 'research output' if they are seen as reflecting academic culture and activity. The numbers of doctoral graduates from the sample was also small, but there was a tendency for departments with higher numbers of PhD-qualified staff and higher overall numbers of staff to produce more PhD graduates.

Table 4.20
Mean numbers of PhD graduates for 1999–2000 by discipline

	Mean no	Departments
All departments	1.4	35
Nursing/midwifery	1.6	16
Combined AHPs	1.6	3
Physiotherapy	2.0	5
OT	-	1
Speech therapy	1.2	4
Radiography	-	2
Nursing/AHPs combined	0.5	4

(Missing cases = 15 or 30%)

Incentives and barriers to research

- 4.47 We asked respondents about the incentives to undertake research and the barriers. Not surprisingly, views about barriers were expressed more forcibly and at greater length.

Incentives

- 4.48 Many universities, including those in the former polytechnic sector, place a new emphasis on developing research-based cultures. For those in nursing and AHPs departments wishing to do likewise at a departmental level, such strategies provided a useful foundation, particularly when matched with university funding for infrastructure development. One respondent listed the following incentives:

'pressure from the centre of the university to have an excellent national and international research profile; opportunity to gain some HEFCE funding through RAE; personal satisfaction/achievement' (Nursing and Midwifery).

- 4.49 For those in departments who either had no history of RAE entry, or who had entered but received a score that did not attract funding, any financial rewards for research appeared absent, for example:

'There are no major incentives other than people wishing to get publications, etc. This is related very strongly to our RAE score – low incentives = low score' (Radiography).

- 4.50 However, where HEFCE funding was available, this provided some possibility of continuing in research:

'The only incentive seems to be that, if you are research active you have access to the money your research group earns through HEFCE to buy yourself out of teaching, or 'buy shares' in a Research Assistant to do further research' (Speech Therapy).

- 4.51 Of course, there were other reasons for developing research and a few respondents reminded us that funding was not the end in itself:

'Good question at the minute ... In the event of performing well in the RAE, we hope to secure *some* research support funding through the university. But we also see raising the research profile as a way of attracting (good) students and staff. Otherwise the incentives are much the same as for all university scholars – knowledge gain as an end in itself, impacts on policy, practice and education' (Nursing).

Barriers

- 4.52 Those respondents in dedicated research centres said they experienced no or few barriers to research. However, they were in a minority. One respondent summed up probably the two chief barriers to research development within nursing, although the situation is different in some respects within the AHPs:

'(a) Funding for nurse education is principally via consortia, the vast majority of which is for teaching and administration only. There is no inbuilt funding for teaching staff to be research active. (b) Historically, nurse teachers who were in Colleges of Health were not selected on the basis of research capability and interest' (Nursing).

- 4.53 Another nursing respondent elaborated on their view of the barriers:

'The small research capacity relative to total number of staff. The time available for novices and post-docs to undertake research is scarce. Heavy teaching loads, administration and mandatory clinical work (one day per week as required by the English National Board for Nursing, Midwifery and Health Visiting) more than fill the working week. The requirement (from the Education Consortium) that mature students should be provided with flexible courses means that lecturers frequently have to teach in the evening. Most academics can do their research once the students are away, if they are too busy during semester. This last option isn't

available to nurse lecturers, since numerous different courses, from Masters level down to short National Board endorsed courses, are run virtually 365 days per year' (Nursing).

- 4.54 If these respondents summarised structural impediments to research, there appeared to be some institution-specific problems too. The following was written by a respondent within a new university:

'There seems to be little institutional support or encouragement. The system for getting university support/agreement for completed bids for external funding is Kafkaesque. One needs to give false deadlines (two weeks before the bid actually has to be in) for the process of getting signatures from every level of management to be completed. There is minimal support for costing bids. One person supports the entire university ... At present, there is not even departmental funding available for presenting papers at conferences. Our low previous RAE rating counts against us in gaining access to funding within and outside the institution. It is a tribute to my colleagues that they have managed to do as much as they have' (Speech Therapy).

- 4.55 We specifically asked about any measures taken within departments to alleviate teaching pressures on staff. Most departments appeared to have some kind of either formal or informal scheme, and many were aimed only at research-active staff and those undertaking PhDs. Some respondents acknowledged that such schemes were inadequate. One notes:

'Focus teaching into certain time periods; distributing admin responsibility among the group; emphasising scholarship not just primary research' (Dietetics).

Another reported:

'All staff are supposed to take one day per week for 'scholarly activity'. Some don't take it, others take it and don't produce anything. Some don't take it but still produce (i.e. me!)' (Nursing).

Support from institutions: infrastructure and pump-priming

- 4.56 We asked respondents whether their department had received any specific funding for infrastructure development to support research in the last two years, or whether any such support was planned in the near future. About two thirds of respondents detailed some infrastructure support. This ranged from the provision and updating of computer equipment through administrative posts and funding of research assistants to support for research chairs and major building works.
- 4.57 Similarly, the great majority of departments benefited from various pump-priming initiatives from their institutions, although a small number of respondents were emphatic that their universities did not support research development in any way. For example, one person noted: 'Sabbaticals [only], clinical priorities make other resource allocation impossible' (Speech Therapy). In most cases, pump-priming initiatives were 'funded on a competitive, peer reviewed basis' (Nursing), but for some departments this caused a problem: 'There are university research studentships which we cannot compete for, as they are only open to 3b and above rated groups' (Speech Therapy).

4.58 Some institutions did appear to allocate research capacity-building funding even to low RAE scoring departments, for example: 'No money available after first RAE bid. There are University Research Support Funds and, when finances permit, Faculty Research Funds – the School has benefited from both' (Nursing). Apart from three exceptions, where respondents gave details of actual sums of money involved, these were small, i.e. between £2,000 and £8,000.

5 The nature and extent of collaborative links

- 5.1 Current policy within UK higher education and health service sectors identifies cross-disciplinary and cross-sector research collaboration as a priority for development (see Chapter 1). In view of this, and as part of our characterisation of nursing and AHPs research culture, we asked our respondents about various kinds of collaboration: those with other disciplines in their own institutions; those with other higher education institutions; and those with NHS trusts, health authorities, social services departments along with other service providers. The most highly developed area of collaboration appeared to be with the service sector. This gave rise to more than twice as much funding as each of the other areas of collaboration.

Collaboration within institutions

- 5.2 We asked respondents to list the academic disciplines within their own institutions with which they had collaborated in research activity over the last five years, and to give the title of the project as well as the source and amount of any funding associated with such research links. Table 5.1 shows the numbers of links between surveyed departments and other disciplines within their own institutions:

Table 5.1
Total and mean numbers of links with other disciplines within own institution by discipline of respondent

	Total Links	Mean no of Links	Departments
All departments	81	2.0	40
Nursing/midwifery	56	2.5	22
Combined AHPs	13	4.3	3
Physiotherapy	5	1.0	5
Speech therapy	4	1.0	4
Dietetics	0	-	1
Radiography	0	-	2
Nursing/AHPs combined	3	1.00	3

(Total cases = 34; missing cases = 7)

- 5.3 The most frequently named collaborating discipline was psychology/psychiatry (11) and sociology/medical sociology (8) and there were four links with engineering departments and departments of primary care/general practice. Twenty-eight departments received funding for these collaborative activities. (see Table 5.2).

Table 5.2
Funding received for collaborations with other disciplines within respondent's own institution (Number of institutions: 15)

	£
Minimum	0
Maximum	1,054,000
Total Funding	6,691,499

Collaborations with other institutions

- 5.4 Twenty-six respondents reported research links with other institutions. Table 5.3 shows the links made by each discipline.

Table 5.3
Total and mean numbers of links with other institutions by discipline of respondent

	Total	Mean	Departments
All departments	77	2.0	38
Nursing/midwifery	45	2.4	19
Combined AHPs	3	1.0	3
Physiotherapy	5	1.3	4
OT	1	1.0	1
Speech therapy	14	2.8	5
Dietetics	0	0.0	1
Radiography	1	0.5	2
Nursing/AHPs combined	8	2.7	3

(Total missing cases = 12)

- 5.5 Most links were with UK universities, while a small number were with universities in the European Union. This echoes the findings reported in Chapter 4, where we commented that three of the sub-fields (midwifery, dietetics and speech and language therapy) seem to be quite international in character. Twelve departments reported funding associated with these links with other institutions (see Table 5.4).

Table 5.4
Funding received for collaborations with other HEIs

	£
Minimum	0
Maximum	600,000
Total Funding	3,957,566

- 5.6 We also asked about research links with NHS trusts or other services providers, such as social service departments.

Table 5.5
Collaborations with NHS and other service providers

	Total	Mean	Departments
All departments	182	4.6	40
Nursing/midwifery	95	4.5	21
Combined AHPs	7	2.3	3
Physiotherapy	4	1.0	4
OT	3	3.0	1
Speech therapy	4	0.8	5
Dietetics	2	2.0	1
Radiography	0	0.0	2
Nursing/AHPs combined	67	22.3	3

- 5.7 Eighteen departments reported funding associated with these collaborations with the NHS or other service provider (see Table 5.6).

Table 5.6
Funding received for collaborations with NHS and other service providers

	£
Minimum	0
Maximum	1,084,999
Total Funding	6,576,428

Comments on collaboration and areas for development

- 5.8 Respondents spoke of generally successful collaborations with other HEIs, NHS trusts and Health Authorities. In the case of links with the NHS particularly, respondents remarked that objectives needed to be clear and relevant to collaborating trusts' policy needs. They tended to feel that commitment of the partners was the key to this success and that problems could arise through a lack of this commitment, or through local rivalry or disincentives built into funding structures.

'Least successful – evidence-based midwifery project. Failed due to a lack of commitment from the partner organisation [and] lack of a project champion with sufficient leverage and commitment. There was a lack of clarity and acceptance of purpose of the role of partners, despite frequent attempts to clarify. We have withdrawn from this project.'

'There can be difficulties inherent in the relationship between geographically close universities in some cases. HEFCE funding streams can be a disincentive to collaboration, as can the contractual requirement to identify a lead partner.'

'...getting the money out of the 'senior partner' university has been difficult.'

The benefits of collaboration were wide-ranging and even various non-funded initiatives could have a later spin-off in terms of subsequent commissions for work, or later joint grant applications. The 'fostering of a collaborative and, as necessary, multidisciplinary research culture' was identified as a priority for development by one department and many others echoed this aspiration.

- 5.9 Commitment needed to be at all levels of collaborating organisations, as the following comments show:

'There is also a need to have commitment to such opportunities from the organisations involved – not just at grass roots level but also throughout.'

'It is not so much about removing barriers, but recognising that there is need for a different culture in relation to research – where you have visible research leaders not just clinical leaders in the various fields of practice.'

5.10 Respondents also commented about different cultures in the higher education and health service sectors, the latter being affected by what are perceived to be an apparently endless series of structural and personnel changes, which could make building crucial personal relationships difficult.

5.11 One respondent had a clear idea of how barriers to collaboration could be eased:

‘If there was one barrier to collaboration [to be singled out] it would be lack of funding for researching educational developments from the Education and Training Consortia when developing any new initiatives.’

‘Barriers such as complex funding and having to bid for monies should be removed. Monies should be awarded to every trust to undertake collaborative projects with university departments on an annual basis (and vice versa) – responding to both educational and clinical research. Scholarship funds should be set up automatically for every trust as well. It should be compulsory that every trust either allocates these funds or is given them to allocate for collaborative initiatives (– joint university/clinical scholarships or research supervision by university). This does not have to be on a grand scale, but [should be] linked to areas such as National Service Framework or the latest Nursing Standards generated from patient complaints (i.e. research it before it becomes an issue, etc).’

5.12 Taken as a whole, collaboration with the NHS appeared to be largely driven by local opportunities and some departments had clearly built a successful niche in evaluating local health and social care initiatives – over a wide range of topic areas. With the main source of income for these departments coming from ‘education only’ contracts with Education and Training Consortia (ETCs), it is hardly surprising that a highly pragmatic approach was taken to research activity. Perhaps as confirmation of this interpretation, there was only lukewarm support for the suggestion that national government health priorities might influence the development of the individual researcher’s strategies. Most respondents said that these priorities had little impact on them:

‘No impact really! We are at such an early stage that we do whatever comes up – eg, from ENB, local trusts, staff post-grad projects.’

5.13 However, there were a few exceptions, for example:

‘The national determination to build research capacity within the NHS has assisted the university’s planning for parallel research capacity-building amongst its staff in nursing, midwifery, and health visiting.’

5.14 Collaborations with more research-developed departments in other institutions were also seen as helpful by less developed departments, particularly when their ‘senior’ collaborators were experienced in collaboration.

Summary

5.15 Collaboration was seen as an important priority by our respondents. Collaboration with more experienced academic partners was thought to be a crucial way of building a reputation and laying down longer term links. Collaboration with service providers was valued not only

because it represented a *relatively* accessible source of (generally small) funding, but also because our respondents appeared genuinely motivated to influence local NHS and social services culture towards more of a research orientation. With some notable exceptions, NHS collaborations tended to be local and pragmatic rather than strategically planned in accordance with national priorities.

6 Institutional factors and case studies

- 6.1 In this Chapter we review the position from the perspective of the institutions and comment on some of the key factors in building research capacity. Following this, we present three case studies drawn from the institutions we visited. The purpose is to highlight some of the issues that arise in institutions in developing research capacity and in seeking collaboration with the NHS.
- 6.2 The three case studies we have selected present a broad spectrum in terms of their research ranking under the RAE in 1996.

Institutional factors

- 6.3 A very mixed picture emerged from our visits relating to the diversity in institutions' organisational arrangements, their capacity to shape their outcomes, and the different stages of development of the disciplines. History, geography, leadership, local support and sponsorship exert a powerful influence upon the profile and performance of disciplines. The impression given is of many different groups struggling to reconcile the tensions that are built into the health/HE system. Research leaders often appear to perceive themselves as operating against the odds: in spite of, and not because of, the system. Tensions operate at a variety of levels: national, regional, local and institutional, and have important economic and practical consequences for research.
- 6.4 The first of these tensions relates to the different cultures of health and HE. Each has different priorities and works to different time frames. Within many of the institutions visited, the NHS is seen to be constantly reorganising, while HE has more stability and can engage in longer term planning. The perceived short-termism of the NHS, and its highly politicised priorities, are regarded as out of step with higher education whose mission extends beyond that of health. Secondly, the content of NHS funding and research commissioning is now increasingly focussed and specific, which can reduce the opportunity to build up new areas and strengths over the long term. Thirdly, the research culture of Regional Offices and trusts can also be extremely variable. In some regions there is perceived by some departments to be a pervasive culture of anti-intellectualism, with little interest in research or postgraduate qualifications. Some regions, it is claimed, have even been unwilling to meet with university heads of departments. Finally, although some trusts are reported as being research friendly and encouraging collaboration through joint funding of research posts, others have refused to co-operate and have even severed links where these existed. The fear in some quarters is that the differential may widen, as some regions invest in infrastructure while others do not.
- 6.5 The culture of the institution matters too. One Deputy Vice Chancellor (DVC) noted that the university understood least about the medical school and its clinical concerns. Departments with a long standing presence in their universities may have had 30 years to build up their research, while recent arrivals through merger have had as little as five years to do so. But even departments which are longer established have had to adapt to rapid change, not only within the NHS but within HE, through mergers with former schools and colleges of nursing and midwifery.

Shaping strategy

6.6 Strategies for success in research reflect not only the institution's history but also local context and opportunities for development. Strategies and tactics for growth share some common features across the regions: a desire for a better RAE rating, recruitment of more research-active staff, a recognition of the need to work in partnership. The growth in the number of staff put forward for the 2001 RAE submission illustrates this ambition. New departments aspire towards a step-wise increase in activity, albeit from a low baseline. Established departments seem alert to developing along national priorities and keen to tap into high-prestige funding sources and training awards. Strategies of keeping informed about funding initiatives and seeking collaboration with other disciplines as equal partners were regarded as important, although this required long term investment.

6.7 Geography, as well as faculty location, could impact upon collaborative relationships with trusts and Education and Training Consortia (ETCs), as well as between institutions. While some ETCs were research friendly, even factoring a small element of research into their contract with HEI's, others were regarded as hostile. One person commented:

'ETCs say they want "teaching informed by research", but people here don't believe this and the ETCs don't provide funding for evidence-based teaching.'

Indeed, there were different perceptions of what evidence-based health care entailed in practice. The same range of attitudes was found in regions and trusts. While some regions have discriminated in favour of non-medical professionals in education and training awards, others have ignored such incentives.

6.8 It would be interesting to explore the impact of faculty location upon research activity, and whether some faculties provide better 'shelters' for research to grow, since nursing and AHPs departments are housed in a wide range of schools and faculties. Some have formed new structures through mergers with kindred disciplines such as social work and education. In one of our case studies we noted that four groups (a school and three departments) were being brought together to form an Institute of Health Sciences, and such a strategy is also being employed by other institutions. The quality of the immediate environment may be crucial in shaping success through local mechanisms and practices, sharing infrastructure, intelligence, research support and internal partnerships, as well as shaping identity, a sense of belonging and the culture of achievement.

6.9 Infrastructure use or sharing is largely invisible or difficult to track within organisations. Site visits have revealed little about infrastructure use and its distribution between different disciplines and departments. Financial systems seem unable to provide the level of detail needed to reveal this, although the results of the Transparency Review may well lead to changes in this, and one university was confident that such data would become available within approximately twelve months. The charging, collection and then distribution of overheads usually follows a university-wide policy and the flow of overheads recovered can take a variety of routes through the university administration. In one case, all the overhead is returned to the School, but a tax based on staff and student car drivers is deducted in return.

6.10 All nursing and AHP departments draw their funding mainly from teaching, but a diet of high volume teaching is regarded as a threat to research. Strategies are therefore designed to protect research from teaching by separating the two functions. Developmental models take a variety of forms, ranging from the establishment of themed centres to more loosely formed

topical networks and practice clusters. Networks assume different styles and functions. Some may be small and internal to the department, providing support for publications and bids, etc. Others may be larger, involving up to 100 people and extend to clinicians; engaging them in dissemination, designing new ways of communicating findings, and building capacity through the creation of research-friendly environments.

- 6.11 Specialist research centres are most commonly built around existing research strengths. Others may be an act of bold forecasting of what issues or topics will be requiring research effort in the future. Alternative growth strategies are to recruit a handful of new research posts in the new subject areas or to attempt to upgrade the performance and activity of the whole school/department. The latter is slower as it is designed to embed research into the fabric of school activities. 'Budding off' or 'piggybacking' from a more successful unit was another recommended approach.
- 6.12 Specialist research centres in new universities tend to reflect the practice-driven nature of their sponsorship. Structurally they are organised around a continuum that flows from practice development to research. Some employ core staff with separate funding mechanisms, but the risk is that funding for research is often opportunistic. In some areas NHS trusts have been active in supporting practice development portfolios in universities.
- 6.13 The key strategic decision for the senior university managers in charge of research policy is whether to focus their efforts and resources on selected proven 'stars' or whether to grow research capacity elsewhere as well. Most of the universities we visited recognised that building research capacity in new disciplines required planning and investment from the centre. Nursing, midwifery and AHPs, as newcomers, have challenged some universities' policy of investing centrally in existing research strengths rather than supporting new areas. In some cases nursing and allied health professions can account for as much as 25% of the total university income; the scale of this leads universities to recognise the need to develop research capacity in such large teaching departments. They argue that it would be unthinkable to have as many as 25% of the university's students taught by staff with no research capacity or commitment to scholarship. Some new universities are fast-tracking their research capacity through partnerships with trusts and funding university or joint centres linked to areas of practice development.
- 6.14 A second key strategic question relates to the nature of research and the perceived difference between research that is appropriate for the RAE, and research that meets the needs of the NHS for solutions to applied problems in the service. Some universities have clear research strategies for all their departments which make it clear where they stand in this spectrum.
- 6.15 There is a range of central support services which the university can provide to help new disciplines win research projects and it is surprising that some institutions have still to establish research support units or offices to co-ordinate these services. The classic model of support would provide: intelligence on research projects and grants (possibly using a database such as Community Of Science); assistance in finding research partners (particularly for EU projects); training and help with bid writing and planning; help with project budgeting and costing; training in project management; assistance with planning project evaluation; advice on dissemination strategies; conference management; assistance with identification and realisation of any IPR.

- 6.16 A variety of academic support mechanisms has been put in place, often by central top-slicing of the QR research income for development. The support provided ranges from capital investment in new buildings, to encouraging new departments to bid for university pump-priming lectureship and studentship schemes. Some universities will support the appointment of the first years of 'new blood' lectureship posts, which are usually accessed on a competitive basis. In an effort to boost emergent areas with 'achievable research potential', some institutions have declared a policy of investing some of their future QR funds in departments with a grade 3 in the 2001 RAE in order to help them to grow to 4 or 5 in 2006. Others offer time in lieu of teaching (25 days) for NHS-funded staff to engage in research and scholarship. Contractual changes can also be made to adjust teaching time to accommodate research, or to offer sabbaticals.

Co-ordination and collaboration

- 6.17 The type of research required to do well in the RAE was perceived to be very different from the applied research needed to enhance professional practice and patient care (although the stated criteria by which the RAE will assess quality do not support this perception). Close collaboration with trusts can drive developments according to their 'patch' priorities. This may make longer term strategic planning difficult. Researchers told us that rarely are trusts proactive in seeking collaboration. More often it is researchers who seize the initiative and operate as 'out-reach' workers marketing their expertise to trusts. Significantly, national R&D priorities had a low profile in the portfolios of departments except where these had a longer history of development. Similarly, there was little evidence of trusts using research to inform specific aspects of clinical governance agendas. Nor are there signs of a system of analysing payback informing commissioning practices by trusts. Where relationships with several trusts exist, duplication of effort is common, with little effort made to rationalise across organisations.

Conclusions

- 6.18 Significant variation exists in the extent to which the RAE represents a driver for schools and departments. Many departments still seem to be dependent upon a relatively narrow range of funders with local/regional rather than national priorities predominating. Their research agendas on the whole do not appear to be driven by the RAE. Research capacity building in some new university contexts has meant improving scholarship and professional practice rather than research as defined by HEFCE. For capacity to be improved, the manner in which education is commissioned and funded was thought to need changing, with an element of time built into education contracts to take account of research. Conditions of employment for NHS staff in universities also vary and this was regarded as requiring review.
- 6.19 The challenges for all groups (nursing and the AHPs) were regarded as being similar but varying by degree. Some disciplines have a sense of being more Cinderellas than others. Radiography was singled out as lacking a natural research base – 'the soft end of science, and the hard end of caring sciences'. The midwifery research base is different again, with a small but committed body of researchers with a strong consumer base to their research activities.

Case studies

- 6.20 The first case, at Central Lancashire, is based on a Department of Nursing and Midwifery and shows how that department remedies a relative dearth of research funding from the local trusts by creating a series of research networks with practitioners. A supportive central administration also has a strategy which helps large departments with low RAE scores to grow their research capacity.

Case Study 1: The University of Central Lancashire

Background

1. The University of Central Lancashire is the seventh largest in the United Kingdom and is a large provider of Nurse education, relating to fourteen NHS trusts. The University has over one thousand nursing students undertaking the Diploma in Higher Education and a smaller number of nursing degree students. The Faculty of Health, one of five faculties within the University, offers an extensive portfolio of undergraduate, postgraduate and continuing professional development courses, as well as research opportunities. The Nursing and Midwifery Departments within the Faculty of Health have a strong background in teaching, achieving a score of 24 in the recent Subject Review of Nursing and Midwifery undertaken by The Quality Assurance Agency for Higher Education. The University of Central Lancashire does not principally provide training for AHPs but they can and do join courses in Post Graduate Medicine and Health Studies Departments.
2. In the Nursing and Midwifery department, as in most areas of the University (with some exceptions including Astronomy and Material Science), research is not well developed. Academic staff in the Nursing Departments were integrated largely from Schools of Nursing and total around one hundred and fifteen full-time equivalent staff. The University is also in an area where the NHS trusts do not have a strong research tradition and the department has to accept several small-scale projects and many internally funded ones.
3. In the 1996 Research Assessment Exercise, Nursing was submitted to Unit 10 (UOA 10) and scored 2, with 9 research-active staff. The ambition for 2001 is to submit to the same UOA with a target score of 3A, with 19 active researchers. The increase in the numbers returned is particularly pleasing, given that eight of the researchers returned in Unit of Assessment 10 in 1996 will be returned in the Unit of Assessment 41 in 2001.

Clinical and Research Networks for Nursing

4. The Department is strongly committed to the notion of clinical practice being a central theme in its research. It has developed a Clinical Nursing Practice Research Unit, which is constructed around clinical and research networks created by each research team for specific clinical fields, in which key research themes are identified by practitioners, researchers and leaders of service delivery.
5. The creation of the Clinical Nursing Practice Research Unit (CNPRU) and the clinical and research networks was a response to the Department's success in securing NHS Executive and local trust funding for collaborative research projects in stroke rehabilitation, mental health, diabetes, parenting and community development. Bringing researchers together to create a supportive and challenging community, and forming the research teams within

specific clinical fields, provided a greater momentum to the department's research capacity building strategy. It has enabled a more pro-active approach to be taken to developing the department's distinctive portfolio of collaborative clinical practice research. The Unit was greatly assisted in strengthening its research through acquiring Faculty funding for the employment of research assistants within each of the teams. Three of the research assistants are graduate nurses seconded part-time and are currently employed in clinical practice.

6. The CNPRU aims to expand its distinctive portfolio of collaborative clinical practice research through supporting researchers and their teams in creating and sustaining clinical and research networks in response to service, client and societal needs. There are already six such networks, which are currently established and sustained through the Unit, in the clinical fields of stroke rehabilitation, diabetes, mental health, parenting and communities, children and families, and care of older people.
7. The Department has a long-standing tradition of working collaboratively with the health services and users through clinical forums, link systems, networks and joint appointments. These have proved to be very useful in areas of curriculum development, monitoring and evaluation, supporting clinical staff in their teaching roles and their own professional development, user involvement, research capability building and practice development. Whilst several of the clinical and research networks are newly created, some have emerged from these existing forums and networks which will continue to provide a conduit for the establishment of additional clinical and research networks in the future.
8. The purpose of each clinical and research network is to engage in dialogue with practitioners and to support, evaluate and disseminate the development of clinical nursing practice. This dialogue results in collaborative working between practice and academia. A key research focus is the body of research that concentrates on patient, client and carer experiences of health and illness.
9. Each network is concerned with setting the agenda for future research work in its particular clinical field through:
 - identification of existing problems of clinical nursing practice
 - sharing of concerns, ideas and successes
 - the expansion of nursing through research and development
 - the identification and dissemination of research to underpin the effectiveness of nursing practice.
10. The networks operate locally and in some cases attract members within the region and from further afield. They are open to nurses and other practitioners working in the core clinical specialities and membership ranges from 30 to 100. It is anticipated that membership will be further extended to other professionals as the CNPRU's research portfolio develops.
11. The University and Faculty have supported the research teams in getting their networks up and running. The Director of the University Advancement Unit, which seeks to promote academic, scholarly and research activity, was extremely supportive in providing guidance, expert advice and access to university resources to help in the establishment of the CNPRU. The Faculty Business Development Unit provided support in establishing the network databases, distributing network materials and helping with organising network conferences.

However, the initial challenge for researchers has been to find the time, commitment and energy to establish and sustain the networks.

12. Not all networks do the same thing. The researchers have taken different approaches to setting up the network structures in order for researchers and practitioners to work in a planned and strategic way to address inconsistencies, test and develop new initiatives, generate research questions and consensus statements about practice, and disseminate research findings. However, each research team maintains a database of members, organises events for collaborative working and dissemination (including symposia and clinical conferences), produces and circulates regular newsletters and maintains a web site. Internet access is also being currently developed to allow more interactivity within the network.
13. A major issue for the Clinical Nursing Practice Research Unit and its researchers is how to sustain the network activity – balancing the expectations of clinical practitioners and service leaders with the limitations of available staff resources. However, this is offset by the fact that the number of collaborative clinical nursing research projects generated through the networks is growing, with further research grants awarded by NHS trusts for research projects in all of the existing networks. In one case a new network has led to four small research projects. Thus, the Unit could become self-funding in due course, but its current success and the experience gained through NHS collaboration will be taken account of in the competition for further University and/or Faculty funds.
14. A strong message for the Department from the networks is that collaborative research would seem to be essential to get nursing research 'off the ground'. This is in contrast to developing individuals in isolation from networks, and the more traditional models for building nursing research capacity and capability within higher education and the NHS.
15. 'Badging' up the nursing research within core clinical fields and themes, does provide instant recognition and access to practitioners and other stakeholders who wish to participate, and who readily identify themselves with the particular clinical field and the researchers.
16. There are some hazards to watch out for:
 - i. Working through clinical and research networks in this kind of way requires researchers to manage the balance between dissemination activity and the generation of the future research agenda. The latter is perhaps of primary interest to fewer network members, whilst the former is of primary interest to the majority of network members.
 - ii. A balance has also to be maintained between honouring large teaching contracts whilst developing scholarly and research activity. This needs careful planning, workload management, and annual monitoring and review by the head of department.
 - iii. The approach to developing a distinctive portfolio of clinical nursing practice research in selected, specific clinical fields may lead those not in the networks to feel marginalised, and this issue needs to be managed carefully.

Conclusion

17. The idea of the networks, which began as a means of making practitioners aware of new research findings and ideas, and of dissemination, has become a valuable two-way flow of

information and intelligence about patient needs and problems in the particular clinical areas. It is also beginning to generate project income for the department as network members in the NHS learn to trust their academic colleagues and to understand how they can contribute to resolving some of their problems. For those universities in areas where the NHS Regional Office is not supportive of research in HEIs, the network approach offers a mutually valuable route into practice, as well as a source of worthwhile research experience.

- 6.21 The second case, at City University, focuses on a different situation. Since the University already has two strong departments, it centres on how research capacity is created in a large School of Nursing which had a ranking of 1 in 1996. The study records a very substantial growth in external research income and suggests what has made this possible.

Case Study 2: School of Nursing and Midwifery at the City University

Background

1. This study shows how a University has been able to build up the capacity of a group of nursing and AHPs departments over the four-year period since 1996. It illustrates the extent to which the centre can help a school or a department that wishes to grow its research competencies.
2. City University has four main units in the health field. They are:
 - School of Nursing and Midwifery
 - Department of Languages and Communications Science
 - Department of Radiography
 - Department of Optometry.
3. In addition, there are three health-related groups in the School of Social Sciences and one in the School of Informatics. Undergraduate students in health account for a third of the University's student numbers. The School of Nursing and Midwifery and the three departments will shortly be brought together in an Institute of Health Sciences in August 2001. In the 1996 RAE, Nursing and Radiography achieved rankings of 1, while Optometry and Languages and Communications Science were both scored at 3A. Thus, the main challenge for the University is to ensure that Nursing with its 170 academic staff performs well in the 2001 submission.
4. The University prides itself on its links with business and the professions and it has one of the highest proportions of taught postgraduates in the UK. Because of this, it takes a strategic view of encouraging research that is relevant to client's needs, as well as research that is traditionally favoured by the RAE criteria. Action research and developmental research are welcomed.
5. Despite this distinctive approach, the University is still keen to strengthen its classic research profile and has set an ambitious target for the 2001–2006 period, by aiming at a 50% increase in research-active staff from the 2001 baseline. In Nursing this means that 25% of the staff should be research active, and that the School has set itself a target of a ranking of 5 in ten years' time.

6. The Optometry Department has made a bid to the Joint Infrastructure Fund and expects to be awarded funds; other than this there have been no major infrastructure receipts. The University has itself invested in new teaching and research accommodation for the department, with clinical facilities now located adjacent to the Moorfields Eye Hospital. A new building for the Department of Languages and Communications will have part of its cost met from an NHS capital contribution, including the provision of a clinic. This is influenced by the need to expand the numbers to meet the demands of a new NHS teaching contract.
7. The level of external research funding and support varies between the constituent departments. The Department of Languages and Communication Science, for example, is hoping to achieve a grade 4 in the RAE and has over 80% of its staff research active. It also has had a portfolio of research funded by MRC, EPSRC, EU, DfEE, Wellcome Trust and several other charities, as well as many NHS collaborative projects. Similarly, the Department of Optometry has developed some leading-edge research, funded by the Research Councils, and has attracted an internationally recognised research group in the area of visual psychophysics. The Nursing and Midwifery School also has ESRC, EU and Lotteries Board grants, as well as participating in two ESRC projects with other institutions.
8. The University is very active in obtaining external funds. Figures obtained from the central Research Grants Office show the following to have been received since the last RAE:

Table 6.1
Research Income from Three Departments, 1996–2000

Unit	Funder	£
School of Nursing and Midwifery:	DH/NHS(E)	£67,000
	Industry	£3,600
	Various NHS trusts	£2,135,116
Language and Comms Science:	DH/NHS(E)	£226,853
	Charities	£679,490
	Government	£177,466
	NHS trusts	£32,231
	Research Councils	£102,096
Radiography:	Research Councils	£46,305
	Charities	£33,937

(In addition to the above, the Department of Optometry has received grants to the value of £1.67m in the last few years.)

University Support

9. City University operates a very devolved structure and schools have considerable budgetary autonomy. Thus, the health departments retain all the sums they earn under the contracts they hold with Education and Training Consortia, subject to payments for central services using a transparent and agreed costing methodology. This negotiation is managed centrally, but the school or department is fully involved.
10. The devolved system, together with the favourable treatment of research overheads at a central level, and the attraction of significant funds from local trusts, has enabled the School of Nursing to invest strategically in the development of research. Since 1996, the

main plank of this strategy has been to encourage all staff to develop as researchers within a strategic framework of themes and targeted areas of strength. These relate to older people, mental health and learning disabilities, perinatal health and inter-professional education. Another theme has been to recruit research-active professors from other institutions, by offering them the incentive for five years of a fully-funded research assistant, half a secretarial post, and a reduced teaching load. They have all been given the clear brief to expand the School's research profile and activity. Other features of the support have been:

- i. encouragement in a policy of recruiting experienced non-nurses and non-midwives to chairs in the Nursing School (for example, a statistician and the head of research from Dr Barnardo's), as the supply of research-active nurses is very limited
 - ii. access to central funds for the support of research fellows/lectureships
 - iii. a generous 'taxation' policy as regards the level of funds that are deducted to meet central University overheads
 - iv. refunds, direct to those who earned them, of all overheads generated by external contracts (the local NHS trusts are willing to pay 46% overheads on at least the salary element of the project budget, while some pay 46% on the total project cost)
 - v. a long-term commitment to continued support, even if the 2001 RAE results are not as good as expected.
11. The University does not currently provide any central support in the preparation of bids, or in negotiation with funding bodies, nor does it offer any central training in this area. However, these services will be set in train with the creation of a central Research Development Office and the development of suitable information systems. In addition, the University has identified the need to help schools to disseminate the results of their research, and the External Relations office will be used to develop communications mechanisms such as the web site, the internal newsletter, and local press and media.
12. The new Institute of Health Sciences is encouraging collaboration between the University and Queen Mary College, with whom the University has a strategic alliance, building on their joint programmes in primary care. This has already led to a joint project for a NHS Call Down centre, joint research seminars and joint pump priming for collaborative projects.
- School of Nursing and Midwifery Support**
13. The School of Nursing and Midwifery has 170 staff spread over two sites. The main one is beside St Bartholomew's Hospital, with whom it has close links historically, while the other is close to the Royal London Hospital in Whitechapel.
14. These geographical barriers are overcome by regular fortnightly meetings of heads of research groups in a Research Core Group, chaired by a newly-appointed Assistant Dean for Research. This group encourages co-ordination and joint bidding between teams. It works to an overall research policy set by a School Research Policy Committee, and is helped by a Research Administrator who assists with the preparation of bids for external funding. Each department within the school has a Head (appointed on a rotating basis)

who is responsible for the management of teaching and a Head of Research who is in charge of research.

15. Many of the staff in the Nursing and Midwifery School have come from a culture where research was not part of their work profile, and the strategy is therefore to recognise both research and scholarly activity. All are expected to engage in scholarly work but not necessarily in RAE-type research.
16. The School's external research activity has been achieved with no funding from HEFCE, as it only achieved a ranking of 1 in the last RAE. Fortunately, the consortium with whom the School negotiates for teaching income has agreed to include an allowance in the overhead calculation for a contribution to the School's Strategic Development Fund. Also, an element of 25 study days in the contracts for all staff, and an allowance for sabbatical periods, are used to train researchers and to encourage all staff to be research-aware.
17. A position of practitioner/researcher has been created, in which the holders are funded by trusts and split their time between the trust and the University. Eighteen such posts have been appointed by several trusts for three years, with a remit to embed research findings in practice, and to undertake action research related to practical issues in their work.
18. The newly-appointed professoriate, and a core of experienced supervisors in the School, has enabled 23 PhD candidates to be accepted. Many of these work in trusts and they are encouraged by the School to publish their work. The School has just funded a PhD away-day event in which the aim was to raise the level of awareness about research issues. It is also developing a professional PhD with a large research component.

Conclusion

19. The University has established a growing base of research-active professionals as well as a portfolio of worthwhile projects with its local NHS trusts. This has been achieved principally by recruiting senior staff with entrepreneurial characteristics and allowing them to operate in a devolved environment supported by a benign central management. This central support is particularly helpful in allowing the retention of a significant proportion of all overheads recovered. However, there has also been help from the two education and training consortia who have taken into account the University's need to invest resources in building up the research capacity of its teaching staff. HEFCE funds via the QR research funding stream have helped two of the departments

- 6.22 The third and final case study comes from an institution which has established an impressive array of partnerships with the NHS trusts in its area. Despite this solid base in practice, the study emphasises how dependent the discipline is still on internal backing from the institution.

Case Study 3: University of Northumbria at Newcastle

Faculty of Health, Social Work and Education

Background

1. The Faculty of Health Social Work and Education was established following the incorporation of Newcastle and Northumberland College of Nursing and Midwifery and Bede College of Nursing and Midwifery into higher education. The formation of the Faculty brought together the pre- and post-registration educational programmes for nursing, health visiting and midwifery, with physiotherapy, occupational therapy, social work and teaching. This created the opportunity to develop integrated educational and research programmes for these professions. Given this configuration, the Faculty strategy recognised the trend towards inter-disciplinarity which became the cornerstone of Faculty policy.
2. Although situated in a 'new' university, the Faculty inherited a reasonable establishment of active researchers from the pre-existing University Departments with which the nursing colleges merged. At the time of incorporation, two nurse lecturers and one physiotherapy lecturer were undertaking externally-funded post-doctoral research in Health Services research. All three actively participated in local, regional and national professional research networks. This research activity was undertaken alongside, and often in collaboration with academics in education, and with non-professional academics who had an established track record of health services research. Consequently, supervision was available to develop research capacity in nursing and AHPs.
3. The introduction of the NHS R&D strategies in the early 1990s provided the opportunity for growth and development in nursing and AHPs research leading to considerable investment. Regional funding was obtained for a Chair in Nursing and two support posts. Additional infrastructure funding was obtained from Regional R&D funds to support practice development research. Opportunities to join NHS Regional R&D committees (including funding committees) provided in-depth knowledge and understanding about the evolving R&D agenda in health services research, and further built capacity in nursing and AHPs research.
4. In keeping with the evolving health services research agenda, the focus for nursing and AHPs research within the Faculty increasingly moved towards service and practice development. This strategy was informed by the ideologies and research interests of the active researchers themselves, and supported by Faculty policy. To implement this policy the Faculty established joint Chairs with local trusts in Learning Disability, Nursing, Physiotherapy, Psychology, Dementia Care and Primary Care. A Professorship in Rehabilitation was established and jointly funded with a local trust. This works to the model of medical chairs in that it is located in the trust, and works closely with practising physiotherapists and other staff to develop clinical research programmes.

Nursing Research and Development Unit

5. The Faculty teaching structure is organised into five schools, four of which have nurse lecturers housed within them. In order to develop research capacity and coordinate nursing research across the Faculty, the Nursing Research and Development Unit (NRDU) was established. This provides a forum for the strategic development and co-ordination of nursing and midwifery research across the Faculty. It aims to promote nursing and midwifery research

and support individual nursing and midwifery research initiatives. To enhance this aim, all members of the NRDU have been aligned to Schools to strengthen research capacity within the Faculty.

6. The aims of the NRDU are to:
- focus on the core aspects of nursing and midwifery practice
 - respond to the needs of service users and focus on their experiences through active involvement in the research process
 - respond to the demands of service provision
 - emphasise the practice and service development elements of research
 - promote interdisciplinary and interagency research and to provide a broad basis for development
 - establish comprehensive programmes of research focusing on identifying the optimal combination of inter-agency, self and family care across the tiers of provision in relation to chronic and enduring health problems
 - contribute to the development of innovative methodologies in the nursing and midwifery context.

Collaborative Links with the NHS

7. In order to achieve these aims the Unit has established collaborative nursing research links with over 15 trusts. A range of different affiliative structures has been developed including time-limited honorary Research Associate posts for NHS staff. Obtaining an honorary post gives full access to University library facilities in exchange for an individual programme of joint publication, research and practice development, which is identified, endorsed and monitored by the Faculty.
8. A satellite nursing research centre has been established in Sunderland City Hospitals Trust, which is headed up by a Joint Chair in Nursing. Similarly, the Regional Chair undertook a two-and-a-half-year, half-time secondment to Newcastle City Health Trust. In both cases the Chairs work closely with the Nursing Directorate. This arrangement facilitates an evidence-based approach to clinical leadership and service development in nursing, but more importantly, it facilitates a strategic and systematic co-ordination of nursing developments between trusts based on models of best practice. This reduces idiosyncratic developments and local variations in practice which impede nursing research development. The research programme within the NRDU focuses on Practice Development Research, Care of Older People, and User and Carer Experiences and Outcomes.
9. The Practice Development Research Programme has established the Northumbria Strategic Alliances for R&D (N-SARD) This uses a 'hub and spoke' structure to advance the horizontal networking of a number of organisations, maximising R&D resources and creating a learning environment to develop the use of R&D in patient care. Each 'spoke' in N-SARD is very specific to the health care provider organisation. However, as a whole, their work contributes to a distinct practice development research programme, focussing on the ways in which practitioners use and create the knowledge with which they effect development in their understanding and practice of patient care. Some of the research questions arising from this focus are about the relationship between practitioners and patients and how they access each others' knowledge base; the partnerships between different professional groups; and the development of professional roles and knowledge. Many of the research studies concern the care of people with sustained health needs, for example people with dementia.

10. A similar range of alliances has been developed by the Care of Older People programme, which has been formally recognised as a multi-professional Research Centre in the Faculty. This Centre works across the health and social care interface and has established extensive links with the private nursing home sector. The Centre is headed by a nursing Chair.
11. The User and Carer Experiences and Outcomes programme again adopts a multi-professional perspective and has been working to develop innovative methodologies which capture user and carer experiences over time and across professions and agencies, and develop outcomes which do not privilege the contribution of any single agency or profession. Again, strategic alliances have been developed with service providers leading to the introduction of service innovations which create opportunities for further evaluation.
12. Collaborations with other HEIs tend to be around specific projects or programmes. A number of such collaborations exist with Newcastle University, York University, University of Jyväskylä in Finland, Stirling University and McMaster University in Canada.
13. The main driver for the focus on collaboration was the beliefs, ideologies, strategies, skills and managed autonomy of the active nursing and AHPs researchers, coupled with a supportive climate, pump-priming infrastructure funding, and successful outcomes which gave local service purchasers and providers the confidence to invest incrementally in this activity.

Funding

14. Funding for these initiatives comes from three sources:
 - i. The University currently wholly or jointly funds three of the four nursing Chairs and the Chair in Rehabilitation. It is currently funding two half-time post-doctoral research fellowships. Central administration services are provided as well as infrastructure costs.
 - ii. Local NHS trusts, Local Health Authorities, Local Authorities and the Educational Consortia fund numerous development posts, staff secondments (of NHS staff into the NRDU, and University staff into the NHS), evaluative research projects and consultancies. The Region funds a Chair in Nursing and a senior research support post and some secretarial support.
 - iii. University and NHS staff affiliated to the NRDU, and the Chair in Rehabilitation, have been successful in obtaining competitive international, national and regional research grants, bursaries and R&D fellowships in their own right, and in collaboration with a range of other HEI's.

15. The NRDU is highly dependent on local resources, which means that the continuation of these resources requires the Unit to meet local service needs.

Benefits

16. The innovation has enabled:
 - the development of research capacity and a shared professional research knowledge base across a very broad spectrum of nurses, midwives, health visitors and physiotherapists, both in the university and in the NHS

- a contribution to the development of clinical leadership and modernisation in nursing/AHPs in the health and social care sector (a number of nurse consultants locally are affiliated to the NRDU)
- teaching and curriculum developments are increasingly informed by the activities of the NRDU
- a Professional Doctorate is being developed under the auspices of the NRDU
- experienced nurse and AHPs researchers from the Faculty are able to work collaboratively and on an equal footing with other disciplines to develop multi-professional research projects, sometimes taking the lead.

Problems

17. The main problem has been one of topic and focus, and the way these relate to academic disciplines. Nursing as a practice and as an academic discipline is pervasive. Demarcating areas of activity as legitimate nursing research, as against topic-focused research (eg, practice development), client-focused (eg, children/older people), service-focused (eg, primary care/acute services), or diagnostic research (eg, stroke, respiratory disease) is a continuing area for negotiation. Structuring research activity around these areas subsumes the contribution made by the professional knowledge base of nursing and AHPs, thus reducing synergy, visibility and capacity development in these fledgling disciplines. Alternatively, restricting the research agenda to nursing/AHPs theoretical models, or to research *on* nurses and AHPs rather than *with* nurses and AHPs, massively reduces the potential modernising impact of nursing/AHPs R&D.
18. Other problems to be overcome include:
- spreading people too thinly
 - not profiling the work strongly enough
 - developing research and clinical leadership capacity through supporting senior nurses/AHPs who are older and more expensive than research grants/fellowships allow
 - developing an international profile which does not always fit with service and practice development strategies, nor is required by local service providers
 - the fact that most nurse/AHPs lecturers are funded by NHS Consortia which, unlike HEFCE, do not usually include any allowance for research time
 - the fact that most of the academic staff submitting to the nursing/AHPs RAE are not HEFCE-funded, which impacts negatively on the research income generated through these submissions.

The Future

19. The continuation of this activity is highly dependent on the continued support of the Faculty and the University for the NRDU and for AHPs research. The multi-disciplinary agenda now being pursued as agreed Faculty and University policy, may lead to a restructuring of research activity that could very easily render nursing/AHPs research invisible within the Faculty. Like all innovations, these remain vulnerable to structural change. The recently published Department of Health Strategy for Nursing Research provides an important framework for sustaining these innovations. For this to happen, the NRDU and AHPs researchers would need to generate significant income for the University. Should this not be forthcoming, other research structures which appear more likely to generate income may prevail.

20. For nursing and AHPs research to be enhanced, it has to be valued in its own right by the host organisation. This means more than valuing and rewarding the individuals who undertake this research: it means naming, framing and profiling the activity to enable legitimate academic and clinical leadership to develop and flourish.

Appendix I Individuals interviewed

Auldeen Alsop	CPD Project Manager, South Yorkshire Education and Training Consortia
Professor Senga Bond	University of Newcastle
Tracy Bury	Head of R&D, Chartered Society of Physiotherapy
Sally Byng	Chief Executive, Connect
Dr David Carrington	Chief Executive, PPP Medical Trust
Professor Jessica Corner	Institute of Cancer Research
Professor Janet Finch	Vice Chancellor, University of Keele
Dr Diana Garnham	Secretary, Association of Medical Research Charities
Margaret Goose	Chief Executive, Stroke Association
Headley Hilton	Senior Business Manager, Workforce Development, NHSE
Avril Imison	Head of Policy Therapy Services, Department of Health
Professor Alison Kitson	Director, RCN Institute
Dr Angela Madden	Chair, Research Committee, British Dietetics Association
Professor Eileen Martin	Chair, Council of Deans and Heads of School in Nursing and Midwifery
Professor G McKenna	Vice Chancellor, University of Ulster
Dr David Moore	Asst Chief Nursing Officer, Department of Health
John Rushforth	Acting Head of Research Policy, HEFCE
Dr Howard Scarfe	Head of Career Schemes, Wellcome Trust
Dr Julia Spragg,	PPP Medical Trust
Rosalynd Steele	Royal College of Midwives
Professor David Thompson	Head, Dept of Health Studies, University of York
Alan Walker	Director of Education, Chartered Society of Physiotherapy
Ali Wilson	Research and Development, NHSE Northern and Yorkshire Regional Office

Appendix 2 The research questionnaire



Centre for Policy in
Nursing Research



Association of
Commonwealth
Universities

To All Heads of Departments of
Nursing, Midwifery, Health Visiting
and Allied Health Professions

Dear Colleague

A HEFCE and Department of Health Study on: Promoting Research in Nursing, Midwifery, Health Visiting and Allied Health Professions

You may be aware that HEFCE and the Department of Health have established a Joint Review Group to explore how to promote more high quality research related to Nursing, Midwifery and Professions Allied to Medicine. In order to support this work a study has been commissioned to establish the current research landscape, and we are writing to seek the views of your department or school.

Attached is a one-page information sheet describing the study, and a questionnaire that we are sending to all relevant heads of departments. We are aware of the work involved in completing the survey, but hope that you will recognise that the data provided by this study will be extremely important in informing decision making on the future funding and operation of research. We therefore would strongly encourage you to complete the questionnaire.

There are three main points to clarify:

- 1) Please provide any clarifying remarks you wish adding additional sheets as required. All answers are absolutely confidential and anonymous; we ask for your name only to contact you if necessary.
- 2) We are aware that some departments will be producing their 2001 RAE returns. In such cases rather than answering each of our questions we would be happy to receive draft RAE returns. However, please check to see that the RAE return answers all our questions, and where it doesn't please add further information.
- 3) In the questionnaire we seek data about departments, but recognise that structures vary, so please provide answers in the way that makes most sense for your situation. Where data is aggregated (eg, for a single school) please note any disciplinary differences that exist.

We have sent this to you via email as most people in our sample have indicated that this would be easier for them. Please save this document onto your computer's hard drive, complete the questionnaire on your computer and email the completed form back to michael.traynor@LSHTM.ac.uk by **January 15th 2000**. For help or further information please contact me on 0207 927 2305 or at anne-marie.rafferty@lshtm.ac.uk.

Yours faithfully

Anne Marie Rafferty
John Fielden

Project Co-Directors

A HEFCE and Department of Health Study on: Promoting Research in Nursing, Midwifery, Health Visiting and Allied Health Professions

The Higher Education Funding Council (HEFCE) and the Department of Health have established a Joint Review Group to explore how to promote more high quality research related to Nursing, Midwifery, Health Visiting and Professions Allied to Medicine. In order to support the work of the Group a study has been commissioned to establish the current research landscape, and in particular:

- The current funding sources, levels and purposes of research.
- The provision and use of research infrastructure.
- Opportunities and mechanisms for collaboration between and across institutions, disciplines, and sectors.
- Mechanisms for exposing practitioners to research and involving them in contributing to and using research.

Through reviewing these areas the study will inform decision-making on how to promote capacity development and targeted public investment in high quality research relevant to nurses, midwives, health visitors and Allied Health Professions.

The study is being undertaken by an experienced consortium of four groups: The Centre for Policy in Nursing Research (CPNR), Commonwealth Higher Education Management Service (CHEMS), Higher Education Consultancy Group, and the Forum for R & D in Allied Health Professions (represented by its convenor).

A key element of the study will involve engaging with stakeholders, and working collaboratively with higher education institutions, professional bodies, NHS trusts, research funding bodies and relevant government policy organisations.

The study will combine survey methods with more in depth site visits and interviews held with professional bodies, funders and higher education institutions whose partnership links with the NHS are strong. An attempt will be made to identify examples of 'best practice' in strategic development and implementation of joint funding, research collaboration, user involvement and infrastructure development.

The study begins in mid-October 2000 and is due to be completed by April 2001. Further details can be obtained from John Fielden, Association of Commonwealth Universities, 36 Gordon Square, London WC1H 0PF (tel 0207 380 6700 email j.fielden@cwcom.net also <http://www.acu.ac.uk/chems/chems.htm>) and Anne Marie Rafferty, CPNR, London School of Hygiene and Tropical Medicine, Keppel St, London WC1E 7HT (tel 0207 927 2305 a.rafferty@lshtm.ac.uk also <http://www.lshtm.ac.uk/php/hsru/cpnr/cpnr.htm>).

A HEFCE and Department of Health Study on:

Promoting Research in Nursing, Midwifery, Health Visiting and Allied Health Professions

a) About your department

- 1 Please give your name and title.
- 2 What is the title of your department? (eg, School of Nursing Studies, Department of Physiotherapy)
- 3 Please give an email address or telephone number for further contact.
- 4 In which faculty/school is your department located? (eg, faculty of medicine)
- 5 How long has your department/school been part of a Higher Education Institution?

Please give number of years

--	--

Please give more details if necessary:

- 6 Please state the number of graduates for 1999–2000 from your Department at different levels:

Taught Masters courses	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	not known	<input style="width: 30px; height: 20px;" type="text"/>
Masters by research	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	not known	<input style="width: 30px; height: 20px;" type="text"/>
PhD studies	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	not known	<input style="width: 30px; height: 20px;" type="text"/>
Other research courses	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	not known	<input style="width: 30px; height: 20px;" type="text"/>
(please specify):	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>		

b) About the research assessment exercise (RAE)

- 7 Which, if any, of previous RAEs did any staff in your department enter:

1992	<input style="width: 30px; height: 20px;" type="text"/>	1996	<input style="width: 30px; height: 20px;" type="text"/>	None	<input style="width: 30px; height: 20px;" type="text"/>
------	---	------	---	------	---

8 What was your score?

1992		1996		None	
------	--	------	--	------	--

9 Are any staff in your Department/School entered into the 2001 RAE?

Yes		No	
-----	--	----	--

If **no**, jump to question 14.

10 If **yes**, could you identify the proportion of your total staff entered?

			are entered out of				total staff full-time equivalents
--	--	--	--------------------	--	--	--	-----------------------------------

11 Please list which units of assessment they will be entered in:

Unit of Assessment	Number of staff

12 Realistically, what score would you like to achieve in this exercise?

13 Would you be willing to return, in confidence, a copy of your 2001 RAE entry forms to us?

Yes, have enclosed this	
-------------------------	--

No	
----	--

Possibly at a later date	
--------------------------	--

If you have enclosed a copy of your RAE entry and the information is included in this entry, you may not need to complete all of the questions 14 – 33.

c) Your research strategy

14 Does your department have a written research strategy or plan that is known to staff?

Yes		No	
-----	--	----	--

15 Please list the priority areas for the development of research in the department.

16 In what ways have government priorities influenced both your research plan and your priorities for research development?

17 What special funding outside the normal resource allocation system, if any, has your Institution provided to support this plan or previous research activities?

d) Research Funding

18 Please list the research income for your department over the past four academic years and identify the source of funding:

	1996/7	1997/8	1998/9	1999/2000
Research councils				
Charities				
Department of Health				
Education and Training consortia				
NHS Regional funding				
European Union				
Special HEFCE support (eg, ColIR)				
Other (please specify)				
Total				

19 By what mechanisms does your institution fund research in your department? (For example, does it use a formula - and if so what is it? Are there any research awards that it provides which you can compete for? etc)

26 What are the main barriers to undertaking research in your department?

27 Irrespective of RAE criteria, what do you think are the three best indicators for assessing the quality of research in the Nursing, AHPS, and related fields?

g) Staffing

28 How many of your staff have PhDs?

			out of a total of			
--	--	--	-------------------	--	--	--

29 How many research publications in books or referred journals have your staff produced over the past four years?

30 What is your department doing to enhance the research capability of staff? In particular, what staff training and development strategies are you pursuing to enhance research?

31 A lack of time is often cited as a barrier to research. What - if anything - does your department do to try and ensure that staff time is available?

32 What are the implications of promotion criteria for staff in your department on how research can be enhanced?

h) About your research links

We are particularly interested in identifying the level and character of links between nursing/AHPs and related departments and others.

- 33 Are there any other **academic disciplines *within your own institution*** with which your department has collaborated over the last five years in its research activity? If so, please list them here:

discipline	project	funder	funding amount

- 34 Are there any **other higher education institutions** with which your Department has collaborated over the last five years in its research activity? If so, please list them here:

institution	project	funder	funding amount

- 35 Are there any **NHS trusts, Social Service Departments, Local Education Authorities or other similar bodies** with which your Department has collaborated over the last five years in its research activity? If so, please list them here:

Name of collaborator	Project etc.	funder	funding amount

- 36 Are there any non-funded or informal links between your department and service providers? Please describe them here.
- 37 From your experience of the above, what have been the most successful and least successful collaborations? Please say why. Can you identify any barriers to collaboration which you feel should be removed?
- 38 Are there any other comments you would like to make about the development, funding and factors that contribute to productive research links?

Thank you for your participation in this survey. Please return this completed form by **January 15th 2000**. If you are sending by mail, please address to Dr Michael Traynor CPNR, London School of Hygiene and Tropical Medicine, Keppel St, London WC1E 7HT.

Appendix III

List of contractions used for organisations' names in Tables 4.11 to 4.16

<i>Contraction</i>	<i>Organisation's name</i>
A & O Reg	Anglia & Oxford Region, NHS
Allen&Hanbury	Allen & Hanbury plc (Glaxo plc)
BBSRC	Biotechnology & Biological Sciences Research Council
Br Heart Fdn	British Heart Foundation
Br M Squibb	Bristol Myers Squibb, Inc (USA)
Brit Council	British Council
CA MRC	Medical Research Council (Canada)
Canc Res C	Cancer Research Campaign
Chest Ht Str	Chest Heart and Stroke Association
Dept Health	UK Department of Health
Dept Int Dev	UK Department for International Development
Diabetes UK	(formerly British Diabetes Association)
Eng NB Nurs	English National Board for Nursing
ESRC	Economics and Social Sciences Research Council
Eur Comm	European Commission
Fisons	Fisons plc
Ghana Govt	Government of Ghana
Glaxo Wellco.	GlaxoWellcome plc
HG Wallace	HG Wallace Ltd, Colchester
Hlth Pro RT	Health Promotion Research Trust, Cambridge
Hoffman LaR	Hoffman LaRoche sa (Switzerland)
Howard Fdn	Howard Foundation (US)
IDRC, CA	International Development Research Centre (Canada)
Imp Canc RF	Imperial Cancer Research Fund
INSERM	Institut National de la Santé et de la Recherche Médicale (France)
Kabi Pharm.	Kabi Pharmacia AB (Sweden)
Kellogg Inc	Kellogg Inc (USA)
King's Fund	King Edward's Fund for London
London Univ	University of London funds
MacArthur F	MacArthur Foundation (USA)
Macmillan N	Cancer Relief Macmillan Fund
Max Planck	Max Planck Gesellschaft (Germany)
Med Res C	Medical Research Council (UK)
Mental Hlth F	Mental Health Foundation (UK)
N & Y Reg	Northern & Yorkshire Region, NHS

N W Reg	North West Region, NHS
Nat Inst Hlth	National Institutes of Health (USA)
Nestlé Fdn	Nestlé Foundation (Switzerland)
NThames Reg	North Thames Region, NHS
Nuff Prov H	Nuffield Provincial Hospitals Trust
Nuffield Fdn	Nuffield Foundation
Nutricia,C&G	Nutricia and Cow & Gate Ltd
Roy Col Nurs	Royal College of Nursing
Royal Bank S	Royal Bank of Scotland
S & W Reg	South & West Region, NHS
S Thames Reg	South Thames Region, NHS
Shell T&T	Shell Transport & Trading plc
SK Beecham	SmithKline Beecham plc
St Thomas H	St Thomas's Hospital Special Trustees
Thai Gov't	Government of Thailand
Trent Reg	Trent Region, NHS
UNICEF	United Nations International Children's Emergency Fund
Unilever plc	Unilever plc
US AID	United States Agency for International Development
WHO	World Health Organization
Wellcome Tr	Wellcome Trust
Wessex Med	Wessex Medical Trust, Southampton Hospital

Appendix IV

The potential benefits of further investment in research in nursing, midwifery and professions allied to medicine

By: Dr Steve Hanney, Brunel University

There are three main sections to this Appendix:

1. A review both of how benefits from health research can be conceptualised, and of previous attempts to assess *ex post* benefits (i.e. based on actual results rather than forecasts).
2. A discussion of how these ideas can be applied to research in nursing, midwifery and AHPs, illustrated by case studies.
3. An analysis, informed by the literature, of how in general a case can be constructed showing potential benefits of further investment in research in nursing, midwifery and AHPs.

Section 1

Assessing the benefits of health research

1.1 A major report, 'Exceptional Returns: The Economic Value of America's Investment in Medical Research', last year made the dramatic, but perhaps rather speculative claim that the monetary value of the increased longevity in the USA between 1970–1990 was \$57 trillion ('Funding First', 2000, available at: www.laskerfoundation.org/reports/reports.html). There has long been a debate about how far increased life expectancy is due to improvements in health, which are in turn based on medical research. McKeown (1979) famously argued that improvements in health, commonly attributed to biomedical research, should more accurately be attributed to nutritional, environmental, and behavioural changes. However, the major contribution to increased longevity in the USA between 1970–90 is the reduction in mortality from cardiovascular disease. It is claimed that at least one third of this reduced mortality 'is apparently the result of medical research that led to new drugs and treatment protocols' ('Funding First', 2000, p 8). If even just a third of the reduced cardiovascular mortality came from medical research then 'the return on the investment averaged \$500 billion a year' (p 8). The report recognises that treatment costs should also be brought into the equation, but it claims that even if the extreme assumption is made that all health care expenditures are inputs in life-extension, then 'the gain in the value of life, net of what was spent to attain the longer life, is just 15% smaller' (p 7).

1.2 The author is not aware of any thorough review and application of the 'Funding First' methodology to the UK, although some of the reservations about this approach are discussed at various points below. Furthermore, it operated at an overall level, rather than attempting to assess the benefits of particular research programmes or fields. Below we review a range of approaches, including attempts to assess the benefits from specific programmes and even projects. But before doing so, it is worth noting that the real significance of the 'Funding First' analysis is that, whatever the causes of previous reductions in mortality, the sums involved are so large that it might be possible to argue that if medical research made only a small contribution to future gains in longevity, the value of them would be enormous. This issue is revisited in Section 3.

1.3 Previous analysis (Buxton and Hanney, 1998) suggests that at least five alternative conceptual foci for assessing the value for money from an R&D programme, such as that of the NHS, can be identified.

1.3.1 Knowledge generation

This is in essence the traditional academic approach, which measures the quality and quantity of publications, and possibly citations. Whilst these are important, they are a long way from being sufficient once the premise has been accepted that, for the NHS, R&D is not an end in itself.

1.3.2 Cost savings

This approach might appeal particularly to managers, and some results have been published which strive to give illustrative examples of cost savings resulting from research. For example, work by the US National Institute of Health focused principally on savings that might be attributable to some of their research projects (NIH, 1993). This approach, however, would ignore the broader objectives of the NHS and is not an adequate basis for assessing the value of the R&D programme.

1.3.3 Life-years or QALYs

Increasingly, health care is being evaluated in terms of QALYs (quality-adjusted life years) gained, and costs per QALY gained, so it might be appropriate to use the same concept when assessing research. A good example of a similar approach is the work of Detsky (1989) who attempted to measure whether clinical trials were a cost-effective investment by using the more limited concept of the cost per life-year gained as a result of trials. He produced figures emphasising the small cost of the research relative to the costs of the therapy in use, but he made several assumptions that would appear to diverge significantly from the reality. He assumed that a clinical intervention would be either completely adopted (or not) depending on the results of the single clinical trial, and that the intervention would not be adopted in the absence of the trial.

1.3.4 Monetary value

Although this is perhaps what people might most readily think of as being the 'payback' or 'return' on an investment, the extraordinary difficulties involved in attempting to put a monetary value on the outcomes of health care itself become compounded when assessing the value of R&D and its effect on improving health outcomes. A monetary approach was used in a report for the Department of Transport to estimate the value of some of their R&D projects (Robertson, 1995). This involved using a monetary valuation of lives saved as a result of improved road safety. Although an official DH report has recently attempted to put a monetary value on a QALY (Department of Health, 1995), there are enormous difficulties in using such an approach to value health research. Essentially, however, this is the approach in the 'Funding First' report, but it only puts a value on reductions in mortality – not morbidity – which is likely to reduce its relevance to research in nursing, midwifery and AHPs. The theoretical approach to valuing a life in the 'Funding First' report is based on research that attempts to derive this figure by researching into individuals' willingness to accept a risk. Although this is an accepted approach in economics, in the US (as in the UK) it has not previously been widely used to produce the social value of life that can be applied to assess the benefits of health care.

1.3.5 Non-additive multidimensional perspective

This method combines aspects of the other approaches and is recommended in work for the DH (Buxton and Hanney, 1994 and 1996; Croxson et al, 2001). The details are set out below.

1.4 The Buxton and Hanney categorisation consists of a non-aggregated multidimensional description of the potential benefits specifically from health research, although much of the thinking could be applied to other sectors as well. This categorisation, set out in Figure 1, consists of five main types of benefits, most of which contain further subdivisions.

Figure 1
Categories of payback

a)	<i>Knowledge</i>
b)	<i>Benefits to future research and research use:</i>
	i) the better targeting of future research;
	ii) the development of research skills, personnel, and overall research capacity;
	iii) a critical capability to utilise appropriately existing research, including that from overseas;
	iv) staff development/educational benefits.
c)	<i>Political and administrative benefits:</i>
	i) improved information bases on which to take political and executive decisions;
	ii) other political benefits from undertaking research.
d)	<i>Health sector benefits:</i>
	i) cost reduction in the delivery of existing services;
	ii) qualitative improvements in the process of service delivery;
	iii) increased effectiveness of services, eg, increased health;
	iv) equity, eg, improved allocation of resources at an area level, better targeting and accessibility;
	v) revenues gained from Intellectual Property Rights;
	vi) organisational development.
e)	<i>Broader economic benefits:</i>
	i) wider economic benefits from commercial exploitation of innovations arising from R&D;
	ii) economic benefits from a healthy workforce and reduction in working days lost.

(Source: Buxton et al, 2000, and adapted from Buxton and Hanney, 1996)

a) Knowledge benefits

Contribution to knowledge (category *a*) constitutes the first step in a rational model of payback. Knowledge may be entirely new, confirmatory, or even simply provide local evidence of a fact long established in the world literature. Traditionally, peer review of the contribution to knowledge has been the key measure; more recently it has been shown that it can be usefully supplemented by bibliometric techniques and patent analysis (see, for example, Anderson, 1989; Commission of the European Communities, 1991).

b) Benefits to future research and research use

These benefits (category *b*) can be significant, although their place in the model developed later is complex. The better targeting of future research (category *bi*) might flow particularly from methodological research and from analysis of observational data (Chalmers, 1992). Some indication of this may be provided by citations analysis. The development of researchers with analytical skills, knowledge of the system, and a web of professional contacts is also of major significance (category *bii*). The ability to utilise, or capture, existing research, including that from overseas (category *biii*), is a payback from having a local research capacity. Despite science exhibiting some of the features of public goods, firms with better in-house scientific research programmes often more effectively exploit and capture outside scientific information (Gambardella, 1992; Rosenburg, 1990). Therefore, the ability 'to be able to learn and benefit from R&D conducted elsewhere needs an R&D capability which is sufficiently "state of the art"' (OST and PREST, 1993, para 6.18; see also Committee on Science,

Engineering and Public Policy, 1999). Staff development/educational benefits (category *biv*) encompass the benefit that can arise through practitioners participating in a research project. The benefits here refer to the service abilities of staff rather than research capacities, which are already covered in category *bii*. Involvement in a research project may make practitioners more receptive to the findings of other research projects and the general concept of evidence-based medicine. If such benefits do arise, they may be particularly valued at a time when health services are keen to achieve a major change towards a widespread culture of research-led or evidence-based practice (see Peckham and Smith, 1996).

c) Political and administrative benefits

These benefits (category *c*) include in category *ci* not just an improved information base, but also evidence that decisions (about national or local policies, professional clinical guidelines etc.) were influenced by the improved information base. Surveys of decision-makers and analysis of documents might reveal this. However, there are various reasons why it is difficult to know what impact research has had on policymakers. These include the frequent time lags before research has an impact, and the difficulty of identifying the impact a specific research projects makes when combined with all the other factors impinging on policy-makers. Therefore, it is most appropriate in case studies to use triangulation techniques, involving several types of information (documentary analysis, interviews, etc), and to interview a range of people with different perspectives on the particular issue. Other political benefits (category *cii*) include the use of research to deflect criticism by showing the problem is being investigated; delay immediate decision-making; and justify decisions taken for other reasons.

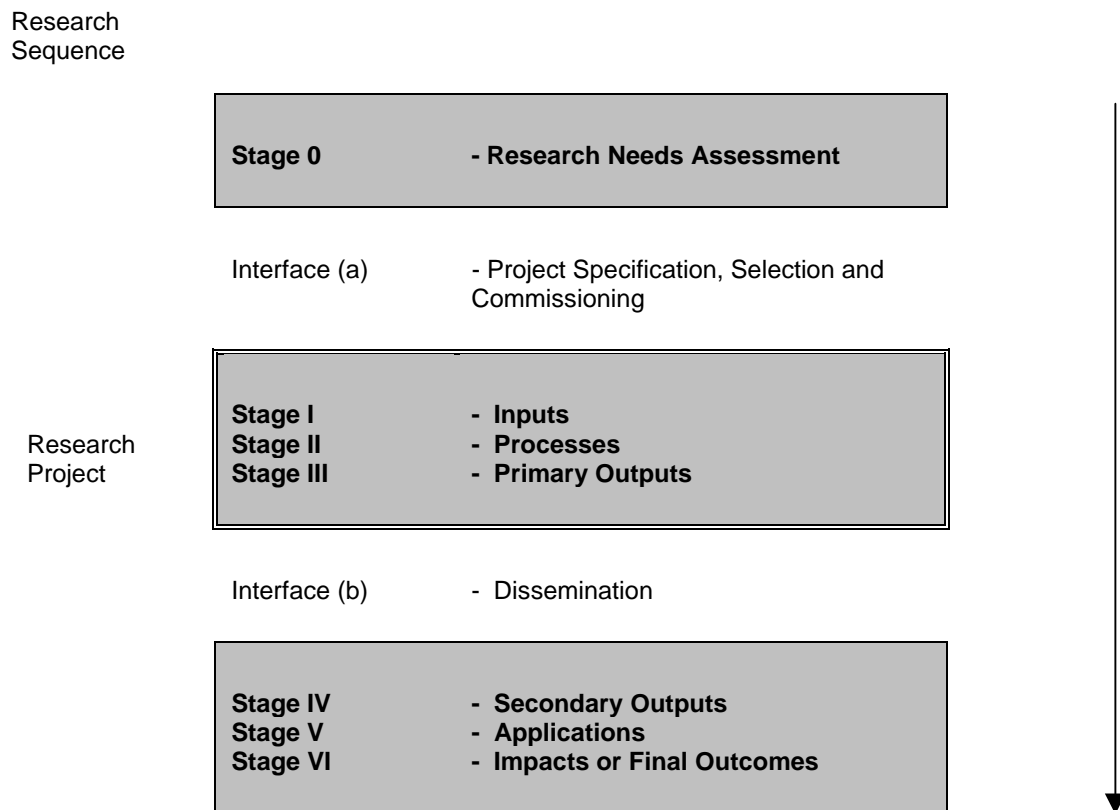
d) Health benefits

These benefits (category *d*) might be viewed as the 'real' paybacks from the perspective of those running the services – and those who need to be convinced of the value of 'diverting' resources from provision of services to R&D. These clearly include cost savings (category *di*), although measurement difficulties arise in estimating whether potential savings are in practice realisable, and in ensuring that costs are not simply being transferred elsewhere. Improvements in the process of care delivery (*dii*) in health services could, for example, include reductions in waiting times. Various measures of patient satisfaction exist, and contingent valuation techniques based on patient preferences are a possible method of assessing the value of quality changes (see Cave et al, 1994, for a general discussion; Bryan et al, 1998; Ratcliffe and Buxton, 1999, for specific examples of the health sector). Greater effectiveness resulting from new or better services may lead to increased health (*diii*) – the 'health gain'. If the measurement of payback is to be used for comparative purposes, this gain will need to be expressed in terms of a common unit, probably a utility construct such as the Quality Adjusted Life Year (QALY). This unit attempts to take into account the increased period patients live following an intervention, and their health status during that period. The analysis of the benefits from the evaluation of the heart transplant programme provided an example of a case study in which the HERG team assessed benefits in terms of both cost savings and QALYs gained (see Buxton, 1994; Buxton and Hanney, 1996). Other benefits may take the form of increased equity (*div*). Measurement could be attempted by assessing the minimisation of variation in the desired definition of equity. Revenue gained by the NHS from Intellectual Property Rights (category *dvi*) refers to the income from the licensing of, and royalties from, intellectual property within the NHS. This is conceptually different from the broader economic benefits that might accrue from the development of new devices, etc (see below). Organisational development (category *dvi*) reflects the fact that community-based and voluntary organisations, as a result of their participation in research, may experience increased funding and resources, an extension of networks, higher local or national status, or other organisational development. This may then lead to an eventual enhancement in the services provided.

e) *Broader economic benefits*

These benefits (category e) include those resulting from commercial exploitation of innovations arising from R&D (e). For this aspect of payback, methods similar to those used by the private sector to measure returns from R&D may be appropriate (see Mansfield 1991; Office of Technology Assessment, 1986; OST and PREST, 1993; Smith, 1991). Specific work in relation to technology transfer for health research has been undertaken (IMPEL, 1993). With the benefits from a healthy workforce (eii) the focus is on the value of production gained. Typically, a human capital approach has been used, in which potential future earnings are calculated for people who, as a result of advances in medical research, can continue to contribute to national production (Mushkin, 1979; Weisbrod, 1983). There is, however, a real concern that such measures may overestimate gains in an economy where there is unemployment (Koopmanschap and Rutten, 1993), and that they may have unacceptable equity implications.

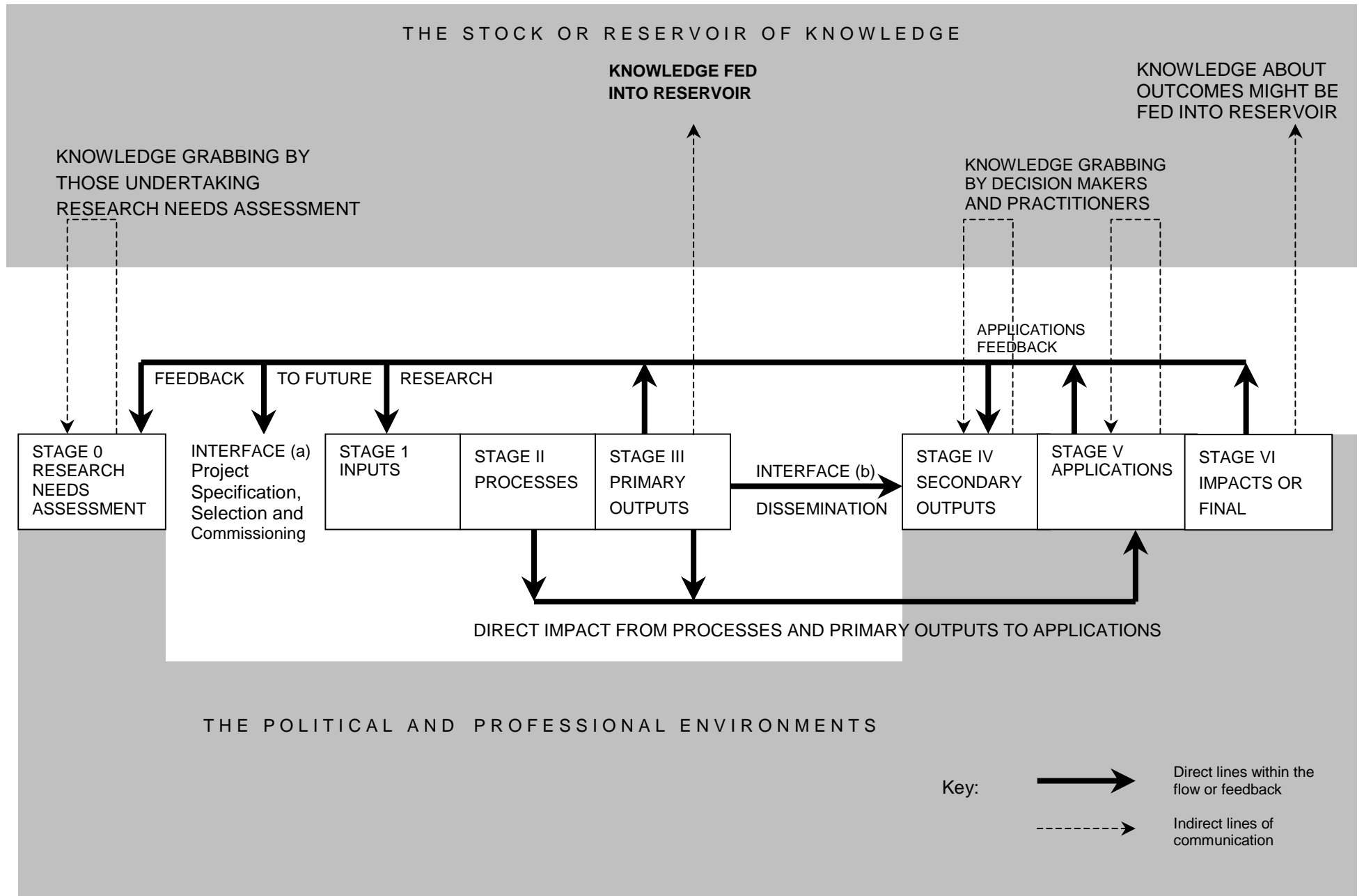
Figure 2
Outline input-output model for assessing the payback from applied research



(Source: Buxton and Hanney, 1996)

1.5 In helping the process of assessing payback, Buxton and Hanney (1996, 1997) used a sequential model to characterise the process whereby R&D generates outputs and final outcomes (see Figure 2). It starts with the identification of R&D needs. Then there is the first of two interfaces between the political and professional environment and the research processes. The permeability of the interfaces (Kogan and Henkel, 1983) can be important if outcomes are to be achieved, and the first interface involves the commissioning and specification of research to meet the identified need. The primary, or initial outputs emerge from the subsequent research processes and include publications and trained researchers. There is then the second, or dissemination interface when findings are relayed to the political or professional environment. This is followed by a stage which may include the generation of secondary outputs in the form of policy statements or administrative decisions (manifest

in, for example, national ministerial decisions or local guidelines) and by an applications stage when research findings are put into practice. Final outcomes result from this and consist of both health service related and more general economic benefits. Although in its simplest form this is a linear model (see Figure 2), it can incorporate and highlight the variety of possible feedbacks that occur, and can be contextualised within a model recognising the existence of a 'knowledge pool' (Gibbons and Johnston, 1974) into which research findings are fed and in which ideas and people interact (Cozzens, 1997; Hanney et al, 2000) (see Figure 3). The existence of such a knowledge pool, and the fact that impacts of research are often unpredictable and spread over a long period (see, for example, Weiss, 1980), highlight the fact that it is desirable for any assessment of R&D benefits to recognise the norms of research.



(Source: Adapted from Hanney et al, 2000)

Section 2

Applying payback analysis to research in nursing, midwifery and the allied health professions

2.1 This appendix concentrates on looking at benefits in two particular areas: efficiency savings from proper evaluation of care, and improved health outcomes. These are essentially covered in Buxton and Hanney's payback categories *di* and *diii*. Both are major categories of benefit and can be used. Two examples from the USA illustrate the points. First, it has been suggested that the research of Brooten et al (1986), on early hospital discharge and home follow-up of very low weight infants led to cost savings and enhanced health outcomes. Second, the work of Aiken et al (1994), on skill mix in nursing has resulted in reduced mortality through better nursing care. It is more likely, however, that most of the health gain resulting from research in nursing, midwifery and AHPs will be through reduced morbidity.

2.2 The great advantages of the multidimensional categorisation described in Section 1 are its flexibility and comprehensiveness. Therefore, a case could also be made that many of the other benefits in the categorisation are also relevant for research in nursing, midwifery and AHPs. For example, an indirect benefit is that it is possible that by being involved in undertaking a research project, nurses and their colleagues might be more likely to look favourably on the general contribution that research can make, and thus have a greater appreciation for Evidence-Based Health Care (EBHC) (category *biv*). More directly, it is likely that research in nursing and the therapies could also result in improvements in the way services are provided to patients, which, although not necessarily directly resulting in cost savings or health gain, do improve the quality of the way the service is delivered (category *dii*) and thus increase patient and staff satisfaction (and possibly, indirectly result in health gain). Similarly, particularly in the therapies, it is likely that research that led to improvements in the service could result in a reduction in the number of days of employment lost through illness, thus contributing in category *eii*. The exemplars described in Appendix II to the Main Report illustrate a variety of ways that UK research in nursing, midwifery and AHPs could provide payback, including research on treating back pain.

2.3 The payback assessment framework described in Section 1 was essentially developed to be relevant for applied health research. It is therefore likely to be relevant for much of the research in nursing, midwifery and AHPs. The assessment of payback from North Thames R&D (Buxton et al, 1999 and 2000) included a case study based on some research of two occupational therapists (Soper and Thorley, 1996). The case study was organised according to the payback framework, which enabled the case study author to demonstrate how payback had arisen in many of the payback categories. Some of the key points from that case study are described here. The OTs worked in a department that provided a service for adults with severe learning difficulties. The researchers wanted to find a better approach, and the aim of the project was to evaluate the effectiveness of applying to the adults an OT programme based on the principles of sensory integration (SI) theory and treatment. The R&D Directorate encouraged the application, but on the advice of reviewers suggested that it be strengthened by talking to an academic advisor. The research findings were published in the 'British Journal of Occupational Therapy' (Soper and Thorley, 1996).

2.4 The benefits were assessed using the sequence in Figure 2 and the categorisation in Figure 1. The researchers claim to have gained research skills, and this project could be seen as a successful example of how research can be conducted outside the major research centres. Therefore there is probably some payback in category *bii* (the development of research skills, personnel and overall research capacity). According to one of the managers, it has helped establish a profile for the trust that they are in the business of research to improve the service in the whole trust. There was a general

feeling that the project helped OTs in the institution develop a greater appreciation of Evidence-Based Health Care, but also a recognition that the wider climate too was changing in this direction. There has probably been payback, therefore, in category *biv* (staff developments/educational benefits in terms of greater appreciation of the contribution research can make). The research built on extensive earlier work in the USA and made that theory practical for a client group in the UK. There is, therefore, payback in category *biii* (a critical capability to utilise appropriately existing research, including that from overseas).

2.5 The project's findings seemed to have strongly influenced some of the service standards and audit tools used within the local unit. The researchers have become closely involved with standard setting in some areas relating to sensory needs (including specific sensory impairments) and living environments. They have influenced the OT standards for the trust. The project has impacted on standards in relation to the reprovision activities. Furthermore, according to one manager, the work is now informing discussions about resource levels for OT in at least the two health authorities served by the trust. All this indicates some level of payback, at least at a local level, in category *ci* (improved information bases on which to take political and executive decisions).

2.6 In the case study, some assessment was attempted of how far the findings had been applied in terms of impacting on the work of staff. The research is seen by managers as not only having made a 'tremendous' impact within the unit, but also as impacting more widely in the community outreach work and spreading into other units and services. These include services for people with a secondary diagnosis of mental health problems, and people with head injuries. A series of courses were run by the researchers, and the replies to questionnaires sent as part of the case study indicated that the courses had helped attendees understand and make provision for the sensory needs of their clients.

2.7 In terms of the final outcomes, or impacts, or benefits of the research project and subsequent activities, there is a clear health gain in terms of quality of life for individuals, although this tends to vary depending on the exact nature of an individual's disabilities. This is payback in category *diii* (increased effectiveness of services). The staff in the trust, and elsewhere, who have been influenced by the research and courses, and who treat clients or advise on their environments, etc, will be responsible for clients numbering hundreds at least.

2.8 There are probably improvements in the processes of service delivery (category *dii*) as a result of the research and courses. It is seen as a pleasurable therapy to give. Partly because clients might be less difficult to cope with, and partly through the contribution they themselves can make, carers are thought to find it a more positive and less stressful experience dealing with clients who have received therapy, and/or are in a more appropriate environment, as a result of a sensory assessment. Given that these are a group of clients who are often socially excluded but who are now receiving much more appropriate care than previously, it has been argued that there is an equity gain (category *div*).

2.9 How far the research leads to cost savings (category *di*) is debated. Clearly the provision of the better service does have resource implications. On the other hand there might be savings in terms of less damage to accommodation, clothing, etc. There might be a reduction in the amount of care required, although this point is contested and has certainly not been proved.

2.10 Finally, for those clients with a less severe disability who respond well to the supported employment scheme, there could be a small gain in category *eii* (economic benefits from a healthy workforce).

2.11 This case study has clearly shown that one therapy research project definitely produced a range of benefits.

Section 3

The potential benefit of further investment in research in nursing, midwifery and the allied health professions

3.1 Much of the previous work that has attempted to assess the potential benefits of future research has focussed on the issue of developing prioritisation techniques for projects, programmes or topics. Enormous difficulties have been encountered in doing this (OTA, 1986; Smith, 1991; OST and PREST, 1993; Buxton and Hanney, 1997). A theoretically attractive approach for selecting technologies for assessment was developed by Eddy (1989), but seems to have been little used (Buxton and Hanney, 1994). Nevertheless, health technology assessment (HTA) seems to be the area of biomedical/health research where most work has been undertaken in assessing the potential value of research (see, for example, Institute of Medicine, 1992; Phelps and Parente, 1990; Torgerson et al, 1996; Claxton and Posnett, 1996). Many of these approaches were reviewed by Harper et al (1998), who then produced a model of ex ante (i.e. forecast) evaluation of likely payback to a HTA. The conclusion in another recent study was that, 'it is feasible to conduct ex ante assessments of the value for money of HTA for specific topics. However, a considerable amount of work is required to ensure that the methods are valid, reliable, consistent, and are an efficient use of valuable researcher time' (Davies et al, 2000). One ex ante payback study had an impact by contributing to the business case which was used when decisions were made about the funding of the MRC's multimillion pound trial of Hormone Replacement Therapy (Townsend and Buxton, 1997).

3.2 Although this type of analysis might be helpful for prioritising HTAs, it is unlikely to contribute much to building a case that can demonstrate the potential benefit from further research across the whole field of nursing, midwifery and allied professions. There are, however, a couple of approaches that might be more useful. First, going back to the analysis in the 'Funding First' report, it is claimed that one of the background papers (Murphy and Topel, 1999) has shown what the economic value would be of reducing deaths from a series of diseases. The value of eliminating heart disease would be \$48 trillion, and cancer \$47 trillion. This means that 'the economic value of extending life is so large, that research generating even modest advances against major killer diseases is bound to be a superb investment' ('Funding First', 2000, p 8). These estimates mean that innovation based on medical research that reduced overall cancer or cardiovascular deaths by only 1% would be worth almost \$500 billion or about 6% of US Gross Domestic Product (Murphy and Topel, 1999). The figures for the USA are so large because of three main factors:

- (1) the \$5,000,000 value of life drawn from economic research on individuals' willingness to take on risk;
- (2) the magnitude of the reduction in death rates over the 1970–1990 period; and
- (3) the sheer size of the US population, to which increases in the stock of knowledge can be applied" (Murphy and Topel, 1999, p 25).

3.3 There are a number of difficulties with this analysis. The cost of future therapies is not clear. Furthermore, it might be, especially in the UK, that the large benefits of increased longevity would point to an increase in expenditure on health care directly, rather than necessarily funding more research. In reality, the figures probably point to a increase in expenditure on both health care and health research. The figures in the UK will not, however, be as large as in the USA. Clearly factor (3) above relating to population size will be much less significant for the UK. Furthermore, the value for a life identified in the 1995 DH report for the UK, which was based on willingness to pay, was £728,000 in 1994. This is about $\frac{2}{9}$ of the US figure. Even that, though, could translate into a benefit for research that reduced

cardiovascular or cancer mortality by just 1%, perhaps being worth a very large sum of money. Therefore, any calculation that showed that research in nursing, midwifery and AHPs might have any chance of reducing mortality in the National Service Framework priority areas of cardiovascular disease or cancer, would make the research worthwhile – indeed, would almost certainly pay many times over for a whole portfolio of research in nursing, midwifery and AHPs. It might be feasible to speculate on areas where a contribution could be made. For example, research in the field of dietetics could lead to stronger evidence about the contribution that improvements to diet and exercise could make to combating heart disease and cancer. Research that showed how best to put this information over effectively to the public could also make a major contribution.

3.4 Clearly, more basic biomedical or clinical research is likely eventually to produce most dividends in reducing mortality, and most research in nursing, midwifery and AHPs will not lead to reductions in mortality. Therefore other arguments also have to be made to show the potential value of the broad range of research in these areas. It seems not unreasonable to claim that the benefits from research shown in Section 2 would be likely to occur from at least a selection of the future research in nursing, midwifery and AHPs, and would occur across the range of payback categories.

3.5 Once more research is funded in these fields, and capacity builds, it is likely that research benefits will flow. In addition, a multiplier effect could operate whereby a wider range of research funding bodies are encouraged to fund research in these fields, which might in turn generate further benefits as a result of the initial DH/HEFCE investment.

3.6 Finally, it might be worth examining how a demand model for the funding of research in nursing, etc, by the DH and HEFCE, would fit neatly with the payback framework described in Section 1. Research that fits with key elements of the framework is likely to have built into it several elements that are conducive to generating payback (see Buxton and Hanney, 1996, for a fuller discussion). For example, research that involves a needs assessment process involving a range of stakeholders, and maintains contact with them during the project, is more likely to produce research that results in eventual payback. These conditions fit neatly into the 'Priority and Needs' approach currently being developed by DH (DH, 2000). On the other hand, research that is of quality, and where academic researchers have been involved in discussions about feasibility and attractiveness before the nature of the research tender document is settled, is again more likely to produce payback. Therefore there is a role for HEFCE in this model, in helping to fund the academic research capacity that can undertake, or collaboratively lead quality work in nursing, midwifery and AHPs. The case study in Section 2 showed the valuable role academic advisors can play in working with practitioners when they undertake research. Buxton and Hanney (1996 and 2000) build on the work of Weiss and Bucuvalas (1980) to show that decision makers are less likely to want to implement the findings of research if they believe the work is not of the highest methodological quality. This is because they would not want critics of any decision to be able to undermine their decision by claiming the research behind it was flawed.

3.7 It should be possible to construct a demand model for further research in the fields of nursing, midwifery and AHPs that is compatible with the missions of both the DH and HEFCE, and is likely to lead to future benefits.

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